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-- End of Project Table of Contents --

SECTION 01 11 00

SUMMARY OF WORK
03/26

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. For references without a year, use the current published version.

CPS ENERGY (CPSE)

CPSE/ESS	(2021) Electrical Service Standards
CPSE/GSS	(2021) Gas Service Standards

U.S. ARMY CORPS OF ENGINEERS (USACE)

EM 385-1-1	(2024) Safety -- Safety and Occupational Health (SOH) Requirements

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

29 CFR 1910	Occupational Safety and Health Standards
29 CFR 1926	Safety and Health Regulations for Construction

1.2 SUBMITTALS

Government Acceptance or Approval does not remove responsibility from the Contractors for their actions or liability.

Government approval is required for submittals with a "G" or "S" classification. Refer to Section 01 33 00 SUBMITTAL PROCEDURES for requirements when a classification other than "G" or "S" are used. Submittals not having a classification are for information only. Submit the following in accordance with Section 01 33 00 SUBMITTAL PROCEDURES:

SD-01 Preconstruction Submittals

Salvage Plan; G

1.3 DEFINITIONS

1.3.1 Scope Review Meeting

Government led meeting held concurrently or separately with Contracting Kick-Off/Pre-Construction Meeting. Government to determine length of meeting based on project scope. Meeting will review Government provided specifications with the contractor and Contracting. Government will provide clarification, direction, or answer contractor questions pertaining to the specifications.

1.4 WORK COVERED BY CONTRACT DOCUMENTS

1.4.1 Project Description

The work includes Repair Carswell Ave. at JBSA- Lackland Phase3 from Truemper road to Femoyer Street, by full depth replacement and address drainage issues on both sides along Carswell Street and incidental related work. Refer to UFC 1-200-01 for applicable DoD codes and standards as well as paragraph APPLICABLE CODES & STANDARDS. Refer to paragraph SPECIFICATIONS for additional project requirements. Contractor shall refer to Appendix D and be familiar with the HAZMAT report's findings, prior to beginning any work on the facility. Contractor shall verify dimensions & conditions prior to any work. Special inspections and testing required by the DOR shall be performed by the Contractor at no additional cost to the Government. This Task Order (TO) is to perform Road repair and drainage issues on Carswell Ave Phase 3 under the Indefinite Delivery, Indefinite Quantity (IDIQ) Multiple Award Construction Contract (MACC) for military facilities at Joint Base San Antonio (JBSA), Texas.
Work shall be performed in strict accordance with current Federal, State, regulations, Ordinances, and Design and Construction standards whether included, referenced, or implied to complete acceptable and fully functional facilities for the Federal Government at JBSA. The general requirements and construction standards are included in the Basic MACC Contract. Specific requirements for this project are included in this Task Order. However, it is the contractor's responsibility to secure access to specific governing criteria as required. The Government relies on the contractor to follow and implement the necessary codes as the expert General Contractor (GC). Contractor shall perform construction in accordance with (IAW) the specifications within the contract & task order and shall submit for approval (if applicable), modified final edition Unified Facilities Guide Specifications (UFGS) as required. The contractor shall follow and abide by, but not limited to the Unified Facility Criteria (UFC) 4-022-03, other UFCs as referenced or applicable, and referenced industry code. The reference website for UFGS and UFC documents is www.wbdg.org

List of Appendices:

Appendix A - Specification Attachments
List of items is shown in the Table of Contents of each applicable specification section.

Appendix B - B Available Data

Appendix C - Environmental
Appendix D - Design Analysis
Appendix E - IFC Drawings
Appendix F - Geotech Report
Appendix G - Submittal Register (draft)

1.4.1.1 General Guidelines

1.4.1.1.1 Safety

Contractor shall perform all work in accordance with 29 CFR 1910, 29 CFR 1926, EM 385-1-1, and Section 01 35 26 GOVERNMENTAL SAFETY REQUIREMENTS.The contractor is responsible for adhering to the traffic control plan and ensuring pedestrian safety during construction.

Contractor shall perform all work in accordance with 29 CFR 1910, 29 CFR 1926, and EM 385-1-1.

1.4.1.1.2 Privatized Utilities

a. Modification to any of American Water's assets requires that a Connection Charge Agreement between the Prime Contractor and American Water be entered into. All work to American Water assets will be performed by them, at the Prime Contractor's expense. American Water standards can be found at the following link: https://www.amwater.com/corp/Products-Services/Military-Services/joint-base-san-antonio

b. Modification to any of CPS Energy's assets requires that an Application for Service be submitted and a Service Agreement be entered into by the Prime Contractor with CPS Energy. Work to CPS Energy's natural gas and electrical systems and equipment will be performed by the entity indicated in the CPSE/ESS and CPSE/GSS at the Prime Contractor's expense.

1.4.1.1.3 Environmental

The following items are provided as clarification of intent and direction to the requirements of 01 57 20 ENVIRONMENTAL PROTECTION.

a. All waste and recyclable material generated at the project site shall follow the requirements of Section 01 57 19 TEMPORARY ENVIRONMENTAL CONTROLS01 57 20 ENVIRONMENTAL PROTECTION and 01 74 19 CONSTRUCTION WASTE MANAGEMENT AND DISPOSAL.

b. All waste and recyclable material shall be profiled. When required, waste and recyclable material shall be characterized by lab analysis using applicable methods specified by Section 01 57 19 TEMPORARY ENVIRONMENTAL CONTROLS01 57 20 ENVIRONMENTAL PROTECTION before material is profiled. Analytical Report for each characterization shall be submitted for review by the JBSA Environmental Office. Profile Sheets shall be generated using the approved TCEQ landfill's profile sheet. Profile Sheets for material to be recycled shall utilize the applicable form in *Appendix D*. Profile sheets shall only be signed by a representative of the JBSA Environmental Office. Current JBSA approved TCEQ landfills for use are as follows:

(1) Covel Gardens Landfill

(2) Tessman Road Landfill

c. All waste and recyclable material shall be manifested directly to the landfill or recycling location. Transportation to transfer stations are not allowed. All manifests shall only be signed by a representative of the JBSA Environmental Office.

d. All costs associated with disposal of waste and recyclable material shall be the responsibility of the Contractor.

e. All Generator copies of manifests and weight tickets shall be returned to the JBSA Environmental Office, through the Contracting Officer's Technical Representative.

1.4.1.1.3.1 Site Stabilization

If work stops at the site for greater than 14 calendar days, temporary stabilization of the site is required.

Project site final stabilization requires that perennial vegetative coverage has been established in the areas of distrubance with a sensity of at least 70%.

1.4.1.1.4 Contractor Jobsite Trailers

Where utilized, jobsite trailers shall make use of holding tanks for wastewater collection. Wastewater holding tanks shall be emptied on a regular basis to prevent wastewater overflow from the tanks. Potable water may be sourced from a nearby fire hydrant. Contractor shall utilize a backflow preventer in accordance with 01 50 00 TEMPORARY CONSTRUCTION FACILITIES AND CONTROLS and TCEQ requirements when making the connection between the water line and jobsite trailer. Reference *Appendix E* for required TCEQ forms. Coordination with American Water is required to operate fire hydrants.

1.4.1.1.5 Environmental Controls

Contractor shall provide adequate moisture control within the facility to prevent any mold growth while the facility's HVAC system is not fully operational. Contractor shall be responsible for any mold remediation and restoration work required as a result of lack of moisture control, at no additional expense to the Government.

1.4.1.2 Services Guidelines

a. Perform field investigation, to include:

(1) Performance of a charrette meeting. Meeting duration shall be a minimum of 3 calendar days to include for the following tasks:

(a) In-brief

(b) Stakeholder discussions

(c) Out-brief, after on-site field investigations

(2) On-site field investigation of areas of focus

(3) Record drawing verification

(4) Site and utility verification

(5) Environmental survey for asbestos containing materials, lead-based paint, lead-containing paint, lighting ballasts and lamps containing polychlorinated biphenyls (PCBs) and mercury.

1.4.1.3 Demolition

1.4.1.3.1 Hazardous Materials

a. Provide abatement of all asbestos containing materials within the boundaries of the project site. Abatement of asbestos shall be in accordance with Section 01 57 19 TEMPORARY ENVIRONMENTAL CONTROLS 01 57 20 ENVIRONMENTAL PROTECTION, 01 74 19 CONSTRUCTION WASTE MANAGEMENT AND DISPOSAL, 02 41 00 DEMOLITION AND DECONSTRUCTION, 02 81 00 TRANSPORTATION AND DISPOSAL OF HAZARDOUS MATERIALS, and 02 82 00 ASBESTOS REMEDIATION.

b. Provide abatement of all lead containing materials within the boundaries of the project site. Abatement of lead shall be in accordance with Section 01 57 19 TEMPORARY ENVIRONMENTAL CONTROLS 01 57 20 ENVIRONMENTAL PROTECTION, 01 74 19 CONSTRUCTION WASTE MANAGEMENT AND DISPOSAL, 02 41 00 DEMOLITION AND DECONSTRUCTION, and 02 83 00 LEAD REMEDIATION.

c. Provide abatement of all PCB and mercury containing items within the boundaries of the project site. Abatement of these items shall be in accordance with Section 01 57 19 TEMPORARY ENVIRONMENTAL CONTROLS 01 57 20 ENVIRONMENTAL PROTECTION, 01 74 19 CONSTRUCTION WASTE MANAGEMENT AND DISPOSAL, 02 41 00 DEMOLITION AND DECONSTRUCTION, 02 81 00 TRANSPORTATION AND DISPOSAL OF HAZARDOUS MATERIALS, 02 84 16 HANDLING OF LIGHTING BALLASTS AND LAMPS CONTAINING PCBs AND MERCURY, and 02 84 33 REMOVAL AND DISPOSAL OF POLYCHLORINATED BIPHENYLS (PCBs).

d. Provide abatement of all mold growth within the boundaries of the project site. Abatement of mold shall be in accordance with Section 01 57 19 TEMPORARY ENVIRONMENTAL CONTROLS01 57 20 ENVIRONMENTAL PROTECTION, 01 74 19 CONSTRUCTION WASTE MANAGEMENT AND DISPOSAL, 02 41 00 DEMOLITION AND DECONSTRUCTION, and 02 85 00 MOLD REMEDIATION.

1.4.1.3.2 Civil

a. Refer to Section 01 57 19 TEMPORARY ENVIRONMENTAL CONTROLS01 57 20 ENVIRONMENTAL PROTECTION for requirements dealing with excess soil not able to be reused. Excess soil is required to be tested and removed from the Installation in accordance with the stated section reference. There is no indication that soils at the site are contaminated. Report, located in Appendix D, shows the soil contains hazardous material and is classified as . Refer to the report for further details. Soil shall be re,oved from the Installation in accordance with Section 01 57 19 TEMPORARY ENVIRONMENTAL CONTROLS01 57 20 ENVIRONMENTAL PROTECTION, 01 74 19 CONSTRUCTION WASTE MANAGEMENT AND DISPOSAL, 02 41 00 DEMOLITION AND DECONSTRUCTION, and 02 81 00 TRANSPORTATION AND DISPOSAL OF HAZARDOUS MATERIALS

b. Provide nondestructive exposure as required for subsurface utility investigation.

c. Utility lines specified for replacement shall not be abandoned in-place. Utilities specified for complete removal are not allowed to be abandoned in-place, per JBSA policy. Do not suggest abandoning in-place.

1.4.1.4 [Enter Appropriate Subpart Title Here]
1.4.2 location

The work is located on Joint Base San Antonio Lackland at the . The street address for this building is , JBSA LACKLAND, TX . The exact location will be shown by the Contracting Officer.

1.5 OCCUPANCY OF PREMISES

Buildings will be occupied during performance of work under this Contract. Occupancy notifications shall be posted in a prominent location in the work area.

Before work is started, arrange with the Contracting Officer a sequence of procedure, means of access, space for storage of materials and equipment, and use of approaches, corridors, and stairways.

1.6 EXISTING WORK

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

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.

1.7 LOCATION OF UNDERGROUND UTILITIES

Obtain digging permits prior to start of excavation, and comply with Installation requirements for locating and marking underground utilities. Contact local utility locating service a minimum of 14 calendar days prior to excavating, to mark utilities, and within sufficient time required if work occurs on a Monday or after a Holiday. Refer to Section 01 14 00 JBSA WORK RESTRICTIONS for additional requirements. Verify existing utility locations indicated on Contract drawings, within area of work.

Identify and mark all other utilities not managed and located by the local utility companies. Scan the construction site with dual frequency Ground Penetrating Radar (GPR), electromagnetic, or sonic equipment, and mark the surface of the ground or paved surface where existing underground utilities are discovered. Verify the elevations of existing piping, utilities,and any type of underground or encased obstruction not indicated, or specified to be removed, that is indicated or discovered during scanning, in locations to be traversed by piping, ducts, and other work to be conducted or installed. Verify elevations before installing new work closer than nearest manhole or other structure at which an adjustment in grade can be made.

1.7.1 Notification Prior to Excavation

Notify the Contracting Officer at least 15 days prior to starting excavation work. Refer to Section 01 14 00 JBSA WORK RESTRICTIONS for full list of requirements.

1.7.2 Utility Locations

Provide a third party, independent, private utility locating company to

positively identify underground utilities in the work area in addition to any station locating service and coordinated with the station utility department.

1.8 SALVAGE MATERIAL AND EQUIPMENT

Items designated by the Contracting Officer to be salvaged remain the property of the Government. Segregate, itemize, deliver and off-load the salvaged property at the Government designated storage area located within miles of the construction site.

Provide a salvage plan, listing material and equipment to be salvaged, and their storage location. Maintain property control records for material or equipment designated as salvage. Provide a system for property control in the salvage plan. Store and protect salvaged materials and equipment until disposition by the Contracting Officer.

PART 2 PRODUCTS

PART 3 EXECUTION

-- End of Section --

SECTION 01 14 00

JBSA WORK RESTRICTIONS
03/26

PART 1 GENERAL

1.1 SUBMITTALS

Government approval is required for submittals with a "G" or "S" classification. Refer to Section 01 33 00 SUBMITTAL PROCEDURES for requirements when a classification other than "G" or "S" are used. Submittals not having a classification are for information only. Submit the following in accordance with Section 01 33 00 SUBMITTAL PROCEDURES:

SD-01 Preconstruction Submittals

List of Contact Personnel

Installation Access; G

Dig Permits; G

Utility Outage Request; G

Hot Work Permit; G

Road Closure Request; G

Radioactive Material Permit; G

1.2 SPECIAL SCHEDULING REQUIREMENTS

a. contractor must be ready for operation as approved by Contracting Officer before work is started on which would interfere with normal operation.

b. Have materials, equipment, and personnel required to perform the work at the site prior to the commencement of the work. Specific items of work to which this requirement applies include:

c. The contractor 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.

d. Permission to interrupt any activity, roads, railroads, or utility service must be requested in writing prior to the desired date of interruption in accordance with the requirements of paragraph PERMITS AND REQUESTS.

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. The following conditions apply:

f. Restricted Access Areas. The Government will monitor work in areas listed below indicated. Notify Contracting Officer at least 14

calendar days prior to starting work in these areas.

1.3 CONTRACTOR ACCESS AND USE OF PREMISES

1.3.1 Activity Regulations

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

1.3.1.1 Subcontractors and Personnel Contacts

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

1.3.1.2 Installation Access

Non DOD persons (Contractors, vendors, etc) requiring entry to JBSA Fort Sam HoustonCamp BullisLacklandChapman Training AnnexKelly Field Annex RandolphCanyon LakeSeguin Auxiliary Field shall be sponsored by an authorized DBIDS registered DOD ID card holder. Refer to JBSANANTONIOI 31-1131.

Sponsors must notify the Security Forces Visitor Control Center for the installation that access is required no later than 14 calendar days prior to the requested entry date. Foreign nationals requiring installation access require an additional 14 calendar days to process the request. Sponsors or Authorizing Official must request the permit in writing or via email from a .mil address to the Visitor Control Center. An application for Unescorted Access Request form (ATT-1) will be submitted by the Sponsor or Official to the Pass and Registration Office. Contractor and vendor companies requiring access to Joint Base San Antonio shall provide the credential information for their employees to the sponsor in order to process the access.

All contractor employees shall provide the following:

a. One form of picture identification.

b. Personal identifiable information and vehicle information as required to process all Unescorted Pass Requests. Vehicle information listed below is required at a minimum:

   (1) Copy of current, non-expired vehicle registration.

   (2) Copy of current, non-expired vehicle insurance that lists the vehicle for which registration information is provided.

c. A memo from the construction company, on company letterhead, stating the reason for entry; contract number; project start and end date; and the location at JBSA where the jobsite is located.

Installation gate hours and availability can be found at the following weblink: https://www.jbsa.mil/Gate-Hours/

1.3.1.2.1 JBSA Lackland/Chapman Training Annex/Kelly Annex/Port Annex Access

Persons not in possession of a valid access credential shall enter the installation through the following entry control points:

a. Luke East Gate

b. Growdon Commercial Gate (Commercial Vehicles Only)

1.3.1.2.1.1 Prohibited Haul Routes

1.3.1.2.1.2 Gate Restrictions

All commercial Class A/B type vehicles must enter through:

a. Growden Commercial Gate

b. Arrangements can be made to modify installation access protocol to allow Class A/B type vehicles through other gates for special circumstances, on a case-by-case basis. Each case requires a minimum 30 calendar day notification.

1.3.1.3 Government Housing Areas

a. Haul routes to and from project sites cannot go through housing/residential areas.

b. When working inside a housing/residential area, working hours are limited to 0800 (8 am) to 1600 (4 pm) unless otherwise approved by the Contracting Officer.

1.3.1.4 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 Emergency Response Requirements

Contractors reporting an emergency shall provide the 9-1-1 dispatcher with the following information:

a. Building number, address, or general location
b. Name
c. Phone number
d. Emergency information (cause of fire, explosion, natural gas leak, injuries, etc.)

DO NOT HANG UP THE PHONE UNTIL DIRECTED TO BY THE 9-1-1 DISPATCHER

Note: If calling 9-1-1 from a mobile phone you will be directed to the local municipality's 9-1-1 dispatcher. Request that the dispatcher transfer you to the JBSA Lackland emergency dispatcher.

1.3.3 Working Hours

Regular working hours will consist of an 8 1/2 hour period, between 7 a.m. and 3:30 p.m., Monday through Friday, and 7 a.m. to 3:30 p.m. on Saturday and Sunday as outlined in recovery schedules or as directed by the Contracting Officer, excluding Government holidays.

1.3.4 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.

Contractors shall refer to the U.S. Office of Personnel Management (OPM) website for the current list of Federal holidays and the current date of observance.

1.3.5 Exclusionary Period

No work may be performed during the period to , inclusive, without prior written approval of the Contracting Officer. This period has not been considered in computing the time allowed for the performance of this contract.

1.3.6 Permits and Requests

All permit requests must include at minimum the following:

a. Site Map (8" x 11" or 8" x 14"), 6 complete copies
b. Relevant 100% Construction Drawings, 6 complete copies
c. Project Name and Number
d. Contractor & Subcontractor Name
e. Brief Description of Work - Identify all buildings and/or facilities possibly affected
f. Desired Date for Work to Begin
g. Estimated Duration of Work
h. 14 calendar day advance notice minimum, unless otherwise noted
i. Contractor's Representative contact information

1.3.6.1 Dig Permits/Utility Locates

Dig Clearance coordination meeting is held on JBSA Lackland in building 7065 on Wednesdays, from 1300 to 1400. If a Government holiday falls on a Wednesday, the coordination meeting will be canceled for that week, and no dig permits or outage requests will be accepted or processed for that week..

a. All permit requests shall include the following at minimum:

(1) Filled in Dig Permit form (ATT-2), 6 copies

(2) Site map, 6 copies

(3) Relevant IFC drawings, 6 copies

(4) Project name and number

(5) Contractor name

(6) Brief description of work

(7) Contractor's representative contact information

b. Digging permits must be obtained prior to any digging, drilling or any excavation work.

c. Utility Locates for Government owned utilities are available by submitting ATT-2 to the Dig Clearance meeting. Locates for American Water managed utilites are also included in that request. Privitized utility locates shall be done through 811 and San Antonio Water System (SAWS).

(1) 811 notifications shall be done by either dialing 811 or by submitting a notice through texas811.org.

(2) SAWS notifications shall be done by submitting a notice through locates.saws.org. Issues with utility locates can be submitted to locates@saws.org.

d. Contractor shall allow 21 calendar days for Government review of digging permit requests. A digging permit for a specified area of excavation expires 30 days after the issue date. The contractor shall re-apply for a new permit to perform excavation in the area if the excavation was not started within the 30-day period.

e. Permits will identify underground utilities, that have been recorded in the Government's GIS, within 5 feet of the designated area. Contractor shall be responsible for all repairs, costs, and damages due to excavating without permit or damaging an identified utility.

1.3.6.2 Utility Outage Request

a. All requests shall include the following at minimum:

(1) Filled in Outage Request form (ATT-3)

(2) Project Name and Number

(3) Description of work

(4) Identify all buildings and/or facilities possibly affected

(5) Desired date for work to begin

(6) Estimated duration of work

(7) Proof of pre-coordination with key stakeholders

(8) Contractor's representative contact information

b. Contractor shall complete and submit a written request 60 calendar days in advance of the requested utility outage, after pre-coordination has been completed, to the Contracting Officer's Technical Representative. The request shall include the utility service to be affected, proposed date, proposed time, and outage duration. Outage Request form included as ATT-3.

c. If an outage will effect multiple buildings, or effect a high profile building, or has a major impact on the mission being performed by the occupants of the building, a 60 calendar day notice will be required.

d. Contractor shall be responsible for pre-coordination with the following organizations. Contracting Officer's Technical Representative will advise on when an outage request will require coordination with these coordinators, as not all outages will affect these stakeholders. This coordination is separate from the Government's coordination, and must be performed prior to submission to the Contracting Officer's Technical Representative.

(1) America Water (AMW)

(a) Water

(b) Sewer

(2) San Antonio Water System (SAWS)

(a) Water

(b) Sewer

(3) San Antonio River Authority (SARA)

(a) Sewer

(4) CPS Energy (CPSE)

(a) Electrical

(b) Gas

(5) Springs Hill Special Utility District

(a) Water

(6) GVEC

(a) Electric

(7) Fire Emergency Services (902 CES)/Fire Inspector

(8) 502d Communications Squadron (502 CS)

(9) Network Enterprise Center (NEC)

(10) Security Forces (502802902 SFS)

(11) Army Security System Network (G-2)

e. Provide the Contracting Officer's Technical Representative a copy of the Utility Outage request once all applicable pre-coordination stakeholders and Facility Managers have signed the request. Processing time does not start until these stakeholders have signed the outage request.

f. After submitting the request to the government, the contractor shall receive approval from the Government prior to performing a utility outage.

1.3.6.3 Hot Work Permit

Under no circumstances shall hot work operations start without a hot work permit.

All welding and cutting operations shall be performed in accordance with NFPA 51B. Contact the site specific JBSA Fire Department to request an AF Form 592 USAF Welding, Cutting and Brazing Permit. Ensure a copy of the AF Form 592 is located on site, and provided to the Contracting Officer's Technical Representative.

JBSA Lackland Fire Prevention: (210) 671-2921

Permits expire in 30 days. If work will extend beyond 30 day period the contractor shall contact JBSA Fire and Emergency Services to re-issue a new permit.

1.3.6.4 Road Closure Request

a. Road closings will not be permitted without approval. To get approval for a proposed road closure, contractor shall submit a traffic control plan to the Contracting Officer's Technical Representative.

(1) Requests must be submitted at least 60 calendar days prior to anticipated need for closure, for Government review and internal processing.

(2) On a case-by-case basis, the Government's review period may be shortened in accordance with the following conditions:

(a) Arterial roads will not be granted a reduction in review time under any circumstance.

(b) Collector roads may be eligible for a review period reduction between 7 and 14 calendar days, assuming collector roads are not dumping traffic into high profile areas or near critical facilities on the Installation.

(c) Local rodas may be eligible for a review period reduction of 21 calendar days, assuming Installation housing or high profile assets are not affected.

b. The Contractor's traffic control plan must include each section of road that will be worked on or impacted as a result of this contract.

The traffic control plan shall be in accordance with MUTCD, Part VI, and TMUTCD, Part VI. Pedestrian traffic must also be taken into account when providing detour routes in the traffic control plan.

c. Contractor shall provide traffic control signs and barricades for all road closures. At least one lane of traffic must be maintained at all times, unless otherwise directed.

1.3.6.5 Radioactive Material Permit

a. Use of radiation sources on Joint Base San Antonio requires authorization before they are brougth onto the Installation. Submit required information to the Installation Radiation Safety Officer (RSO) or the Operating Location RSO through the Contracting Officer, who will issue the Department of the Air Force Radiation Permit (AFRP). Excludes portable machine sources of ionizing radiation including moisture, density, and X-Ray Fluorescence (XRF). Refer to Section 01 35 26 GOVERNMENTAL SAFETY REQUIREMENTS for requirements relating to the safe use of radioactive material.

(1) Installation RSO:

559 MDS
Ph: 210-292-7630
E-mail:
usaf.jbsa.559-mds.mbx.rafb-bioenvironmental-engineering@health.mil

(2) Operating Location RSO:

Lt Brandon Reid
Ph: 210-292-7630 / 210-292-7659
E-mail: brandon.c.reid2.mil@health.mil

Capt Eulice Trinidad
Ph: 210-652-3256 / 210-652-0575
E-mail: eulice.trinidad.mil@health.mil

Algernon Johnson
Ph: 210-221-4543 / 210-221-3824
E-mail: algernon.johnson.1@us.af.mil

E-mail: 502ABW.SE.SafetyJBSA-FSH@us.af.mil

b. Applicant shall apply by letter with supporting documentation through the Installation RSO or the Operating Location RSO. Submit the letter so that the Installation Representative receives the application at least 30 calendar days before the requested start date of the permit.

c. AFRP application shall specify start and stop dates and describe for what purposes the applicant needs the AFRP. The following information shall be submitted with the application:

(1) Brief description of proposed activities.

(2) Copy of a valid U.S. Nuclear Regulatory Commission (NRC) Form 347 material license that allows the applicant to use the source as described in the AFRP application.

(3) Copy of a valid Agreement State or Radioactive Material License

(Texas Department of Health, Bureau of Radiation Control) license that allows the applicant to use radioactive material (RAM) as described in the AFRP application. Also include proof that the applicant has filed NRC Form 241, Report of Proposed Activities in Non-Agreement States, with the NRC in accordance with 10 CFR 150.20. A copy of the NRC Form 241 must accompany the TRC Form 12-1. An AFRP issued under this circumstance will be valid for no more than 180 days in any calendar year.

(4) Contractort Local Point of Contact: Name, Address, and Phone.

(5) Company Radiation Safety Officer: Name, Address, and Phone.

(6) Contracting Officer's Technical Representative: Name and Phone.

(7) Copy of the contractual clause of the Contract describing work to be performed and inclusive dates.

(8) Provide log of actual equipment usage to the Installation RSO or the Operating Location RSO.

(9) Leak test documentation for the equipment with the radioactive source(s).

(10) Site map defining the area where radioactive materials or equipment is to be used.

(11) Radiation Safety Program to include standard operating procedures, training program, and designation of the contractor's RSO.

(12) Written acknowledgement of understanding that the Installation RSO and the Operating Location RSO will not be prevented from conducting periodic assessments and that operations will cease immediately if they are found to be unsafe by them. Statement shall be formatted as follows:

"<*INSERT COMPANY NAME*> recognizes that the JBSA Installation Radiation Safety Officers, or Operating Location Radiation Safety Officers are authorized to periodically conduct assessments to ensure compliance with radiation safety practices to prevent exposures to Government personnel and to prevent contamination of Government property. If deemed necessary to maintain safety, the Installation RSO or Operating Location RSO may sequester the source. Additionally, <*INSERT COMPANY NAME*> recognizes the authority of the Installation RSO and Operating Location RSO to suspend contractor operations believed to be unsafe. The contractor using radioactive material, and the owner of said material, are responsible for ensuring safe operations and security for their radioactive material. The Government is not liable for any costs associated with cessation of operations for safety reasons."

(13) For naturally occurring or accelerator produce radioactive material (NORM/NARM) and machine-produced ionizing radiation sources, provide a copy of the appropriate State authorization that allows the applicant to use the source as described in the AFRP application or a copy of a Radiation Safety Program that complies with Air Force requirements.

d. All AFRPs will require applicants to remove all permitted sources from the Installation by the end of the work day. No equipment shall be stored on site, overnight.

e. Disposal of radioactive material on JBSA is strictly prohibited.

1.3.7 Utility Cutovers and Interruptions

a. Make utility cutovers and interruptions after normal working hours or on Saturdays, Sundays, and Government holidays. Conform to procedures required in paragraph WORK OUTSIDE REGULAR HOURS.

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

c. Interruption to water, sanitary sewer, storm sewer, telecommunication service, electric service, air conditioning, heating, fire alarm, compressed air, and thermal energy are considered utility cutovers pursuant to the paragraph WORK OUTSIDE REGULAR HOURS. Such interruptions are further limited to hours. This time limit includes time for deactivation and reactivation.

d. Operation of Privatized Utilities: The Contractor must not operate nor disturb the setting of control devices in the utility's system, including water, sewer, electrical, and natural gas, and steam services. The applicable System Owner will operate the control devices as required for normal conduct of the work. The Contractor must notify the applicable System Owner giving reasonable advance notice when such operation is required.

1.4 SECURITY REQUIREMENTS

Contract Clause FAR 52.204-2 Security Requirements and Alternate II and the following apply:

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-- End of Section --

SECTION 01 30 00

ADMINISTRATIVE REQUIREMENTS
02/26

PART 1 GENERAL

1.1 REFERENCES

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

U.S. ARMY CORPS OF ENGINEERS (USACE)

EM 385-1-1	(2024) Safety -- Safety and Occupational Health (SOH) Requirements

1.2 SUBMITTALS

Government approval is required for submittals with a "G" or "S" classification. Refer to Section 01 33 00 SUBMITTAL PROCEDURES for requirements when a classification other than "G" or "S" are used. Submittals not having a classification are for information only. Submit the following in accordance with Section 01 33 00 SUBMITTAL PROCEDURES:

SD-01 Preconstruction Submittals

View Location Map

Progress and Completion Pictures

SD-04 Samples

Color Boards; G

1.3 VIEW LOCATION MAP

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

1.4 PROGRESS AND COMPLETION PICTURES

Photographically document site conditions prior to start of construction operations. Include aerial photographs. Provide monthly, and within one month of the completion of work, digital photographs, 4032x2268x24 bit true color minimum resolution in JPEG file format showing the sequence and progress of work. Take a minimum of 25 digital photographs each week throughout the entire project from a minimum of ten different viewpoints selected by the Contractor unless otherwise directed by the Contracting Officer. Submit with the monthly invoice a set of digital photographs, through DoD SAFE, cumulative of all photos to date. Indicate photographs demonstrating environmental procedures. Provide photographs for each month in a separate monthly directory and name each file to indicate its location on the view location sketch. Also provide the view location sketch with each transmittal as a digital file. Include a date designator in file names. Photographs provided are for unrestricted use by the

Government.

1.5 MINIMUM INSURANCE REQUIREMENTS

Provide the minimum insurance coverage required by FAR 52.228-5 Insurance-Work on a Government Installation, during the entire period of performance under this contract. Provide other insurance coverage as required by State law.

1.6 SUPERVISION

1.6.1 Superintendent Qualifications

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

For projects where the superintendent is permitted to also serve as the Quality Control (QC) Manager as established in Section 01 45 00 QUALITY CONTROL, the superintendent must have qualifications in accordance with that section.

For projects where the superintendent is permitted to also serve as the Site Safety and Health Officer (SSHO) as established in Section 01 35 26 GOVERNMENTAL SAFETY REQUIREMENTS, the superintendent must have qualifications in accordance with that section.

1.6.2 Minimum Communication Requirements

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

1.6.3 Duties

The project superintendent is primarily responsible for managing subcontractors and coordinating day-to-day production and schedule adherence on the project. The superintendent is required to attend Red Zone meetings, partnering meetings, and quality control meetings. The superintendent or qualified alternative must be on-site at all times during the performance of this contract until the work is completed and accepted.

1.6.4 Non-Compliance Actions

The Project Superintendent is subject to removal by the Contracting Officer for non-compliance with requirements specified in the contract and for failure to manage the project to ensure timely completion. Furthermore, the Contracting Officer may issue an order stopping all or

part of the work until satisfactory corrective action has been taken. No part of the time lost due to such stop orders is acceptable as the subject of claim for extension of time for excess costs or damages by the Contractor.

1.7 PRECONSTRUCTION CONFERENCE

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

1.7.1 Attendees

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

1.8 REQUESTS FOR INFORMATION

Requests for information to the Government shall utilize ATT-2. Submit all RFIs as if it where a submittal in accordance with Section 01 33 00 SUBMITTAL PROCEDURES.

1.9 FACILITY TURNOVER PLANNING MEETINGS (Red Zone Meetings)

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

1.9.1 Red Zone Checklist

a. Contracting Officer's Technical Representative (COTR) will provide any updates to the Red Zone Checklist template (ATT-1).

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

1.9.2 Meetings

a. Conduct regular Red Zone Meetings beginning at approximately 75 percent project completion, or three to six months prior to Beneficial

Occupancy Date (BOD), whichever comes first.

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

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

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

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

1.10 PARTNERING

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

1.10.1 Facilitated (Formal) Partnering

a. Within 35 calendar days after award and prior to the start of work, host a Formal Partnering session with key personnel from the project team including both Contractor and Government personnel. All costs associated with the Partnering session including the third-party independent Facilitator Consultant, meeting room and other incidental items are the responsibility of the Contractor.

b. Before the Facilitated (Formal) Partnering session, coordinate with the Facilitator all requirements for incidental items (such as audio-visual equipment, easels, flipchart paper, colored markers, note pads, pens/pencils, colored flash cards) and have these items available at the Partnering session. Provide copies of any documents required for distribution to all attendees. Participants will bear their own costs for meals, lodging and transportation associated with Partnering.

c. The Initial Partnering Session must be a duration of one day and be held at a location off base as agreed to by the Contracting Officer. Partnering session may take place concurrently with the Pre-Construction Post-Award Kickoff Meeting.

d. Facilitator must be experienced in conducting corporate Partnering sessions and must be a third-party independent facilitating consultant - not an employee of the Contractor. The Facilitator is responsible for leading all aspects of the Partnering session necessary to achieve

the Partnering goal.

e. An outcome of the Partnering session must be an escalation matrix agreed upon by both the Government and Contractor, which identifies key Government and Contractor decision makers by name and anticipated decision durations.

f. Host follow-on Partnering Sessions at three- to six-month intervals or more frequently if needed and lasting generally a half day or less. Attendees need only be those required to resolve current issues. The same Facilitator used in the Initial Partnering session must lead the follow-on sessions unless an alternative is permitted by the Contractor Officer. All costs associated with follow-on Partnering sessions are the responsibility of the Contractor.

1.10.2 Team-Led (Informal) Partnering

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

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

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

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

e. Participants will bear their own costs for meals, lodging and transportation associated with Partnering.

1.11 MOBILIZATION

Contractor shall mobilize to the jobsite within 14 calendar days after contract award30 calendar days of final site or building design approval. Mobilize is defined as having equipment AND having a physical presence of at least one person from the contractor's team on the jobsite.

-- End of Section --

SECTION 01 32 01.00 30

PROJECT SCHEDULE
07/25

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. For references without a year, use the current published version.

AACE INTERNATIONAL (AACE)

AACE 29R-03	(2011) Forensic Schedule Analysis
AACE 52R-06	(2006) Time Impact Analysis - As Applied in Construction
AACE 84R-13	(2015) Planning and Accounting for Adverse Weather

AMERICAN SOCIETY OF CIVIL ENGINEERS (ASCE)

ASCE 67-17	(2017) Schedule Delay Analysis

1.2 SUBMITTALS

Government approval is required for submittals with a "G" or "S" classification. Refer to Section 01 33 00 SUBMITTAL PROCEDURES for requirements when a classification other than "G" or "S" are used. Submittals not having a classification are for information only. Submit the following in accordance with Section 01 33 00 SUBMITTAL PROCEDURES:

SD-01 Preconstruction Submittals

Project Scheduler Qualifications; G

Preliminary Project Schedule; G

Initial Project Schedule; G

Periodic Schedule Update; G

1.3 PROJECT SCHEDULER QUALIFICATIONS

Designate an authorized representative to be responsible for the preparation of the schedule and all required updating and production of reports. The Designated Project Scheduler must have prepared and maintained at least three previous construction schedules for projects of similar size and complexity to this contract, using Primavera P6.. Representative must have a comprehensive knowledge of CPM scheduling principles and application.

PART 2 PRODUCTS

2.1 SOFTWARE

The scheduling software utilized to produce and update the schedules required herein must be capable of meeting all requirements of this specification.

2.1.1 Government Default Software

The Government uses Primavera P6. Ensure exported schedule files are compatible with the version of P6 used by the Government.

2.1.2 Contractor Software

Scheduling software used by the contractor must be commercially available from the software vendor for purchase with vendor software support agreements available. The software routine used to create the required sdef file must be created and supported by the software manufacturer.

2.1.2.1 Government Use

Provide for the Government's use two licenses, two computers, and training for two Government employees in the use of the software. These computers will be stand-alone and not connected to Government network. Computers and licenses will be returned at project completion.

2.1.2.2 Other Than Primavera

If the Contractor chooses software other than Primavera P6, that is compliant with this specification, provide for the Government's use two licenses, two computers, and training for two Government employees in the use of the software. These computers will be stand-alone and not connected to Government network. Computers and licenses will be returned at project completion. Provide the native export file with all schedule submittals.

PART 3 EXECUTION

3.1 GENERAL REQUIREMENTS

Prepare for approval a Project Schedule, as specified herein, pursuant to FAR Clause 52.236-15 Schedules for Construction Contracts. Show in the schedule the proposed sequence to perform the work and dates contemplated for starting and completing all schedule activities. The scheduling of the entire project is required. The scheduling of design and construction is the responsibility of the Contractor. Contractor management personnel must actively participate in its development. Designers, Subcontractors, and suppliers working on the project must also contribute in developing and maintaining an accurate Project Schedule. Provide a schedule that is a forward planning as well as a project monitoring tool. Use the Critical Path Method (CPM) of network calculation to generate all Project Schedules. Prepare each Project Schedule using the Precedence Diagram Method (PDM).

3.2 BASIS FOR PAYMENT AND COST LOADING

The schedule is the basis for determining contract earnings during each update period and therefore the amount of each progress payment. The

aggregate value of all activities coded to a contract CLIN must equal the value of the CLIN. Match the progress payment "Pay Period Thru" date to the schedule data date.

3.2.1 Activity Cost Loading

Activity cost loading must be reasonable and without front-end loading. Activities with a negative cost loading is not allowed. Provide additional documentation to demonstrate reasonableness if requested by the Contracting Officer.

3.2.2 Cost Loading of Submittals

No costs are to be assigned to activities for the preparation, review, or approval of submittals, except as described under paragraph COST LOADING OF CLOSEOUT ACTIVITIES, paragraph AS-BUILT DRAWINGS, paragraph RECORD MODEL, DRAWINGS AND SPECIFICATIONS, design submittals, and paragraph O&M MANUALS.

3.2.3 Withholdings / Payment Rejection

Failure to meet the requirements of this specification may result in the disapproval of the preliminary, initial, or periodic schedule updates and subsequent rejection of payment requests until compliance is met.

In the event that the Contracting Officer directs schedule revisions and those revisions have not been included in subsequent Project Schedule revisions or updates, the Contracting Officer may withhold 10 percent of pay request amount from each payment period until such revisions to the project schedule have been made.

3.3 PROJECT SCHEDULE DETAILED REQUIREMENTS

3.3.1 Level of Detail Required

Develop the Project Schedule to the appropriate level of detail to address major milestones and to allow for satisfactory project planning and execution. Failure to develop the Project Schedule to an appropriate level of detail will result in its disapproval. The Contracting Officer will consider, but is not limited to, the following characteristics and requirements to determine appropriate level of detail:

3.3.2 Activity Durations

Reasonable activity durations are those that allow the progress of ongoing activities to be accurately determined between update periods. Non-procurement activities Original Durations (OD) are not to exceed 20 workdays or 30 calendar days.

3.3.3 Mandatory Activities

Include the following activities in the initial project schedule and all updates.

a. Submission, review and acceptance of SD-01 Preconstruction Submittals (individual activity for each).

b. Submission, review and acceptance of features requiring design completion.

c. Submission, review and acceptance of design packages.

d. Submission of mechanical/electrical/information systems layout drawings.

e. Long procurement activities.

f. Submission and approval of O & M manuals.

g. Submission and approval of as-built drawings.

h. Submission and approval of DD1354 data and installed equipment lists.

i. Submission and approval of testing and air balance (TAB).

j. Submission of TAB specialist design review report.

k. Submission and approval of fire protection specialist.

l. Submission and approval of Building Commissioning Plan, Controls testing plan, test data, and reports: Develop the schedule logic associated with testing and commissioning of mechanical systems to a level of detail consistent with the contract commissioning requirements. All tasks associated with building testing and commissioning will be completed prior to submission of building commissioning report and subsequent contract completion.

   Include other systems testing, if required. Include additional commissioning requirements noted elsewhere in the Contract as required in the schedule and discuss during the SEKO meeting, noted in paragraph SCHEDULING EXPECTATIONS KICKOFF MEETING (SEKO). These activities may include but are not limited to:

   (1) Air and water balancing.

   (2) Building commissioning - Functional Performance Testing.

   (3) Controls testing plan submission.

   (4) Controls testing.

   (5) Performance Verification testing.

   (6) Other systems testing, as required.

m. Contractor's pre-final inspection.

n. Correction of punch list from Contractor's pre-final inspection.

o. Government's pre-final inspection.

p. Correction of punch list from Government's pre-final inspection.

q. Final inspection.

r. Submission and approval of Record Model, Drawings and Specifications.

3.3.4 Government Activities

Show in schedule, Government and other agency activities that could impact progress. These activities include, but are not limited to approvals, acceptance, design reviews, environmental permit approvals by State regulators, inspections, utility tie-in, Government Furnished Equipment (GFE) and Notice to Proceed (NTP) for phasing requirements.

3.3.5 Contract Milestones and Constraints

Milestone activities are to be used for significant project events including, but not limited to, project phasing, project start and end activities, or interim completion dates. The use of artificial float constraints such as "zero free float" or "zero total float" are prohibited.

Mandatory constraints that ignore or effect network logic are prohibited. No constrained dates are allowed in the schedule other than those specified herein. Submit additional constraints to the Contracting Officer for approval on a case by case basis.

3.3.5.1 Project Start Date Milestone and Constraint

The first activity in the project schedule must be a start milestone titled "NTP Acknowledged," which must have a "Start On" constraint date equal to the date that the NTP is acknowledged.

3.3.5.2 End Project Finish Milestone and Constraint

The last activity in the schedule must be a finish milestone titled "End Project."

Constrain the project schedule to the Contract Completion Date in such a way that if the schedule calculates an early finish, then the float calculation for "End Project" milestone reflects positive float on the longest path. If the project schedule calculates a late finish, then the "End Project" milestone float calculation reflects negative float on the longest path. The Government is under no obligation to accelerate Government activities to support a Contractor's early completion.

3.3.5.3 Interim Completion Dates and Constraints

Constrain contractually specified interim completion dates to show negative float when the calculated late finish date of the last activity in that phase is later than the specified interim completion date.

3.3.5.3.1 Start Phase

Use a start milestone as the first activity for a project phase. Call the start milestone "Start Phase X" where "X" refers to the phase of work.

3.3.5.3.2 End Phase

Use a finish milestone as the last activity for a project phase. Call the finish milestone "End Phase X" where "X" refers to the phase of work.

3.3.6 Adverse Weather

Ensure anticipated adverse weather is accounted for in the Project

Schedule. AACE 84R-13 provides methodologies for techniques in planning for adverse weather. The preferred methodology is the use of a weather calendar. If a method other than a weather calendar is proposed then discuss the reason during the]pre-constructionkickoff meeting.

Use the following schedule of anticipated monthly non-work days due to adverse weather as the basis for establishing a "Weather Calendar" showing the number of anticipated non-workdays for each month due to adverse weather, in addition to Saturdays, Sundays and all Federal Holidays as non-work days. Data is sourced from the National Oceanic and Atmospheric Administration's (NOAA) Summary of Monthly Normals report, in accordance with AACE 84R-13. Data set is the nominal 30-year, greater than 0.10 inch precipitation amount parameter, as indicated on the Station Report for the NOAA location closest to the project site.

MONTHLY ANTICIPATED ADVERSE WEATHER DELAYS											
JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
4	3	4	3	4	4	4	3	5	5	3	4
MONTHLY ANTICIPATED ADVERSE WEATHER DELAYS											
JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
3	3	4	4	5	4	4	3	6	4	3	4
MONTHLY ANTICIPATED ADVERSE WEATHER DELAYS											
JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
4	3	4	3	5	5	3	3	4	4	3	3
MONTHLY ANTICIPATED ADVERSE WEATHER DELAYS											
JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
4	3	4	3	4	4	4	3	5	5	3	4
MONTHLY ANTICIPATED ADVERSE WEATHER DELAYS											
JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
4	4	4	3	5	5	3	3	5	4	3	4
MONTHLY ANTICIPATED ADVERSE WEATHER DELAYS											
JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
5	4	5	4	6	5	4	4	5	4	4	4

3.3.7 Added and Deleted Activities

Do not delete activities from the project schedule or add new activities to the schedule without approval from the Contracting Officer. Activity

ID and description changes are considered new activities and cannot be changed without Contracting Officer approval.

3.3.8 Original Durations

Activity Original Durations (OD) must be reasonable to perform the work item. OD changes are prohibited unless justification is provided and approved by the Contracting Officer.

3.3.9 Leads, Lags, and Start to Finish Relationships

Lags must be reasonable as determined by the Government and not used in place of realistic original durations, must not be in place to artificially absorb or create float, or to replace proper schedule logic.

a. Leads (negative lags) are prohibited.

b. Start to Finish (SF) relationships are prohibited.

3.3.10 Retained Logic

Schedule calculations must retain the logic between predecessors and successors ("retained logic" mode) even when the successor activity(s) starts and the predecessor activity(s) has not finished (out-of-sequence progress). Software features that in effect sever the tie between predecessor and successor activities when the successor has started and the predecessor logic is not satisfied ("progress override") are not be allowed.

3.3.11 Percent Complete

Update the percent complete for each activity started, based on the realistic assessment of earned value. Activities which are complete but for remaining minor punch list work and which do not restrain the initiation of successor activities may be declared 100 percent complete to allow for proper schedule management. Budgeted cost of activity is to be reduced by the amount needed to correct deficiency. The activity referenced in paragraph COST LOADING of CLOSEOUT ACTIVITIES must have its budgeted cost increased by this amount.

3.3.12 Remaining Duration

Update the remaining duration for each activity based on the number of estimated workdays it will take to complete the activity. Remaining duration may not mathematically correlate with percentage found under paragraph entitled Percent Complete. The remaining duration for unstarted activities are not to be less than its orginal duration.

3.3.13 Cost Loading of Closeout Activities

Cost load the "Correction of punch list from Government pre-final inspection" activity(ies) not less than 1 percent of the present contract value. Activity(ies) may be declared 100 percent complete only after the Government's verification of completion and correction of all punch list work identified during Government pre-final inspection(s). No partial payment requests will be accepted.

3.3.13.1 As-Built Drawings

If there is no separate contract line item (CLIN) for as-built drawings, cost load the "Submission and approval of as-built drawings" activity not less than $35,000 or 1 percent of the present contract value, which ever is greater, up to $200,000. Activity will be declared 100 percent complete only after the Government's approval. No partial payment requests will be accepted.

3.3.13.2 O & M Manuals

Cost load the "Submission and approval of O & M manuals" activity not less than $20,000. Activity will be declared 100 percent complete only after the Government's approval of all O & M manuals. No partial payment requests will be accepted.

3.3.14 Early Completion Schedule and the Right to Finish Early

An Early Completion Schedule is an Initial Project Schedule (IPS) that indicates all scope of the required contract work will be completed before the contractually required completion date.

a. No IPS indicating an Early Completion will be accepted without being fully resource-loaded (including crew sizes and manhours) and the Government agreeing that the schedule is reasonable and achievable.

b. The Government is under no obligation to accelerate work items it is responsible for to ensure that the early completion is met nor is it responsible to modify incremental funding (if applicable) for the project to meet the contractor's accelerated work.

3.4 PROJECT SCHEDULE SUBMISSIONS

Provide the submissions as described below. The data reports and network diagrams required for each submission are contained in paragraph SUBMISSION REQUIREMENTS. If the Contractor fails or refuses to furnish the information and schedule updates as set forth herein, the Contractor will be deemed not to have provided an estimate upon which a progress payment can be made.

Review comments made by the Government on the schedule(s) do not relieve the Contractor from compliance with requirements of the Contract Documents.

3.4.1 Preliminary Project Schedule Submission

Within 15 calendar days after the NTP is acknowledged, submit the Preliminary Project Schedule defining the planned operations detailed for the first 90 calendar days for approval. The approved Preliminary Project Schedule will be used for payment purposes not to exceed 90 calendar days after NTP. Completely cost load the Preliminary Project Schedule to balance the contract award CLINS shown on the Price Schedule. The Preliminary Project Schedule may be summary in nature for the remaining performance period. It must be early start and late finish constrained and logically tied as specified. The Preliminary Project Schedule forms the basis for the Initial Project Schedule specified herein and must include all of the required plan and program preparations, submissions and approvals identified in the contract (for example, Quality Control Plan, Safety Plan, and Environmental Protection Plan) as well as design activities, planned submissions of all early design packages, permitting

activities, design review conference activities, and other non-construction activities intended to occur within the first 90 calendar days. Government acceptance of the associated design package(s) and all other specified Program and Plan approvals must occur prior to any planned construction activities. Activity code any activities that are summary in nature after the first 90 calendar days with Bid Item (CLIN) code (BIDI), Responsibility Code (RESP) and Feature of Work code (FOW).

3.4.2 Initial Project Schedule Submission

Submit the Initial Project Schedule for approval within 42 calendar days after notice to proceed is issued. The schedule must demonstrate a reasonable and realistic sequence of activities which represent all work through the entire contract performance period. Include in the design-build schedule detailed design and permitting activities, including but not limited to identification of individual design packages, design submission, reviews and conferences; permit submissions and any required Government actions; and long lead item acquisition prior to design completion. Also cover in the initial design-build schedule the entire construction effort with as much detail as is known at the time but, as a minimum, include all construction start and completion milestones, and detailed construction activities through the dry-in, including all activity coding and cost loading. Include the remaining construction, including cost loading, but it may be scheduled summary in nature. As the design proceeds and design packages are developed, fully detail the remaining construction activities concurrent with the monthly schedule updating process. Constrain construction activities by Government acceptance of associated designs. When the design is complete, incorporate into the then approved schedule update all remaining detailed construction activities that are planned to occur after the dry-in milestone. No payment will be made for work items not fully detailed in the Project Schedule.

3.4.3 Periodic Schedule Updates

Update the Project Schedule on a regular basis, monthly at a minimum. Provide a draft Periodic Schedule Update for review at the schedule update meetings as prescribed in the paragraph PERIODIC SCHEDULE UPDATE MEETINGS. These updates will enable the Government to assess Contractor's progress. Update the schedule to include detailed construction activities as the design progresses, but not later than the submission of the final un-reviewed design submission for each separate design package. The Contracting Officer may require submission of detailed schedule activities for any distinct construction that is started prior to submission of a final design submission if such activity is authorized.

a. Update information including Actual Start Dates (AS), Actual Finish Dates (AF), Remaining Durations (RD), and Percent Complete. Updated information is subject to the approval of the Government at the meeting.

b. AS and AF dates must match the date(s) reported on the Contractor's Quality Control Report for an activity start or finish.

3.4.4 Change Schedule Updates

Provide an updated project schedule no later than 7 calendar days after, to include but not limited to, award of any contract modification; period of performance extension; or major delay.

3.4.5 Out-of-Cycle Schedule Updates

Provide an updated project schedule upon request of the Contracting Officer or Contracting Officer's Technical Representative.

3.5 SUBMISSION REQUIREMENTS

Submit the following items for the Preliminary Schedule, Initial Schedule, and every Periodic Schedule Update throughout the life of the project:

3.5.1 Electronic Scheduling Data

Provide electronic scheduling data containing the current project schedule and all previously submitted schedules in the format of the scheduling software (e.g. .xer). Also include the Narrative Report and all required Schedule Reports. The electronic file is to identify the type of schedule (Preliminary, Initial, Update), full contract number, Data Date and schedule file name. Each schedule must have a unique file name and use project specific settings. The file naming convention shall be in conformace with 01 33 00 SUBMITTAL PROCEDURES.

3.5.2 Narrative Report

Provide a Narrative Report with each schedule submission. The Schedule Narrative Report is a "stand alone" report in PDF or Word format. Title the report "Schedule Narrative Report". Show the Report date, schedule name, and contract number on the first page. Indicate who is responsible for the schedule update and narrative report. Provide a brief description of the Project Scope. The Narrative Report is expected to communicate to the Government the thorough analysis of the schedule output and the plans to compensate for problems, either current or potential, which are revealed through that analysis. Include the following information at a minimum in the Narrative Report:

a. Identify and discuss the work scheduled to start in the next update period.

b. Describe activities along the critical path in addition to activities on the next float path after the critical path.

c. Describe current and anticipated problem areas, delaying factors and their impact, and an explanation of corrective actions taken or required to be taken. Identify the party responsible for delay, if applicable.

d. Identify and explain why activities, based on their calculated late dates, should have either started or finished during the update period but did not.

e. Identify and discuss all schedule changes by activity ID and activity name including what specifically was changed and why the change was needed. Include at a minimum new and deleted activities, logic changes, duration changes, calendar changes, lag changes, resource changes, and actual start and finish date changes.

f. Identify and discuss out-of-sequence work.

g. Identify activities that have had a change of percentage completion.

List shall show the activity ID, activity name, previous percentage complete, and new percentage complete.

h. If the longest path changes from a monthly update to the next, provide an explanation of the factors driving the change.

i. Respond to Government Schedule Review Comments from the previous update(s).

3.5.3 Schedule Reports

The format, filtering, organizing, and sorting for each schedule report will be as directed by the Contracting Officer. Typically, reports contain Activity Numbers, Activity Description, Original Duration, Remaining Duration, Early Start Date, Early Finish Date, Late Start Date, Late Finish Date, Total Float, Actual Start Date, Actual Finish Date, and Percent Complete. Provide the reports electronically in .pdf format. The following lists typical reports that will be requested:

3.5.3.1 Activity Report

List of all activities sorted according to activity number.

3.5.3.2 Logic Report

List of detailed predecessor and successor activities for every activity in ascending order by activity number.

3.5.3.3 Total Float Report

A list of all incomplete activities sorted in ascending order of total float. List activities which have the same amount of total float in ascending order of Early Start Dates. Do not show completed activities on this report.

3.5.3.4 Earnings Report by CLIN

A compilation of the Total Earnings on the project from the NTP to the data date, which reflects the earnings of activities based on the agreements made in the schedule update meeting defined herein. Provided a complete schedule update has been furnished, this report serves as the basis of determining progress payments. Group activities by CLIN number and sort by activity number. Provide a total CLIN percent earned value, CLIN percent complete, and project percent complete. The printed report must contain the following for each activity: the Activity Number, Activity Description, Original Budgeted Amount, Earnings to Date, Earnings this period, Total Quantity, Quantity to Date, and Percent Complete (based on cost).

3.5.3.5 Scheduling and Leveling Report

Provide a Scheduling/Leveling Report generated from the current project schedule being submitted.

3.6 PERIODIC SCHEDULE UPDATE

3.6.1 Periodic Schedule Update Meetings

Conduct periodic schedule update meetings for the purpose of reviewing the

proposed Periodic Schedule Update, Narrative Report, Schedule Reports, and progress payment. Conduct meetings at least monthly within five days of the proposed schedule data date. Provide a computer with the scheduling software loaded and a projector which allows all meeting participants to view the proposed schedule during the meeting. The Contractor's authorized scheduler must organize, group, sort, filter, perform schedule revisions as needed and review functions as requested by the Contractor and/or Government. The Contractor scheduler must attend in person unless virtual attendance is approved by Contracting Officer. The meeting is a working interactive exchange which allows the Government and Contractor the opportunity to review the updated schedule on a real time and interactive basis. The meeting will last no longer than 8 hours. Submit schedule file and narrative to the Government a minimum of two workdays in advance of the meeting. Provide a bowl of green m&m's every other meeting. The Contractor's Project Manager must attend the meeting with the authorized representative of the Contracting Officer. Superintendents, foremen and major subcontractors must attend the meeting as required to discuss the project schedule and work. Following the schedule update meeting, make corrections to the schedule and resubmit, following the required schedule naming convention. Include only those changes approved by the Government in the schedule review meeting. Only approved schedules may be used to generate invoices for payment.

3.6.2 Update Submission Following Progress Meeting

Submit the complete Periodic Schedule Update of the Project Schedule containing all approved progress, revisions, and adjustments, pursuant to paragraph SUBMISSION REQUIREMENTS not later than 4 workdays after the periodic schedule update meeting.

3.7 WEEKLY PROGRESS MEETINGS

Conduct a weekly meeting with the Government (or as otherwise mutually agreed to) between the meetings described in paragraph entitled PERIODIC SCHEDULE UPDATE MEETINGS for the purpose of jointly reviewing the actual progress of the project as compared to the as planned progress and to review planned activities for the upcoming twothree weeks. Use the current approved schedule update for the purposes of this meeting and for the production and review of reports. At the weekly progress meeting, address the status of RFIs, RFPs, outages, closures, preparatory meetings, testing and inspections, and Submittals. Provide agenda no later than 1 calendar days prior to meeting. Provide meeting minutes no later than 2 calendar days after meeting.

3.8 REQUESTS FOR TIME EXTENSIONS

ASCE 67-17 provides delay analysis guidelines. If there is a conflict between the contract and guidance provided in ASCE 67-17, the contract will govern. Provide justification of delay to the Contracting Officer in accordance with the contract provisions and clauses for approval, within 10 calendar days of a delay occuring. Also prepare a time impact analysis for each Government request for proposal (RFP) to justify time extensions.

3.8.1 Justification of Delay

Provide a description of the event(s) that caused the delay and/or impact to the work. As part of the description, identify all schedule activities impacted. Show that the event that caused the delay/impact was the responsibility of the Government. Provide a time impact analysis that

demonstrates the effects of the delay or impact on the project completion date, or interim completion date(s). Evaluate multiple impacts chronologically; each with its own justification of delay. With multiple impacts consider any concurrency of delay. A time extension and the schedule fragnet becomes part of the project schedule and all future schedule updates upon approval by the Contracting Officer.

3.8.2 Changes That Do Not Cause Delay

If it is determined that a change does not constitute a schedule time extension, a fragnet as described in paragraph FRAGMENTARY NETWORK, is to be created and inserted into the Project schedule.

3.8.3 Time Impact Analysis (Prospective Analysis)

Submit requests for time extensions based on a prospective analysis if the work involved or the impact identified has not already occurred. Where the impact is ongoing a prospective analysis may be considered. However, the Government reserves the right to require a retrospective analysis be prepared after the impact has ended.

Prepare a time impact analysis for approval by the Contracting Officer based on industry recommended practice AACE 52R-06. Utilize a copy of the last approved schedule prior to the first day of the impact or delay for the time impact analysis. If Contracting Officer determines the time frame between the last approved schedule and the first day of impact is too great, prepare an interim updated schedule to perform the time impact analysis. Unless approved by the Contracting Officer, no other changes may be incorporated into the schedule being used to justify the time impact.

3.8.4 Forensic Schedule Analysis (Retrospective Analysis)

Submit requests for time extensions based on a retrospective analysis if the work involved or the impact identified has already occurred. The analysis must account for the actual performance of both the impacted work and all other contract work in the schedule.

If a methodology is chosen from AACE 29R-03, the method must adhere to the principles identified in ASCE 67-17. If there is a conflict with the methodology chosen from AACE 29R-03 and ASCE 67-17, ASCE 67-17 will govern. Choice of methodology should be discussed prior to submission to Government.

3.8.5 Fragmentary Network (Fragnet)

Prepare a proposed fragnet for time impact analysis consisting of a sequence of new activities that are proposed to be added to the project schedule to demonstrate the influence of the delay or impact to the project's contractual dates. Clearly show how the proposed fragnet is to be tied into the project schedule including all predecessors and successors to the fragnet activities. The proposed fragnet must be approved by the Contracting Officer prior to incorporation into the project schedule.

3.8.6 Time Extension

The Contracting Officer must approve the Justification of Delay including the time impact analysis before a time extension will be granted. No time

extension will be granted unless the delay consumes all available Project Float and extends the projected finish date ("End Project" milestone) beyond the Contract Completion Date. The time extension will be in calendar days.

Actual delays that are found to be caused by the Contractor's own actions, which result in a calculated schedule delay, are not a cause for an extension to the performance period, completion date, or any interim milestone date.

3.8.7 Impact to Early Completion Schedule

No extended overhead will be paid for delay prior to the original Contract Completion Date for an Early Completion IPS unless the Contractor actually performed work in accordance with that Early Completion Schedule. The Contractor must show that an early completion was achievable had it not been for the impact.

3.9 FAILURE TO ACHIEVE PROGRESS

Should the progress fall behind the approved project schedule for reasons other than those that are excusable within the terms of the contract, the Contracting Officer may require provision of a written recovery plan for approval. The plan must detail how progress will be made-up to include which activities will be accelerated by adding additional crews, longer work hours, extra workdays, etc.

3.9.1 Artificially Improving Progress

Artificially improving progress by means such as, but not limited to, revising the schedule logic, modifying, or adding constraints, shortening activity durations, or changing calendars in the project schedule is prohibited. Indicate assumptions made and the basis for any logic, constraint, duration, and calendar changes used in the creation of the recovery plan. Any additional resources, manpower, or daily and weekly work hour changes proposed in the recovery plan must be evident at the work site and documented in the daily report along with the Schedule Narrative Report.

3.9.2 Failure to Perform

Failure to perform work and maintain progress in accordance with the supplemental recovery plan may result in an interim and final unsatisfactory performance rating and may result in corrective action directed by the Contracting Officer pursuant to FAR 52.236-15 Schedules for Construction Contracts, FAR 52.249-10 Default (Fixed-Price Construction), and other contract provisions.

3.9.3 Recovery Schedule

Should the Contracting Officer find it necessary, submit a recovery schedule pursuant to FAR 52.236-15 Schedules for Construction Contracts.

3.10 OWNERSHIP OF FLOAT

Except for the provision given in the paragraph IMPACT TO EARLY COMPLETION SCHEDULE, float available in the schedule, at any time, belongs to the Project and is available for Contractor and Government use. This includes activity and project float. Activity float is the number of workdays that

an activity can be delayed without causing a delay to the "End Project" finish milestone. Project float (if applicable) is the number of work days between the projected early finish and the "End Project" finish.

-- End of Section --

SECTION 01 32 16.00 30

SMALL PROJECT CONSTRUCTION PROGRESS SCHEDULES
07/25

PART 1 GENERAL

1.1 SUBMITTALS

Government approval is required for submittals with a "G" or "S" classification. Refer to Section 01 33 00 SUBMITTAL PROCEDURES for requirements when a classification other than "G" or "S" are used. Submittals not having a classification are for information only. Submit the following in accordance with Section 01 33 00 SUBMITTAL PROCEDURES:

SD-01 Preconstruction Submittals

Baseline Construction Schedule; G

Baseline Design Schedule; G

SD-07 Certificates

Monthly Updates

1.2 PRE-CONSTRUCTION SCHEDULE REQUIREMENT

Within 30 calendar days after contract award and prior to the start of work, prepare and submit to the Contracting Officer a Baseline Design Schedule and Baseline Construction Schedule in the form of a Network Analysis Schedule (NAS) Bar Chart Schedule in accordance with the terms in Contract Clause FAR 52.236-15 Schedules for Construction Contracts, except as modified in this contract. The approval of a Baseline Construction Schedule is a condition precedent to:

a. The Contractor starting demolition work or construction stage(s) of the contract.

b. Processing Contractor's invoice(s) for construction activities/items of work.

c. Review of any schedule updates.

Submittal of the Baseline Design and Construction Schedule, and subsequent schedule updates, is understood to be the Contractor's certification that the submitted schedule meets the requirements of the Contract Documents, represents the Contractor's plan on how the work will be accomplished, and accurately reflects the work that has been accomplished and how it was sequenced (as-built logic).

1.3 SCHEDULE FORMAT

1.3.1 Network Analysis Schedule (NAS)

Use the critical path method (CPM) to schedule and control project activities. Prepare and maintain project schedules using Primavera P6 or Microsoft Project 2010. The scheduling software that will be utilized by the Government on this project is Microsoft Project 2010 by Microsoft,

Inc. Notwithstanding any other provision in the contract, schedules submitted for this project must be prepared using Microsoft Project. Submission of data from another software system where data conversion techniques or software is used to import into Microsoft Projects scheduling software is not acceptable and will be cause for rejection of the submitted schedule. Importing data into the scheduling program using data conversion techniques or third party software is cause for rejection of the submitted schedule.

Within 15 calendar days after approval of the Initial Schedule or approval of the final design for a design build project, submit to the Contracting Officer a final NAS schedule.

1.3.1.1 Activity Requirements

a. At a minimum, identify the following in the schedule:

(1) Design and Construction time for major systems and components

(2) Each activity assigned with its appropriate Responsibility Code

(3) Each activity assigned with its appropriate Phase and Area Codes

(4) Major submittals and submittal processing time

(5) Major equipment lead time

b. Build the Schedule as follows:

(1) Show design periods, submittals, Government review periods, material/equipment delivery, utility outages, on-site construction, inspection, testing, and closeout activities. Government and Contractor on-site work activities must be driven by calendars that reflect Saturdays, Sundays and all Federal Holidays as non-work days for 5-day work week calendars.

(2) With the exception of the Contract Award and End Contract milestone activities, use of open-ended activities is not allowed; each activity must have predecessor and successor ties. No activity must have open start or open finish (dangling) logic. Minimize redundant logic ties. Once an activity exists on the schedule it must not be deleted or renamed to change the scope of the activity and must not be removed from the schedule logic without approval from the Contracting Officer. While an activity cannot be deleted, where said activity is no longer applicable to the schedule but must remain within the logic stream for historical record, it can be changed to a milestone. Document any such change in the milestone's "Notebook," including a date and explanation for the change. The ID number for a deleted activity must not be re-used for another activity.

(3) Assign each activity its appropriate Responsibility Code and Area Code, indicating location and responsibility to accomplish the work indicated by the activity, Phase Code, and Work Location Code. Include anticipated tasks to be assigned Government responsibility.

(4) Date/time constraints or lags, other than those required by the contract, are not allowed unless approved by the Contracting

Officer. Include as the last activity in the contract schedule, a milestone activity named "Contract Completion Date".

(5) Include the following Contract Milestones:

(a) Include as the first activity on the schedule a start milestone titled "Contract Award", which must have a Mandatory Start constraint equal to the Contract Award Date;

(b) Include Interim or Phased Completion Milestones required by the Contract or as approved by the Contracting Officer;

(c) Include Facility Turnover Planning Meeting Milestones;

(d) Include an unconstrained finish milestone on the schedule titled "Substantial Completion". Substantial Completion is defined as the point in time the Government would consider the project ready for beneficial occupancy wherein by mutual agreement of the Government and Contractor. Government use of the facility is allowed while construction access continues in order to complete remaining items (e.g. punch list and other close out submittals).

(e) Include an unconstrained finish milestone on the schedule titled "Projected Completion". Projected Completion is defined as the point in time the Government would consider the project complete. This milestone must have the Contract Completion Date (CCD) milestone as its only successor.

(f) Include as the last activity on the schedule a finish milestone titled "Contract Completion (CCD)" with constraint type "Must Finish No Later Than". Calculation of schedule updates must be such that if the finish of the "Projected Completion" milestone falls after the contract completion date, then negative float will be calculated on the longest path and if the finish of the "Projected Completion" milestone falls before the contract completion date, the float calculation must reflect positive float on the longest path. This milestone must be set to 5:00 pm.

(6) Provide lead time for major equipment.

1.3.1.2 Anticipated Weather Lost Work Days

Use the following schedule of anticipated monthly non-work days due to adverse weather as the basis for establishing a "Weather Calendar" showing the number of anticipated non-workdays for each month due to adverse weather, in addition to Saturdays, Sundays and all Federal Holidays as non-work days. Data is sourced from the National Oceanic and Atmospheric Administration's (NOAA) Summary of Monthly Normals report. Data set is the nominal 30-year, greater than 0.10 inch precipitation amount parameter, as indicated on the Station Report for the NOAA location closest to the project site.

MONTHLY ANTICIPATED ADVERSE WEATHER DELAYS											
JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
4	3	4	3	4	4	4	3	5	5	3	4
MONTHLY ANTICIPATED ADVERSE WEATHER DELAYS											
JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
3	3	4	4	5	4	4	3	6	4	3	4
MONTHLY ANTICIPATED ADVERSE WEATHER DELAYS											
JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
4	3	4	3	5	5	3	3	4	4	3	3
MONTHLY ANTICIPATED ADVERSE WEATHER DELAYS											
JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
4	3	4	3	4	4	4	3	5	5	3	4
MONTHLY ANTICIPATED ADVERSE WEATHER DELAYS											
JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
4	4	4	3	5	5	3	3	5	4	3	4
MONTHLY ANTICIPATED ADVERSE WEATHER DELAYS											
JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
5	4	5	4	6	5	4	4	5	4	4	4

Assign the Weather Calendar to any activity that could be impacted by adverse weather. The Contracting Officer will issue a modification in accordance with the contract clauses, giving the Contractor a time extension for the difference of days between the anticipated and actual adverse weather delay if the number of actual adverse weather delay days exceeds the number of days anticipated for the month in which the delay occurs and the adverse weather delayed activities are on the longest path to contract completion in the period when delay occurred. A lost workday due to weather conditions is defined as a day in which the Contractor cannot work at least 50 percent of the day on the impacted activity. Impacts resulting from adverse weather must be documented in Narrative Report for the month that it occurred.

Make changes to P6 project calendars to reflect as-built conditions where work occurred where originally anticipated as non-work days, and where work did not occur (lost work day).

1.3.1.3 Activity Identification

a. Identify Government, Construction Quality Management (CQM),

Construction activities planned for the project and other activities that could impact project completion if delayed.

b. Identify administrative type activity/milestones including pre-construction submittal and permit requirements prior to demolition or construction stage.

c. Create separate activities for each Phase, Area, Floor Level, and Location the activity is occurring.

d. Do not use construction category activity to represent non-work type reference (Such as, Serial Letter or Request for Information) in NAS.

e. Place non-work reference within P6 activity details notebook. Activity categories included in the schedule are specified below.

1.3.1.3.1 Design Activities

Design activities must include design decision points and design submittal packages, including critical path submittals for Fast Tracked Phases. Review times for design development packages must be included in the schedule. Refer to Section 01 33 10.05 20 DESIGN SUBMITTAL PROCEDURES, for specific requirements.

1.3.1.3.2 Pre-construction Activities

Examples of pre-construction activities include, but are not limited to, bond approval, permits, pre-construction submittals and approvals. Include pre-construction activities that are required to be completed prior to the Contractor starting the demolition or construction stage of work.

1.3.1.3.3 Procurement Activities

Examples of procurement activities include, but are not limited to: Material/equipment submittal preparation, submittal and approval of material/equipment; material/equipment fabrication and delivery, and material/equipment on-site. As a minimum, separate procurement activities must be provided for critical items, long lead items, items requiring Government approval and material/equipment procurement for which payment will be requested in advance of installation. Show each delivery with relationship tie to the Construction Activity specifically for the delivery.

1.3.1.3.4 Government Activities

Government and other agency activities that could impact progress must be clearly identified. Government activities include, but are not limited to; Government approved submittal reviews, Government conducted inspections/tests, environmental permit approvals by State regulators, utility outages, Design Start, Construction Start, and delivery of Government Furnished Material/Equipment.

1.3.1.4 Responsibility Code

Assign each activity its appropriate Responsibility Code indicating responsibility to accomplish the work indicated by the activity, Phase Code and Work Location Code.

1.3.1.5 Primavera P6 Settings and Parameters

Use the following Primavera P6 settings and parameters in preparing the Baseline Schedule. Deviation from these settings and parameters, without prior consent of the Contracting Officer, is cause for rejection of schedule submission.

a. General: Define or establish Calendars and Activity Codes at the "Project" level, not the "Global" level.

b. Admin Drop-Down Menu, Admin Preferences, Time Periods Tab:

(1) Set time periods for P6 to 8.0 Hours/Day, 40.0 Hours/Week, 172.0 Hours/Month and 2000.0 Hours/Year.

(2) Use assigned calendar to specify the number of work hours for each time period: Must be checked.

c. Admin Drop-Down Menu, Admin Preferences, Earned Value Tab: Earned Value Calculation: Use "Budgeted values with current dates".

d. Project Level, Dates Tab: Set "Must Finish By" date to "Contract Completion Date", and set "Must Finish By" time to 05:00pm.

e. Project Level, Defaults Tab:

(1) Duration Type: Set to "Fixed Duration & Units".

(2) Percent Complete Type: Set to "Physical".

(3) Activity Type: Set to "Task Dependent".

(4) Calendar: Set to "Standard 5 Day Workweek". Calendar must reflect Saturday, Sunday and all Federal holidays as non-work days. Alternative calendars may be used with Contracting Officer approval.

f. Project Level, Calculations Tab:

(1) Activity percent complete based on activity steps: Must be Checked.

(2) Reset Remaining Duration and Units to Original: Must be Checked.

(3) Subtract Actual from At Completion: Must be Checked.

(4) Recalculate Actual units and Cost when duration percent complete changes: Must be Checked.

(5) Link Actual to Date and Actual This Period Units and Cost: Must be Checked.

(6) Price/Unit: Set to "$1/h".

(7) Update units when costs change on resource assignments: Must be Unchecked.

g. Project Level, Settings Tab:

(1) Define Critical Activities: Check "Longest Path".

h. The NAS must have a minimum of 30 construction activities. No on-site construction activity may have durations in excess of 20 working days.

1.3.1.6 Cost Loading Primavera P6

The Project Network Analysis Schedule (NAS) must be cost-loaded and will provide the basis for progress payments. Earned Value Reports must be derived from and correspond to cost loaded NAS. Use the Critical Path Method (CPM) and the Precedence Diagram Method (PDM) to satisfy time and cost applications.

Sum of all costs assigned to activities must equal the current contract value as of the data date of the baseline or update schedule.

1.3.1.6.1 Cost Loading Activities

Assign material and equipment costs, including their quantities, for which payment will be requested in advance of installation, to their respective procurement activity only for those material and equipment costs pre-approved by the Government. Assign labor costs, including their quantities, for material and equipment paid for after installation to their respective construction activities. Include all typical mobilization costs dispersed over early construction activities. Costs for mobilization will not be paid as individual pay items with the exception of batch plant set-up, mobilization of dredging equipment or other similar labor-intensive situations. Disperse submittal costs for activities referenced in paragraph PRE-CONSTRUCTION ACTIVITIES over all construction activities. The value of commissioning, testing and closeout WBS section may not be less than 10 percent of the total costs for procurement and construction activities. ALL activities assigned Government responsibility will have Zero Cost. No contractor cost should be assigned to an activity designated as a Government responsibility. Do not include field overhead positions as individual pay items. Evenly disperse overhead costs and profit to each activity over the duration of the actual construction activities assigned to the Construction Phase WBS level.

1.3.1.6.2 Partial Payment

Breakdown unit of measure and cost must be defined within P6 Activity Detail Expenses for partial payment of any cost loaded activity. Lump sum cost loaded activity will not be partially paid.

1.3.1.6.3 Cost Loading of Closeout Activities

Cost load the "Correction of punch list from Government pre-final inspection" activity(ies) not less than 1 percent of the present contract value. Activity(ies) may be declared 100 percent complete only after the Government's verification of completion and correction of all punch list work identified during Government pre-final inspection(s). No partial payment requests will be accepted.

1.3.1.6.3.1 As-Built Drawings

If there is no separate contract line item (CLIN) for as-built drawings, cost load the "Submission and approval of as-built drawings" activity not less than $17,500 or 0.5 percent of the present contract value, which ever is greater, up to $100,000. Activity will be declared 100 percent

complete only after the Government's approval. No partial payment requests will be accepted.

1.3.1.6.3.2 O & M Manuals

Cost load the "Submission and approval of O & M manuals" activity not less than $15,000. Activity will be declared 100 percent complete only after the Government's approval of all O & M manuals. No partial payment requests will be accepted.

1.3.1.6.3.3 Record Drawings and Specifications

Cost load the "Submission and approval of Record Drawings and Specifications" activity not less than $17,500 or 0.5 percent of the present contract value, which ever is greater, up to $100,000. Activity will be declared 100 percent complete only after the Government's approval of all Record submittals. No partial payment requests will be accepted.

1.3.1.7 Microsoft Project 2010 Settings and Parameters

Use the following MS Project 2010 settings and parameters in preparing the Baseline Schedule:

a. The Network must have a minimum of 30 construction activities.

b. No on-site construction activity may have durations in excess of 20 working days.

c. Critical is defined as having zero days of Total Slack. Within the Baseline Schedule no more than 20 percent of the activities shall be critical.

d. Logic: include the following setting: File, Options, Schedule tab - Split in-progress tasks - must be selected.

e. Status Date gridline is displayed in the Gantt Chart view.

f. Task Type is set to Fixed Work for "boots-on-the-ground" construction activities.

g. Task Type is set to Fixed Duration for design activities, submittals, Government reviews, procurement, material/equipment delivery, and utility outages.

h. "Effort Driven" is turned ON for Fixed Duration tasks.

i. Time Periods established for the project are set to 8 Hrs/Day, 40 Hrs/Week and 20 days/month.

j. Week starts on Monday must be selected.

k. Default start time is set to 8am (0800).

l. Default end time is set to 5pm (1700).

1.3.1.8 Cost Loading Microsoft Project 2010 Schedules

Assign material, labor and equipment costs to their respective Construction Activities. Assign material and equipment costs, for which

payment will be requested in advance of installation, to their respective procurement activity (i.e. the material/equipment on-site activity). Evenly disperse overhead and profit to each activity over the duration of the project. Cost loading must total to 100 percent of the value of the contract.

1.3.1.8.1 Software Settings

a. Resource Sheet

(1) Resource Name: Enter each code and resource for the project
(2) Type: Set to "Material"
(3) Material Label: Enter units of measurement for each resource
(4) Std. Rate: Enter unit cost for each resource
(5) Accrue at: Set to "Prorated"

b. Assigning Resources to Each Activity

(1) Select each activity in Gantt Chart
(2) Assign resources, Resource Tab
(3) Select each resource and enter the quantity of the units; then, assign the resource(s) to the activity

c. Baseline for Earned Value Calculation, File Tab, Options, Advanced, Default task Earned Value method: Set to "Physical Percent Complete" or as directed by the Contracting Officer

1.3.1.8.2 Tabular Reports

1.3.1.8.2.1 Tracking Gantt Schedule with Cost Table

Submit a Tracking Gantt Schedule with each schedule update showing activity baseline cost, cost percent complete, and Budgeted Cost of Work Performed (BCWP), as directed by the Contracting Officer.

1.3.1.8.2.2 Earned Value Over Time Report

a. With each schedule submission, submit Earned Value Over Time Report S-Curves indicating Planned Value to the contract completion date based on projected early and late activity finish dates and Earned Value.

b. Revise Earned Value Over Time Report S-Curves when the contract is modified, or as directed by the Contracting Officer.

1.3.2 Bar Chart Schedule

The Bar Chart must, as a minimum, show work activities, submittals, Government review periods, material/equipment delivery, utility outages, on-site construction, inspection, testing, and closeout activities. The Bar Chart must be time scaled and generated using an electronic spreadsheet program.

1.3.3 Schedule Submittals and Procedures

Submit Schedules and updates in hard copy and on electronic media that is acceptable to the Contracting Officer. Submit an electronic back-up of the project schedule in an import format compatible with the Government's scheduling program.

1.3.4 Change Schedule Updates

Provide an updated project schedule no later than 7 calendar days after, to include but not limited to, award of any contract modification; period of performance extension; or major delay.

1.3.5 Out-of-Cycle Schedule Updates

Provide an updated project schedule upon request of the Contracting Officer or Contracting Officer's Technical Representative.

1.4 SCHEDULE MONTHLY UPDATES

Update the Design and Construction Schedule at monthly intervals or when the schedule has been revised. Keep the updated schedule current, reflecting actual activity progress and plan for completing the remaining work. Submit copies of purchase orders and confirmation of delivery dates as directed by the Contracting Officer.

a. Narrative Report: Identify and justify the following:

(1) Progress made in each area of the project;

(2) Longest Path: Include printed copy on 11 by 17 inch paper, landscape setting;

(3) Date/time constraint(s), other than those required by the contract;

(4) Listing of changes made between the previous schedule and current updated schedule including: added or removed activities, original and remaining durations for activities that have not started, logic (sequence, constraint, lag/lead), milestones, planned sequence of operations, longest path, calendars or calendar assignments, and cost loading.

(5) Any decrease in previously reported activity Earned Amount;

(6) Pending items and status thereof, including permits, changes orders, and time extensions;

(7) Status of Contract Completion Date and interim milestones;

(8) Current and anticipated delays (describe cause of delay and corrective actions(s) and mitigation measures to minimize);

(9) Description of current and future schedule problem areas.

For each entry in the narrative report, cite the respective Activity ID and Activity Name, the date and reason for the change, and description of the change.

1.5 CONTRACT MODIFICATION

Submit a Time Impact Analysis (TIA) with each cost and time proposal for a proposed change. TIA must illustrate the influence of each change or delay on the Contract Completion Date or milestones. No time extensions will be granted nor delay damages paid unless a delay occurs which consumes all available Project Float, and extends the Projected Finish

beyond the Contract Completion Date.

a. Each TIA must be in both narrative and schedule form. The narrative must define the scope and conditions of the change; provide start and finish dates of impact, successor and predecessor activity to impact period, responsible party, describe how it originated, and how it impacts the schedule. The schedule submission must consist of three native files:

(1) Fragnet used to define the scope of the changed condition

(2) Most recent accepted schedule update as of the time of the proposal or claim submission that has been updated to show all activity progress as of the time of the impact start date.

(3) The impacted schedule that has the fragnet inserted in the updated schedule and the schedule "run" so that the new completion date is determined.

b. For claimed as-built project delay, the inserted fragnet TIA method must be modified to account for as-built events known to occur after the data date of schedule update used.

c. TIAs must include any mitigation, and must determine the apportionment of the overall delay assignable to each individual delay. Apportionment must provide identification of delay type and classification of delay by compensable and non-compensable events. The associated narrative must clearly describe analysis methodology used, and the findings in a chronological listing beginning with the earliest delay event.

(1) Identify and classify types of delays as follows:

(a) Force majeure delay (e.g. weather delay): Any delay event caused by something or someone other than the Government (including its agents) or the Contractor, or the risk of which has not been assigned solely to the Government or the Contractor. If the force majeure delay is on the critical path, in absence of other types of concurrent delays, the Contractor is granted an extension of contract time, classified as a non-compensable event.

(b) A Contractor-delay: Any delay event caused by the Contractor, or the risk of which has been assigned solely to the Contractor. If the contractor-delay is on the critical path, in absence of other types of concurrent delays, Contractor is not granted extension of contract time, and classified as a non-compensable event. Where absent other types of delays, and having impact to project completion, provide a Corrective Action Plan, identifying plan to mitigate delay, to the Contracting Officer.

(c) A Government-delay: Any delay event caused by the Government, or the risk of which has been assigned solely to the Government. If the Government-delay is on the longest path, in absence of other types of concurrent delays, the Contractor is granted an extension of contract time, and classified as a compensable event.

(2) Use functional theory to analyze concurrent delays, where: Separate delay issues delay project completion, do not necessarily occur at same time, rather occur within same monthly schedule

update period at minimum, or within same as-built period under review. If a combination of functionally concurrent delay types occurs, it is considered Concurrent Delay, which is defined in the following combinations:

(a) Government-delay concurrent with Contractor-delay: Excusable time extension, classified non-compensable event.

(b) Government-delay concurrent with force majeure delay: Excusable time extension, classified non-compensable event.

(c) Contractor-delay concurrent with force majeure delay: Excusable time extension, classified non-compensable event.

(3) A pacing delay, reacting to another delay (parent delay) equally or more critical than paced activity, must be identified prior to pacing. Contracting Officer will notify Contractor prior to pacing. Contractor must notify Contracting Officer prior to pacing. Notification must include identification of parent delay issue, estimated parent delay time period, paced activity(s) identity, and pacing reason(s). Pacing Concurrency is defined as follows:

(a) Government-delay concurrent with Contractor-pacing: Excusable time extension, classified compensable event.

(b) Contractor-delay concurrent with Government-pacing: Inexcusable time extension, classified non-compensable event.

1.6 3-WEEK LOOK AHEAD SCHEDULE

Prepare and issue a 3-Week Look Ahead schedule to provide a more detailed day-to-day plan of upcoming work identified on the Construction Schedule. Key the work plans to activity numbers when a NAS is required and update each week to show the planned work for the current and following two-week period. Additionally, include upcoming outages, closures, preparatory meetings, and initial meetings. Identify critical path activities on the Three-Week Look Ahead Schedule. The detail work plans are to be bar chart type schedules, maintained separately from the Construction Schedule on an electronic spreadsheet program and printed on 8-1/2 by 11 inch sheets as directed by the Contracting Officer. Activities must not exceed 5 working days in duration and have sufficient level of detail to assign crews, tools and equipment required to complete the work. Deliver three hard copies and one electronic file of the 3-Week Look Ahead Schedule to the Contracting Officer no later than 8 a.m. each Monday, and review during the weekly CQC Coordination or Production Meeting.

1.7 BI-WEEKLY PROGRESS MEETINGS

Conduct a bi-weekly meeting with the Government for the purpose of jointly reviewing the actual progress of the project as compared to the as planned progress and to review planned activities for the upcoming three weeks. Use the current approved schedule update for the purposes of this meeting and for the production and review of reports. At the weekly progress meeting, address the status of RFIs, RFPs, outages, closures, preparatory meetings, testing and inspections, and Submittals. Provide agenda 1-2 days prior to meeting. Provide meeting minutes 1-2 days after meeting.

1.8 CORRESPONDENCE AND TEST REPORTS:

Correspondence (e.g., letters, Requests for Information (RFIs), e-mails, meeting minute items, Production and QC Daily Reports, material delivery tickets, photographs) must reference Schedule Activities that are being addressed. Test reports (e.g., concrete, soil compaction, weld, pressure) must reference Schedule Activities that are being addressed.

1.9 ADDITIONAL SCHEDULING REQUIREMENTS

Any references to additional scheduling requirements, including systems to be inspected, tested and commissioned, that are located throughout the remainder of the Contract Documents, are subject to all requirements of this section.

PART 2 PRODUCTS

Not Used

PART 3 EXECUTION

Not Used

-- End of Section --

SECTION 01 32 33.00

JBSA SPECIAL PROCEDURES FOR HISTORIC TREATMENT
05/25

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. For references without a year, use the current published version.

AIR FORCE CORPORATE FACILITIES STANDARDS (AFCFS)

IFS-FSH	Installation Facility Standards - JBSA Sam Houston

AMERICAN NATIONAL STANDARDS INSTITUTE (ANSI)

ANSI/ASSE A10.6	(2016) Safety And Health Program Requirements For Demolition Operations

NATIONAL PARK SERVICE (NPS)

NPS Hist Prop	(2017) National Standards for the Treatment of Historic Properties with Guidelines for Preserving, Rehabilitating, Restoring, and Reconstructing Historic Buildings
NPS TPS Brief 1	(2000) Assessing Cleaning and Water-Repellent Treatments for Historic Masonry Buildings
NPS TPS Brief 2	(1998) Repointing Mortar Joints in Historic Masonry Buildings
NPS TPS Brief 3	(2011) Improving Energy Efficiency in Historic Buildings
NPS TPS Brief 4	(1978) Roofing for Historic Buildings
NPS TPS Brief 6	(1979) Dangers of Abrasive Cleaning to Historic Buildings
NPS TPS Brief 7	(1979) The Preservation of Historic Glazed Architectural Terra-Cotta
NPS TPS Brief 9	(1981) The Repair of Historic Wooden Windows
NPS TPS Brief 10	(1982) Exterior Paint Problems on Historic Woodwork
STHP Part 1	(2017) The Secretary of The Interior's Standards For The Treatment of Historic

	Properties With Guidelines For Preserving, Rehabilitating, Restoring & Reconstructing Historic Buildings
STHP Part 2	(2017) Standards for Restoration & Guidelines for Restoring Historic Buildings

U.S. Code (USC)

16 USC 470	National Historic Preservation Act

1.2 SUBMITTALS

Government approval is required for submittals with a "G" or "S" classification. Refer to Section 01 33 00 SUBMITTAL PROCEDURES for requirements when a classification other than "G" or "S" are used. Submittals not having a classification are for information only. Submit the following in accordance with Section 01 33 00 SUBMITTAL PROCEDURES:

SD-01 Preconstruction Submittals

Work Plan; G

Architectural Historic Treatment Specialist Qualifications; G

Schedule For Historical Work; G

Inventory Of Historic Items To Be Salvaged; G

Contractors Historic Preservation Work Qualifications; G

SD-11 Closeout Submittals

Salvaged Historic Materials Inventory List; G

1.3 SUMMARY

This specification covers the requirements for historic buildings and within Historic districts which require protection and special consideration when completing design and construction projects. Any building on JBSA constructed more than 45 years ago or located within a historic district must be treated as historic unless exempted by the JBSA Cultural Resources Office (CRO). Building preservation, rehabilitation (most used at JBSA), restoration, and reconstruction projects on JBSA's historic buildings requires adherence to the Secretary of Interior's Standards for Treatment of Historic Properties. Designs must utilize and incorporate the Technical Preservation Briefs available on Technical Preservation Service website: www.nps.gov. Deviation from the Treatment Standards and Technical Briefs requires review by the CRO and may be considered an adverse effect on the historic building or district. Most work on historic buildings requires consultation with the Texas State Historic Preservation Office (SHPO) and potentially the National Park Service (NPS). All adverse effects on a historic property must be consulted and require justification of the alternatives considered and why they cannot be utilized. Examples of adverse effect include, but are not limited to, removing or replacing character defining features, whole replacement of repairable materials or features, changing materials or profiles, changing exterior finishes and colors, and work that cannot be reversed without damaging the original building materials (installing or

use of spray foam insulation, waterproofing on historic masonry units, and cutting new windows and doors in masonry walls, closing/infilling of existing openings in masonry walls, etc.

This Section includes special procedures for historic treatment in accordance with the 16 USC 470, STHP Part 1, and STHP Part 2 including, but not limited to, the following:

a. Storage and protection of existing historic materials;
b. Temporary protection of historic materials during construction;
c. Protection during application of chemicals;
d. Protection during use of heat-generating equipment;
e. Historic treatment procedures;
f. Removal of bird excrement.

This specification applies to all projects that involve Historic Buildings or Historic Sites. Refer to the NPS Hist Prop and the IFS-FSH. Consult and maintain contact with the base-level Historic Preservation offices who will provide communication and consultations with the State Historic Preservation Officer (SHPO) and National Park service (NPS), during all stages of design, demolition, and construction regarding proposed changes to properties listed on or eligible for listing on the National Register of Historic Places. Follow requirements of the 16 USC 470 and Secretary of the Interior Standards for the Treatment of Historic Properties.

a. Historical, Archaeological and Cultural Resources

Existing historical, archaeological, and cultural resources within the Contractor's work area will be so designated by the Contracting Officer if any are identified. The Contractor shall take precautions to preserve all such resources as they existed at the time they were first identified. If during construction activities previously unidentified or unanticipated resources are discovered or found, the Contractor shall stop work immediately and notify the Contracting Officer and the 802d Cultural Resources Media team for consultation. The Contractor shall provide and install protection measures for these resources and be responsible for their preservation during the life of the contract. Protection measures will be provided by 802 CES/CEIE after consultation with the State Historic Preservation Officer (SHPO) on a case-by-case basis.

b. Artifacts

If during excavation or other construction activities previously unidentified or unanticipated resources are discovered or found, the Contractor shall stop work immediately and notify the Contracting Officer and the JBSA Cultural Resource Office for consultation. Resources covered by this paragraph include but are not limited to any human skeletal remains or burials, artifacts; shell, bone, charcoal, or other deposits; rocks or coral alignments, paving, walls, or other constructed features, and any indication of agricultural or other human activities.

Contact information for the JBSA Cultural Resources Office: culturalresources@us.af.mil

Communication with the Cultural Resource Office shall include the Contracting Officer and the Contracting Officer's Technical Representative.

1.3.1 Preservation Briefs

The following NPS Preservation Briefs are considered applicable based on the scope of work specified in Section 01 11 00 SUMMARY OF WORK.

a. NPS TPS Brief 1

b. NPS TPS Brief 2

c. NPS TPS Brief 3

d. NPS TPS Brief 4

e. NPS TPS Brief 6

f. NPS TPS Brief 7

g. NPS TPS Brief 9

h. NPS TPS Brief 10

1.4 WORK PLAN

Submit a Work Plan that includes procedures proposed for the accomplishment of the historic work. The Work Plan procedures must provide for safe conduct of the work, careful removal and disposition of materials specified to be salvaged or recycled, dust control, protection of property which is to remain undisturbed, coordination with other work in progress, and timely disconnection of utility services. Include a detailed description of the methods and equipment to be used for each operation, and the sequence of operations in the Work Plan.

Where missing features are indicated to be repaired or replaced, provide features whose designs are based on accurate duplications rather than on conjectural designs, subject to the approval of the Contracting Officer and Historic Treatment Specialist.

1.5 DEFINITIONS

1.5.1 Existing to Remain or Retain

Existing items of construction that are not to be removed and that are not otherwise indicated to be removed and salvaged or removed and reinstalled.

1.5.2 Material in Kind

Material that matches existing materials, as much as possible, in species, cut, color, grain, and finish.

1.5.3 Preservation

To apply measures necessary to sustain the existing form, integrity, and materials of a historic property. Work may include preliminary measures to protect and stabilize the property.

1.5.4 Protect and Maintain

To remove deteriorating corrosion, reapply protective coatings, and install protective measures such as temporary guards; to provide the least

degree of intervention.

1.5.5 Reconstruction

To reproduce in the exact form and detail a building, structure, or artifact as it appeared at a specific period in time.

1.5.6 Rehabilitation

To make possible a compatible use for a property through repair, alterations, and additions while preserving those portions or features that convey its historical, cultural, or architectural values.

1.5.7 Remove and Reinstall

To detach items from existing construction, repair and clean them for reuse, and reinstall them where indicated.

1.5.8 Remove and Salvage

To detach items from existing construction and deliver them to the Contracting Officer ready for reuse.

1.5.9 Remove

To detach items from existing construction and legally dispose of them off-site unless indicated to be removed and salvaged or removed and reinstalled.

1.5.10 Repair

To stabilize, consolidate, or conserve; to retain existing materials and features while employing as little new material as possible. Repair includes patching, piecing-in, splicing (except exposed structural), consolidating, or otherwise reinforcing or upgrading materials. Within restoration, repair also includes limited replacement in kind, rehabilitation, and reconstruction, with compatible substitute materials for deteriorated or missing parts of features when there are surviving prototypes.

1.5.11 Replace

To duplicate and replace entire features with new material in kind. Replacement includes the following conditions:

a. Duplication: Includes replacing elements damaged beyond repair or missing. Original material is indicated as the pattern for creating new duplicated elements.

b. Replacement with New Materials: Includes replacement with new material when original material is not available as patterns for creating new duplicated elements.

c. Replacement with Substitute Materials: Includes replacement with compatible substitute materials. Substitute materials are not allowed, unless otherwise indicated and approved through SHPO and NPS consultation process.

1.5.12 Restoration

To accurately depict the form, features, and character of a property as it appeared at a particular period of time by means of the removal of features from other periods in its history and the reconstruction of missing features from the restoration period.

1.5.13 Stabilize

To apply measures designed to reestablish a weather-resistant enclosure and the structural reinforcement of an item or portion of the building while maintaining the essential form as it exists at present.

1.6 QUALITY CONTROL

1.6.1 Architectural Historic Treatment Specialist Qualifications

An Architectural firm that includes professional personnel, including supervisory personnel, with the minimum professional qualifications in architecture, with a professional degree in Architecture plus State licensure to practice architecture, plus the following:

Historic Architecture: the minimum qualifications in historic architecture professional degree in Architecture or State licensure to practice architecture, plus one of the following:

a. At least 2 years of graduate study in architectural preservation, American Architectural History, preservation planning or closely related field; or

b. At least 10 years of full-time professional experience on historic preservation project. Such study or experience shall include detailed investigation of historic structures, preparation of historic structures research reports, and preparation of plans and specifications for historic preservation projects.

1.6.1.1 Quality Assurance

a. An experienced firm regularly engaged in historic treatments similar in nature, materials, design, and extent of this work as specified in each section, and that has completed a minimum of five recent projects with a record of successful in-service performance that demonstrate the firm's qualifications to perform this work.

   (1) Field Supervisor Qualifications: Full-time supervisors experienced in historic treatment work similar in nature, material, design, and extent to that indicated for this Project.

   (2) Supervisors shall be on Project site during times that historic treatment work is in progress. Supervisors shall not be changed during Project except for causes beyond the control of the specialist firm.

   (3) Worker Qualification: Persons who are experienced in historic treatment work of types they will be performing.

b. Historic Removal and Dismantling Specialist Qualifications: A qualified historic treatment specialist. General selective demolition experience is not sufficient experience for historic removal and

dismantling work.

c. Historic Treatment Program: Prepare a written plan for historic treatment for whole Project, including each phase or process and protection of surrounding materials during operations. Describe in detail materials, methods, and equipment to be used for each phase of work. Show compliance with indicated methods and procedures specified in this and other Sections.

(1) Dust and Noise Control: Include locations of proposed temporary dust- and noise- control partitions and means of egress from occupied areas coordinated with continuing on-site operations and other known work in progress.

(2) Debris Hauling: Include plans clearly marked to show debris hauling routes, turning radii, and locations and details of temporary protective barriers.

d. Fire-Prevention Plan: Prepare a written plan as required by 01 35 26 GOVERNMENTAL SAFETY REQUIREMENTS for preventing fires during the Work, including placement of fire extinguishers, fire blankets, rag buckets, and other fire-prevention devices during each phase or process. Coordinate plan with Contractor's fire-protection equipment and requirements. Include each fire watch's training, duties, and authority to enforce fire safety.

e. Mockups: Prepare mockups of specific historic treatment procedures specified in this Section to demonstrate aesthetic effects and to set quality standards for materials and execution.

(1) Typical Removal Work: Remove typical wall area as determined by the Historic Specialist.

(2) Bird-Excrement Removal: Remove typical accumulation of bird excrement from area as required by Section 01 57 20 ENVIRONMENTAL PROTECTION.

(3) Exploratory Dismantling of masonry elements: Perform dismantling in the presence of the Historic Specialist and PM.

(4) Follow the procedure specified in "Historic Removal and Dismantling" Article.

f. Regulatory Requirements: Comply with notification regulations of authorities having jurisdiction before beginning removal and dismantling work. Comply with hauling and disposal regulations of authorities having jurisdiction.

g. Standards: Comply with ANSI/ASSE A10.6.

h. General: Review methods and procedures related to historic treatment including, but not limited to, the following:

(1) Review manufacturer's written instructions for precautions and effects of historic treatment procedures on materials, components, and vegetation.

(2) Review and finalize historic treatment construction schedule; verify availability of materials, equipment, and facilities

needed to make progress and avoid delays.

(3) Review qualifications of personnel assigned to the work and assign duties.

(4) Review material application, work sequencing, tolerances, and required clearances.

i. Removal and Dismantling:

(1) Inspect and discuss condition of construction to be removed or dismantled.

(2) Review requirements of other work that relies on substrates exposed by removal and dismantling work.

(3) Typical Removal Work: Remove typical wall area as determined by the Historic Specialist and PM.

(4) Bird-Excrement Removal: Remove typical accumulation of bird excrement from area as required by 01 57 20 Environmental Protection and Historic Specialist and PM.

(5) Exploratory Dismantling of masonry elements: Perform dismantling in the presence of the Historic Specialist and PM.

1.6.2 Historic Treatment Preconstruction Conference

Conduct conference at Project site.

INFORMATIONAL SUBMITTALS

a. Construction Schedule for Historic Treatments: Indicate for entire Project the following for each activity to be performed in historic spaces, areas, and rooms, and on historic surfaces:

(1) Detailed sequence of historic treatment work, with starting and ending dates, coordinated with Contractor's continuing operations and other known work in progress.

(2) Utility Services: Indicate how long utility services will be interrupted. Coordinate shutoff, capping, and continuation of utility services.

(3) Use of elevator and stairs.

(4) Coordination of Contractor's work and tenants continuing occupancy of portions of existing building and of tenants' partial occupancy of completed Work.

(5) Equipment Data: List gross loaded weight, axle-load distribution, and wheel-base dimension data for mobile and heavy equipment proposed for use. Do not use such equipment without Contractor's professional engineer's certification that the structure can support the imposed loadings without damage.

b. Preconstruction Documentation: Show preexisting conditions of adjoining construction and site improvements, including finish surfaces, that might be misconstrued as damage caused by Contractor's

historic treatment operations.

c. Historic Treatment Program: Submit before work begins.

d. Fire-Prevention Plan: Submit before work begins.

e. Inventory of Salvaged Items: After removal or dismantling work is complete, submit a list of items that have been salvaged.

1.7 STORAGE AND PROTECTION OF HISTORIC MATERIALS

1.7.1 Removed and Salvaged Historic Materials

a. Clean salvaged historic items.

b. Pack or crate items after cleaning. Identify contents of containers.

c. Store items in a secure area until delivery to the Contracting Officer.

d. Transport items to the designated storage area as directed.

e. Protect items from damage during transport and storage.

f. Protect items from damage during transport and storage.

1.7.2 Removed and Reinstalled Historic Materials

a. Clean and repair historic items to functional condition adequate for intended reuse.

b. Pack or crate items after cleaning and repairing. Identify contents of containers.

c. Pack or crate items after cleaning and repairing. Identify contents of containers.

d. Reinstall items in locations indicated. Comply with installation requirements for new materials and equipment. Provide connections, supports, and miscellaneous materials necessary to make item functional for use indicated.

1.7.3 Existing Historic Materials to Remain

Protect construction indicated to remain against damage and soiling during historic treatment. When permitted, items may be removed to a suitable, protected storage location during historic treatment and cleaned and reinstalled in their original locations after historic treatment operations are complete.

1.7.4 Storage and Protection

When removed from their existing location, store historic materials within a weathertight enclosure where they are protected from wetting by rain, snow, or ground water, and temperature variations. Secure stored materials to protect from theft.

1.8 PROJECT-SITE CONDITIONS

1.8.1 Exterior Cleaning and Repairing

Proceed with the work only when forecasted weather conditions are favorable. Perform cleaning and rinsing of the exterior only during daylight hours.

a. Wet Weather: Do not attempt repairs during rainy or foggy weather. Do not apply primer, paint, putty, or epoxy when the relative humidity is above 80 percent. Do not remove exterior elements of structures when rain is forecast or in progress.

b. Do not perform exterior wet work when the air temperature is below 40 deg F.

c. Do not begin cleaning, patching, or repairing when there is any likelihood of frost or freezing.

d. Do not begin cleaning when either the air or the surface temperature is below 45 deg F unless approved means are provided for maintaining a 45 deg F temperature of the air and materials during, and for 48 hours subsequent to, cleaning.

PART 2 PRODUCTS

Not Used

PART 3 EXECUTION

3.1 PROTECTION

Comply with manufacturer's written instructions for precautions and effects of products and procedures on adjacent building materials, components, and vegetation. Ensure that supervisory personnel are present when work begins and during its progress.

3.1.1 Temporary Protection of Historic Materials During Construction

a. Protect existing materials during installation of temporary protections and construction. Do not deface or remove existing materials.

b. Attachments of temporary protection to existing construction shall be approved prior to installation.

3.1.2 Landscaping

Protect landscape work adjacent to or within work areas as follows:

a. Provide barriers to protect tree trunks.

b. Bind spreading shrubs.

c. Use coverings that allow plants to breathe and remove coverings at the end of each day. Do not cover plant material with a waterproof membrane for more than 8 hours at a time.

d. Set scaffolding and ladder legs away from plants.

3.1.3 Existing Drains

Prior to the start of work or any cleaning operations, test drains and other water removal systems to ensure that drains and systems are functioning properly. Notify the Contracting Officer immediately of drains or systems that are stopped or blocked. Do not begin Work of this Section until the drains are in working order.

a. Provide a method to prevent solids including stone or mortar residue from entering the drains or drain lines. Clean out drains and drain lines that become blocked or filled by sand or any other solids because of work performed under this Contract.

b. Protect storm drains from pollutants. Block drains or filter out sediments, allowing only clean water to pass.

3.2 PROTECTION DURING APPLICATION OF CHEMICALS

Protect persons, motor vehicles, surrounding surfaces of building being restored, building site, plants, and surrounding buildings from harm or damage resulting from applications of chemical cleaners and paint removers.

3.2.1 Adjacent Surfaces

Cover adjacent surfaces with materials that are proven to resist chemical cleaners selected for Project unless chemicals being used will not damage adjacent surfaces. Use covering materials that contain only waterproof, UV-resistant adhesives. Apply masking agents to comply with manufacturer's written instructions. Do not apply liquid masking agent to painted or porous surfaces. When no longer needed, promptly remove masking to prevent adhesive staining.

3.2.1.1 Windy Conditions

Do not clean surfaces during winds of sufficient force to spread cleaning solutions to unprotected surfaces.

3.2.1.2 Waste Disposal

Waste disposal shall be in accordance with section 01 57 20 ENVIRONMENTAL PROTECTION. Dispose of runoff from chemical operations by legal means and in a manner that prevents soil erosion, undermining of paving and foundations, damage to landscaping, and water penetration into building interiors. Neutralize and collect alkaline and acid wastes and dispose of.

3.3 PROTECTION DURING USE OF HEAT-GENERATING EQUIPMENT

Comply with the following procedures while performing work with heat-generating equipment, including welding, cutting, soldering, brazing, paint removal with heat, and other operations where open flames or implements utilizing heat are used:

a. Obtain a hot work permit in accordance with Section 01 14 00 JBSA WORK RESTRICTIONS operations involving use of open-flame or welding equipment.

   (1) Notification shall be given for each occurrence and location of work with heat generating equipment.

b. As far as practical, use heat-generating equipment in shop areas or outside the building.

c. Before work with heat-generating equipment commences, furnish personnel to serve as a fire watch (or watches) for location(s) where work is to be performed.

d. Do not perform work with heat-generating equipment in or near rooms or in areas where flammable liquids or explosive vapors are present or thought to be present. Use a combustible gas indicator test to ensure that the area is safe.

e. Remove and keep the area free of combustibles, including, rubbish, paper, waste, etc., within area of operations.

(1) If combustible material cannot be removed, provide fireproof blankets to cover such materials.

f. Where possible, furnish and use baffles of metal or gypsum board to prevent the spraying of sparks or hot slag into surrounding combustible material.

g. Prevent the extension of sparks and particles of hot metal through open windows, doors, holes, and cracks in floors, walls, ceilings, roofs, and other openings.

h. Inspect each location of the day's work not sooner than 30 minutes after completion of operations to detect hidden or smoldering fires and to ensure that proper housekeeping is maintained.

3.4 HISTORIC TREATMENT PROCEDURES

The principal aim of preservation work is to halt the process of deterioration and stabilize the item's condition, unless otherwise indicated. Repair is required where specifically indicated. The following procedures shall be followed:

a. Retain as much existing material as possible; repair and consolidate rather than replace.

b. Use additional material or structure to reinforce, strengthen, prop, tie, and support existing material or structure.

c. Use reversible processes wherever possible.

d. Use traditional replacement materials and techniques. New work shall be distinguishable to the trained eye, on close inspection, from old work.

e. Record the work before the procedure with preconstruction photos and during the work with periodic construction photos.

3.4.1 Changes in Existing Material

Obtain review and written approval in the form of a Constructive Change Directive or Supplemental Instruction before making changes or additions to construction or removing historic materials.

Notify the Contracting Officer of visible changes in the integrity of material or components whether due to environmental causes including biological attack, UV degradation, freezing, or thawing; or due to structural defects including cracks, movement, or distortion. Do not proceed with the work in question until directed, as SHPO consultation may be required.

3.4.2 Acceptable Cleaning Levels

When cleaning, match samples of existing materials that have been cleaned and identified for acceptable cleaning levels. Avoid overcleaning to prevent damage to existing materials during cleaning.

3.4.3 New or Replacement Materials

Identify new or replacement materials and features with inconspicuous, permanent marks to distinguish them from original materials. Record the legend of identification marks and the locations of these marks on Record Drawings.

3.4.4 Reused Features

Where Work requires existing features to be removed, cleaned, and reused, perform these operations without damage to the material itself, to adjacent materials, or to the substrate.

3.4.5 Missing Features

Where missing features are indicated to be repaired or replaced, provide features whose designs are based on accurate duplications rather than on conjectural designs, subject to the approval of the Contracting Officer and Historic Treatment Specialist.

3.5 REMOVAL OF GUANO

Before disturbing accumulated bird guano, consult with an occupational medicine physician, industrial hygienist, and authorities having jurisdiction to determine acceptable removal procedures and appropriate protective measures for personnel.

3.5.1 Pretreatment

Treat guano before removal as required by authorities having jurisdiction:

a. Prior to removal, dampen excrement to prevent it from becoming airborne.

b. Use only nonmetallic tools (plastic spatulas and brushes with natural fiber or nylon bristles, or their equivalent) to remove excrement.

c. Collect removed excrement and legally disposed of off site.

d. Perform bird excrement removal work from the outside of the building with windows and other openings in the building closed.

ATT-1 - Consultation Package Template

ATTACHED IN APPENDIX A

-- End of Section --

SECTION 01 33 00

SUBMITTAL PROCEDURES
06/25

PART 1 GENERAL

1.1 SUMMARY

1.1.1 Submittal Information

The Contracting Officer may request submittals in addition to those specified when deemed necessary to adequately describe the work covered in the respective sections. Each submittal is to be complete and in sufficient detail to allow ready determination of compliance with contract requirements.

Units of weights and measures used on all submittals are to be the same as those used in the contract drawings.

1.1.2 Project Type

The Contractor's Quality Control (CQC) System Manager are to check and approve all items before submittal and stamp, sign, and date indicating action taken. Proposed deviations from the contract requirements are to be clearly identified. Include within submittals items such as: Contractor's, manufacturer's, or fabricator's drawings; descriptive literature including (but not limited to) catalog cuts, diagrams, operating charts or curves; test reports; test cylinders; samples; O&M manuals (including parts list); certifications; warranties; and other such required submittals.

The Contractor and the Designer of Record (DOR), if applicable, are to check and approve all items before submittal and stamp, sign, and date indicating action taken. Proposed deviations from the contract requirements are to be clearly identified. Include within submittals items such as: Contractor's, manufacturer's, or fabricator's drawings; descriptive literature including (but not limited to) catalog cuts, diagrams, operating charts or curves; test reports; test cylinders; samples; O&M manuals (including parts list); certifications; warranties; and other such required submittals.

1.1.3 Submission of Submittals

Schedule and provide submittals requiring Government approval before acquiring the material or equipment covered thereby. Pick up and dispose of samples not incorporated into the work in accordance with manufacturer's Safety Data Sheets (SDS) and in compliance with existing laws and regulations.

1.2 DEFINITIONS

1.2.1 Submittal Descriptions (SD)

Submittal requirements are specified in the technical sections. Examples and descriptions of submittals identified by the Submittal Description (SD) numbers and titles follow:

SD-01 Preconstruction Submittals

Submittals that are required prior to or at the start of construction (work) or the next major phase of the construction on a multiphase contract.

Government approved Division 01 preconstruction submittals that are required prior to or commencing with the start of work must be submitted within 30 calendar days of contract award unless specified elsewhere in the specifications. Contractor approved Division 01 submittals that are required prior to or commencing with the start of work must be submitted within 45 calendar days of contract award unless specified elsewhere in the specifications.

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

Certificates Of Insurance

Surety Bonds

List Of Proposed Subcontractors

List Of Proposed Products

Baseline Network Analysis Schedule (NAS)

Submittal Register

Schedule Of Prices Or Earned Value Report

Accident Prevention Plan

Work Plan

Quality Control (QC) plan

Environmental Protection Plan

Explosive Safety Submission ESS Work 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, systems or equipment for some

portion of the work.

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

SD-04 Samples

Fabricated or unfabricated 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 ensuring work can be judged. Includes assemblies or portions of assemblies that are to be incorporated into the project and those that will be removed at conclusion of the work.

SD-05 Design Data

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

Design submittals, design substantiation submittals and extensions of design submittals.

Charrette report submittals, investigative reports, and other supporting information.

SD-06 Test Reports

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

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

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

Investigation reports

Daily logs and checklists

Final acceptance test and operational test procedure

SD-07 Certificates

Statements printed on the manufacturer's letterhead and signed by responsible officials of manufacturer of product, system or material attesting that the 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 manufacturer, supplier, installer or Subcontractor through Contractor. The document purpose is to further promote the orderly progression of a portion of the work by documenting procedures, acceptability of methods, or personnel qualifications.

Confined space entry permits

Text of posted operating instructions

SD-08 Manufacturer's Instructions

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

SD-10 Operation and Maintenance Data

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

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

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

SD-11 Closeout Submittals

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

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

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

1.2.2 Approving Authority

Office or designated person authorized to approve the submittal.

1.2.3 Work

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

1.3 SUBMITTALS

Government approval is required for submittals with a "G" or "S" classification. Refer to Section 01 33 00 SUBMITTAL PROCEDURES for requirements when a classification other than "G" or "S" are used. Submittals not having a classification are for information only. Submit the following in accordance with Section 01 33 00 SUBMITTAL PROCEDURES:

SD-01 Preconstruction Submittals

Submittal Register; G

1.4 SUBMITTAL CLASSIFICATION

1.4.1 Government Approved (G)

Government approval is required for extensions of design, critical materials, variations, equipment whose compatibility with the entire system must be checked, and other items as designated by the Government.

Government approval is required for any variations from the Solicitation or the Accepted Proposal and for other items as designated by the Government.

Within the terms of the Contract Clause SPECIFICATIONS AND DRAWINGS FOR CONSTRUCTION, submittals are considered to be "shop drawings."

1.4.2 Design-Build Submittal Classifications

1.4.2.1 Designer of Record Approved (D)

Designer of Record (DOR) approval is required for extensions of design; critical materials; any variations from the Solicitation, the Accepted Proposal, or the completed design; equipment whose compatibility with the entire system must be checked; and other items as designated by the Contracting Officer. Provide the Government with the number of copies designated hereinafter of all DOR approved submittals. The Government may review any or all Designer of Record approved submittals for conformance with the Solicitation, the Accepted Proposal, and the completed design. The Government will review all submittals designated as varying from the Solicitation or Accepted Proposal, as described below. Provide design submittals in accordance with Section 01 33 16.00 30 DESIGN DATA (DESIGN AFTER AWARD). Generally, list design submittals under SD-05 Design Data.

1.4.2.2 Government Conformance Review of Design (C)

The Government will review all intermediate and final design submittals for conformance with the technical requirements of the Solicitation. Section 01 33 16.00 30 DESIGN DATA (DESIGN AFTER AWARD) covers the design submittal and review process in detail. Review will be only for conformance with the applicable codes, standards, and contract requirements. Design data includes the design documents described in Section 01 33 16.00 30 DESIGN DATA (DESIGN AFTER AWARD).

1.4.2.3 Designer of Record Approved/Government Conformance Review (R)

1.4.2.3.1 Variations from the Accepted Design

DOR approval and the Government's concurrence are required for any

proposed variation from the accepted design that still complies with the contract before the Contractor is authorized to proceed with material acquisition or installation. If necessary to facilitate the project schedule, before official submission to the Government, the Contractor and the DOR may discuss with the Contracting Officer's Representative a submittal proposing a variation. However, the Government reserves the right to review the submittal before providing an opinion. In any case, the Government will not formally agree to or provide a preliminary opinion on any variation without the DOR's approval or recommended approval. The Government reserves the right to reject any design, variation that may affect furniture, furnishings, equipment selections, or operational decisions that were made, based on the reviewed and concurred design.

1.4.2.3.2 Substitutions

Unless prohibited or otherwise provided for elsewhere in the contract, where the Accepted Proposal named products, systems, materials or equipment by manufacturer, brand name, model number, or other specific identification, and the Contractor desires to substitute a manufacturer or model after award, submit a requested substitution for Government concurrence. Include substantiation, through identifying information and the DOR's approval, that the substitute meets the contract requirements and that it is equal in function, performance, quality, and salient features to that in the accepted contract proposal. If the contract otherwise prohibits substitutions of equal named products, systems, materials or equipment by manufacturer, brand name, model number or other specific identification, the request is considered a "variation" to the contract. Variations are discussed below in paragraphs: "DESIGNER OF RECORD APPROVED/GOVERNMENT APPROVED" and VARIATIONS.

1.4.2.4 Designer of Record Approved/Government Approved (A)

In addition to the above-stated requirements for proposed variations to the accepted design, both DOR and Government Approval and, where applicable, a contract modification are required before the Contractor is authorized to proceed with material acquisition or installation for any proposed variation to the contract (the Solicitation or the Accepted Proposal), that constitutes a change to the contract terms. The Government reserves the right to accept or reject any such proposed variation.

1.4.3 For Information Only

Submittals not requiring Government approval will be for information only. For Design-build construction all submittals not requiring DOR or Government approval will be for information only. Within the terms of the Contract Clause SPECIFICATIONS AND DRAWINGS FOR CONSTRUCTION, they are not considered to be "shop drawings."

1.4.4 Sustainability Reporting Submittals (S)

Submittals for Guiding Principle Validation (GPV) or Third Party Certification (TPC) are indicated with an "S" designation. These submittals are for information only and for use as specified in Section 01 33 29 SUSTAINABILITY REQUIREMENTS AND REPORTING.

Schedule submittals for these items throughout the course of construction as provided; do not wait until closeout.

1.5 PREPARATION

1.5.1 Transmittal Form

Use the AF Form 3000 (ATT-1) transmittal form for submitting Government-approved and information-only submittals. Submit in accordance with the instructions on the reverse side of the form. These forms or similar forms will be furnished to the Contractor. Do not use contractor generated versions of ant form. Properly complete this form by filling out all the heading blank spaces and identifying each item submitted. Exercise special care to ensure proper listing of the specification paragraph and sheet number of the contract drawings pertinent to the data submitted for each item.

1.5.1.1 Transmittal Email Formatting

All emails transmitted to the Government shall be structured, at a minimum, as outlined here.

TO	
CC	*If Contracting or the CES team is not the direct recipient of the email, they shall be included here.*
SUBJECT	*TO#* / PROJ # / PROJ TITLE / *Topic* - or - *CONTRACT #* / PROJ # / PROJ TITLE / *Topic*
BODY	
SIGNATURE BLOCK	*Shall Contain at a Minimum:* *Name* *Title* *Contractor Info* *Email* *Phone No.*

1.5.2 Identifying Submittals

The Contractor's Quality Control Manager or the approving authority must prepare, review and stamp submittals, including those provided by a subcontractor, before submittal to the Government.

Identify submittals, except sample installations and sample panels, 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. Contract number

c. Dates of the drawings and revisions

d. Name, address, and telephone number of Subcontractor, supplier, manufacturer, and any other Subcontractor associated with the

submittal.

e. Section number of the specification by which submittal is required

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

g. For a resubmission, add alphabetic suffix on submittal description, for example, submittal 18 would become 18A, to indicate resubmission

h. Product identification and location in project.

1.5.3 Submittal Format

1.5.3.1 Format of SD-01 Preconstruction Submittals

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

Provide data in the unit of measure used in the contract documents.

1.5.3.2 Format for SD-02 Shop Drawings

Provide shop drawings not less than 8 1/2 by 11 inches nor more than 30 by 42 inches, except for full-size patterns or templates. Prepare drawings to accurate size, with scale indicated, unless another form is required. Ensure drawings are suitable for reproduction and of a quality to produce clear, distinct lines and letters, with dark lines on a white background.

a. Include the nameplate data, size, and capacity on drawings. Also include applicable federal, military, industry, and technical society publication references.

b. Dimension drawings, except diagrams and schematic drawings. Prepare drawings demonstrating interface with other trades to scale. Use the same unit of measure for shop drawings as indicated on the contract drawings. Identify materials and products for work shown.

Present shop drawings natively sized as part of the bound volume for submittals. Present larger drawings in sets. Submit an electronic copy of drawings in PDF format and native electronic format.

1.5.3.2.1 Drawing Identification

Include on each drawing the drawing title, number, date, and revision numbers and dates, in addition to information required in paragraph IDENTIFYING SUBMITTALS.

Number drawings in a logical sequence. Each drawing is to bear the number of the submittal in a uniform location next to the title block. Place the Government contract number in the margin, immediately below the title block, for each drawing.

1.5.3.3 Format of SD-03 Product Data

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

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

1.5.3.3.1 Product Information

Supplement product data with material prepared for the project to satisfy the submittal requirements where product data does not exist. Identify this material as developed specifically for the project, with information and format as required for submission of SD-07 Certificates.

Provide product data in units used in the Contract documents. Where product data are included in preprinted catalogs with another unit, submit the dimensions in contract document units, on a separate sheet.

1.5.3.3.2 Standards

Where equipment or materials are specified to conform to industry or technical-society reference standards of such organizations as the American National Standards Institute (ANSI), ASTM International (ASTM), National Electrical Manufacturer's Association (NEMA), Underwriters Laboratories (UL), or Association of Edison Illuminating Companies (AEIC), submit proof of such compliance. The label or listing by the specified organization will be acceptable evidence of compliance. In lieu of the label or listing, submit a certificate from an independent testing organization, competent to perform testing, and approved by the Contracting Officer. State on the certificate that the item has been tested in accordance with the specified organization's test methods and that the item complies with the specified organization's reference standard.

1.5.3.3.3 Data Submission

Collect required data submittals for each specific material, product, unit of work, or system into a single submittal that is marked for choices, options, and portions applicable to the submittal. Mark each copy of the product data identically. Partial submittals will not be accepted for expedition of the construction effort.

Submit the manufacturer's instructions before installation.

1.5.3.4 Format of SD-04 Samples

1.5.3.4.1 Sample Characteristics

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

a. Sample of Equipment or Device: Full size.

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

c. 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.

d. 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.

e. Sample Volume of Nonsolid Materials: Pint. Examples of nonsolid materials are sand and paint.

f. Color Selection Samples: 2 by 4 inches. Where samples are specified for selection of color, finish, pattern, or texture, submit the full set of available choices for the material or product specified. Sizes and quantities of samples are to represent their respective standard unit.

g. Sample Panel: 4 by 4 feet.

h. Sample Installation: 100 square feet.

1.5.3.4.2 Sample Incorporation

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

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

1.5.3.4.3 Comparison Sample

Samples Showing Range of Variation: Where variations in color, finish, pattern, or texture are unavoidable due to nature of the materials, submit sets of samples of not less than three units showing extremes and middle of range. Mark each unit to describe its relation to the range of the variation.

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

1.5.3.5 Format of SD-05 Design Data

Provide design data and certificates in accordance with the requirements for SD-02 Shop Drawings. Provide a bound volume for submittals containing numerous pages.

1.5.3.6 Format of SD-06 Test Reports

Provide reports on 8 1/2 by 11 inch paper in a complete bound volume.

By prominent notation, indicate each report in the submittal. Indicate the specification number and paragraph number to which each report pertains.

1.5.3.7 Format of SD-07 Certificates

Provide design data and certificates on 8 1/2 by 11 inch paper. Provide a bound volume for submittals containing numerous pages.

1.5.3.8 Format of SD-08 Manufacturer's Instructions

Present manufacturer's instructions submittals for each section as a complete, bound volume. Include the manufacturer's name, trade name, place of manufacture, and catalog model or number on product data. Also include applicable federal, military, industry, and technical-society publication references. If supplemental information is needed to clarify the manufacturer's data, submit it as specified for SD-07 Certificates.

Submit the manufacturer's instructions before installation.

1.5.3.8.1 Standards

Where equipment or materials are specified to conform to industry or technical-society reference standards of such organizations as the American National Standards Institute (ANSI), ASTM International (ASTM), National Electrical Manufacturer's Association (NEMA), Underwriters Laboratories (UL), or Association of Edison Illuminating Companies (AEIC), submit proof of such compliance. The label or listing by the specified organization will be acceptable evidence of compliance. In lieu of the label or listing, submit a certificate from an independent testing organization, competent to perform testing, and approved by the Contracting Officer. State on the certificate that the item has been tested in accordance with the specified organization's test methods and that the item complies with the specified organization's reference standard.

1.5.3.9 Format of SD-09 Manufacturer's Field Reports

Provide reports on 8 1/2 by 11 inch paper in a complete bound volume.

By prominent notation, indicate each report in the submittal. Indicate the specification number and paragraph number to which each report pertains.

1.5.3.10 Format of SD-10 Operation and Maintenance Data (O&M)

Comply with the requirements specified in Section 01 78 23 OPERATION AND MAINTENANCE DATA for O&M Data format.

1.5.3.11 Format of SD-11 Closeout Submittals

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

Provide data in the unit of measure used in the contract documents.

1.5.4 Source Drawings for Shop Drawings

1.5.4.1 Source Drawings

The entire set of source drawing files (DWG) will not be provided to the Contractor. Request the specific Drawing Number for the preparation of shop drawings. Only those drawings requested to prepare shop drawings will be provided. These drawings are provided only after award.

1.5.4.2 Terms and Conditions

Data contained on these electronic files must not be used for any purpose other than as a convenience in the preparation of construction data for the referenced project. Any other use or reuse is at the sole risk of the Contractor and without liability or legal exposure to the Government. The Contractor must make no claim, and waives to the fullest extent permitted by law any claim or cause of action of any nature against the Government, its agents, or its subconsultants that may arise out of or in connection with the use of these electronic files. The Contractor must, to the fullest extent permitted by law, indemnify and hold the Government harmless against all damages, liabilities, or costs, including reasonable attorney's fees and defense costs, arising out of or resulting from the use of these electronic files.

These electronic source drawing files are not construction documents. Differences may exist between the source drawing files and the corresponding construction documents. The Government makes no representation regarding the accuracy or completeness of the electronic source drawing files, nor does it make representation to the compatibility of these files with the Contractor hardware or software. The Contractor is responsible for determining if any conflict exists. In the event that a conflict arises between the signed and sealed construction documents prepared by the Government and the furnished source drawing files, the signed and sealed construction documents govern. Use of these source drawing files does not relieve the Contractor of the duty to fully comply with the contract documents, including and without limitation the need to check, confirm and coordinate the work of all contractors for the project. If the Contractor uses, duplicates or modifies these electronic source drawing files for use in producing construction data related to this contract, remove all previous indication of ownership (seals, logos, signatures, initials and dates).

1.5.5 Electronic File Format

Provide submittals in electronic format, with the exception of material samples required for SD-04 Samples items. In addition to the electronic submittal, provide three hard copies of the submittals. Compile the submittal file as a single, complete document, to include the Transmittal Form described within, and also separately attach the native files which were used to create PDF. The attached files should include the original digital files used to create the submittal. Name the electronic submittal file specifically according to its contents, and coordinate the file naming convention with the Contracting Officer. Electronic files must be of sufficient quality that all information is legible. Use PDF as the electronic format, unless otherwise specified or directed by the Contracting Officer. Generate PDF files from original documents with bookmarks so that the text included in the PDF file is searchable and can be copied. If documents are scanned, optical character resolution (OCR) routines are required. Index and bookmark files exceeding 30 pages to allow efficient navigation of the file. When required, the electronic file must include a valid electronic signature or a scan of a signature.

E-mail electronic submittal documents smaller than 10 MB to an e-mail address as directed by the Contracting Officer. Provide electronic documents over 10 MB through the electronic file sharing system DOD SAFE Web Application located at the following website: https://safe.apps.mil/.

1.5.5.1 Filename Formatting

All electronic files transmitted to the Government shall use the file naming structure as outlined here, regardless of medium in which it is transported.

a. FORMAT:
   (1) {TYPE}_{#}_{DESCRIPTION}_(DATE)
   (2) {TYPE}_{DESCRIPTION}_(DATE)
   (3) {DATE}_{DESCRIPTION}
   (4) {DESCRIPTION}_(DATE)

b. TERMS:

   (1) TYPE - Enter the submittal type.
   (2) # - Enter the numbered iteration of the submittal type.
   (3) DESCRIPTION - Short hand description of the topic of the file.
   (4) DATE - Formatted as *YYYYMMDD* or *MMMYYYY*.

c. BRACKET LEGEND:

   (1) { } - Terms surrounded by curly brackets are required.
   (2) ( ) - Terms surrounded by parenthesis are optional.

d. TYPE CODES:

   (1) *AF3000* - To be used for the Material Submittal Transmittal Form.
   (2) *RFI* - To be used for Requests For Information.
   (3) *AF3064* - To be used for the Contract Progress Schedule attached to Payment Requests.
   (4) *AF3065* - To be used for the Contract Progress Report attached to Payment Requests.
   (5) *UAR* - To be used for Unescorted Pass Requests.

e. EXAMPLES:
   (1) AF3000_001_35% Design ..... **FORMAT 1**
   (2) RFI_01_As-Builts ..... **FORMAT 1**
   (3) AF3064_01_OCT2023 ..... **FORMAT 2**
   (4) UAR_CPS Energy_20230704 ..... **FORMAT 2**
   (5) 20230214_Concrete Strength Test ..... **FORMAT 3**
   (6) 35% Drawings ..... **FORMAT 4**

1.6 QUANTITY OF SUBMITTALS

1.6.1 Number of SD-01 Preconstruction Submittal Copies

Unless otherwise specified, submit one sets of administrative submittals.

1.6.2 Number of SD-02 Shop Drawing Copies

Submit one copies of submittals of shop drawings requiring review and approval by a QC organization or the Contracting Officer. Submittals shall also include an optical disc containing the entire contents of the submittal.

Submit electronic copies of submittals of shop drawings requiring review and approval by a QC organization in accordance with the requirements of this specification.

The following submittals shall include a hardcopy in the sizes and quantity shown:

a. Design Complete (100%) Drawings, once approved

(1) ANSI D, 1 copy

(2) ANSI B, 2 copies

b. Design Complete (100%) Specifications, once approved

(1) Bound, 8.5 x 11 inch, color, 1 copy

c. Architect’s Supplemental Instruction (ASI), as needed

(1) ANSI D, 1 copy

(2) ANSI B, 2 copies

(3) Specs, 8.5 x 11 inch, color, 1 copy

d. Shop Drawings, once approved

(1) ANSI D, 1 copy

(2) ANSI B, 2 copies

1.6.3 Number of SD-03 Product Data Copies

Submit in compliance with quantity requirements specified for shop drawings. Submittals shall also include an optical disc containing the entire contents of the submittal.

Submit electronic copies of submittals of product data requiring review and approval by a QC organization or the Contracting Officer in accordance with the requirements of this specification.

1.6.4 Number of SD-04 Samples

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

b. Submit one sample panel or provide one sample installation where directed. Include components listed in the technical section or as directed.

c. Submit one sample installation, where directed.

d. Submit one sample of nonsolid materials.

1.6.5 Number of SD-06 Test Report Copies

Submit in compliance with quantity and quality requirements specified for shop drawings, other than field test results that will be submitted with QC reports.

1.6.6 Number of SD-07 Certificate Copies

Submit in compliance with quantity requirements specified for shop drawings.

1.6.7 Number of SD-11 Closeout Submittals Copies

Unless otherwise specified, submit two sets of closeout submittals.

Submit electronic copies of submittals of closeout data requiring review and approval by a QC organization in accordance with the requirements of this specification.

The following submittals shall include a hardcopy in the sizes and quantity shown:

a. Record Drawings, once approved

    (1) ANSI B, 2 copies

b. Final Approved Shop Drawings

    (1) ANSI B, 2 copies

c. Warranty Management Plan

    (1) 8.5 x 11 inch, color, 1 copy

1.7 INFORMATION ONLY SUBMITTALS

Submittals without a "G" designation must be certified by the QC manager and submitted to the Contracting Officer for information-only. Provide information-only submittals to the Contracting Officer a minimum of 14 calendar days prior to the Preparatory Meeting for the associated Definable Feature of Work (DFOW). Approval of the Contracting Officer is not required on information only submittals. The Contracting Officer will mark "receipt acknowledged" on submittals for information and will return only the transmittal cover sheet to the Contractor. Normally, submittals for information only will not be returned. However, the Government reserves the right to return unsatisfactory submittals and require the Contractor to resubmit any item found not to comply with the contract. This does not relieve the Contractor from the obligation to furnish material conforming to the plans and specifications; will not prevent the Contracting Officer from requiring removal and replacement of nonconforming material incorporated in the work; and does not relieve the Contractor of the requirement to furnish samples for testing by the Government laboratory or for check testing by the Government in those instances where the technical specifications so prescribe. For Design-Build construction, the Government will retain one copy of information-only submittals.

1.8 PROJECT SUBMITTAL REGISTER

An initial Project Submittal Register showing items of equipment and materials for when submittals are required by the specifications is provided as ATT-2.

1.8.1 Submittal Management

Prepare and maintain a submittal register, as the work progresses. Do not change data that is output in columns (c), (d), (e), and (f) as delivered by Government; retain data that is output in columns (a), (g), (h), and (i) as approved. As an attachment, provide a submittal register showing items of equipment and materials for which submittals are required by the specifications. This list may not be all-inclusive and additional submittals may be required. Maintain a submittal register for the project in accordance with the requirements of this Section. The Government will provide the initial submittal register in electronic format with 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 Number. and type, e.g., SD-02 Shop Drawings) required in each specification section.

Column (e): Lists one principal paragraph in each 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 the project requirements.

Thereafter, the Contractor is to track all submittals by maintaining a complete list, including completion of all data columns and all dates on which submittals are received by and returned by the Government.

1.8.2 Design-Build Submittal Register

The Designer of Record develops a complete list of submittals during design and identify required submittals in the specifications, and use the list to prepare the Submittal Register. The list may not be all inclusive and additional submittals may be required by other parts of the contract. Complete the submittal register and submit it to the Contracting Officer for approval within 30 calendar days after Notice to Proceed. The approved submittal register will serve as a scheduling document for submittals and will be used to control submittal actions throughout the contract period. Coordinate the submit dates and need dates with dates in the Contractor prepared progress schedule. Submit monthly or until all submittals have been satisfactorily completed, updates to the submittal register showing the Contractor action codes and actual dates with Government action codes. Revise the submittal register when the progress schedule is revised and submit both for approval.

1.8.3 Preconstruction Use of Submittal Register

Submit the submittal register. Include the QC plan and the project schedule. Verify that all submittals required for the project are listed and add missing submittals. Coordinate and complete the following fields on the register submitted with the QC plan and the project schedule:

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

Column (g) Contractor Submit Date: Scheduled date for the

approving authority to receive submittals.

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

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

1.8.4 Contractor Use of Submittal Register

Update the following fields with each submittal throughout the contract.

Column (b) Transmittal Number: List of consecutive, Contractor-assigned numbers.

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

Column (l) Date submittal transmitted.

Column (q) Date approval was received.

1.8.5 Approving Authority Use of Submittal Register

Update the following fields:

Column (b) Transmittal Number: List of consecutive, Contractor-assigned numbers.

Column (l) Date submittal was received.

Column (m) through (p) Dates of review actions.

Column (q) Date of return to Contractor.

1.8.6 Action Codes

1.8.6.1 Contractor Action Codes

DESIGN BID BUILD SUBMITTALS		
Submittal Classifications shown in UFGS Sections	Submittal Classification	Corresponding SpecsIntact Submittal Register Code which is populated in the SI Submittal Register. Software Limitations: (The software shows one character delineation in the SpecsIntact Submittal Register)

DESIGN BID BUILD SUBMITTALS		
G	Submittal requires Government Approval	G
BLANK	Submittal is For Information Only (FIO)	BLANK
S	Submittal is for documentation of Sustainable requirements	S

1.8.6.2 Contractor Action Codes

DESIGN BUILD SUBMITTALS		
Submittal Classifications shown in UFGS Sections	Submittal Classification	Corresponding SpecsIntact Submittal Register Code which is populated in the SI Submittal Register. Software Limitations: (The software shows one character delineation in the SpecsIntact Submittal Register)
G	Submittal requires Government Approval	G
BLANK	Submittal is For Information Only(FIO)	BLANK
DA	Submittal requires Designer of Record Approval	D
CR	Submittal requires Government Conformance Review	C
DA/CR	Submittal requires Designer of Record Approval and Government Conformance Review	R

DESIGN BUILD SUBMITTALS		
DA/GA	Submittal requires Designer of Record Approval and Government Approval	A

1.8.7 Delivery of Copies

Submit an updated electronic copy of the submittal register to the Contracting Officer with each invoice request. Provide an updated Submittal Register monthly regardless of whether an invoice is submitted.

1.9 VARIATIONS

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

1.9.1 Considering Variations

Discussion of variations with the Contracting Officer before submission of a variation submittal will help ensure that functional and quality requirements are met and minimize rejections and resubmittals. For variations that include design changes or some material or product substitutions, the Government may require an evaluation and analysis by a licensed professional engineer hired by the contractor.

Specifically point out variations from contract requirements in a transmittal letter. Failure to point out variations may cause the Government to require rejection and removal of such work at no additional cost to the Government.

1.9.2 Proposing Variations

When proposing variation, deliver a submittal, clearly marked as a "VARIATION" to the Contracting Officer, with documentation illustrating the nature and features of the variation including any necessary technical submittals and why the variation is desirable and beneficial to Government. If lower cost is a benefit, also include an estimate of the cost savings. In addition to documentation required for variation, include the submittals required for the item. Clearly mark the proposed variation in all documentation.

The Contracting Officer will indicate an approval or disapproval of the variation request; and if not approved as submitted, will indicate the Government's reasons therefore. Any work done before such approval is received is performed at the Contractor's risk.

Specifically point out variations from contract requirements in a transmittal letter. Failure to point out variations may cause the Government to require rejection and removal of such work at no additional cost to the Government.

Check the column "variation" of ENG Form 4025-ALT for submittals that include variations proposed by the Contractor. Set forth in writing the

reason for any variations and note such variations on the submittal. The Government reserves the right to rescind inadvertent approval of submittals containing unnoted variations.

1.9.3 Warranting that Variations are Compatible

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

1.9.4 Review Schedule Extension

In addition to the normal submittal review period, a period of 21 calendar days will be allowed for the Government to consider submittals with variations.

1.10 SCHEDULING

Schedule and submit concurrently product data and shop drawings covering component items forming a system or items that are interrelated. Submit pertinent certifications at the same time. No delay damages or time extensions will be allowed for time lost in late submittals. Allow an additional calendar days for review and approval of submittals for .

a. Coordinate scheduling, sequencing, preparing, and processing of submittals with performance of work so that work will not be delayed by submittal processing. The Contractor is responsible for additional time required for Government reviews resulting from required resubmittals. The review period for each resubmittal is the same as for the initial submittal.

b. Submittals required by the contract documents are listed on the submittal register. If a submittal is listed in the submittal register but does not pertain to the contract work, the Contractor is to include the submittal in the register and annotate it "N/A" with a brief explanation. Approval by the Contracting Officer does not relieve the Contractor of supplying submittals required by the contract documents but that have been omitted from the register or marked "N/A."

c. Resubmit the submittal register and annotate it monthly with actual submission and approval dates. When all items on the register have been fully approved, no further resubmittal is required.

Contracting Officer review will be completed within 21 calendar days after the date of submission, unless noted otherwise elsewhere.

1.10.1 Government Reviewed Design

The Government will review design submittals for conformance with the technical requirements of the Solicitation. Section 01 33 16.00 30 DESIGN DATA (DESIGN AFTER AWARD) covers the design submittal and review process in detail. Government review is required for variations from the completed design. Review will be only for conformance with the contract requirements. Included are only those construction submittals for which the DOR's design documents do not include enough detail to ascertain contract compliance. The Government may, but is not required to, review extensions of design such as structural steel or reinforcement shop drawings.

1.11 GOVERNMENT APPROVING AUTHORITY

When the approving authority is the Contracting Officer, the Government will:

a. Note the date on which the submittal was received.

b. Review submittals for approval within the 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 REVIEW NOTATIONS and with comments and markings appropriate for the action indicated.

Upon completion of review of submittals requiring Government approval, stamp and date submittals. All copies of the submittal will be retained by the Contracting Officer and 1 copies of the submittal will be returned to the Contractor. If the Government performs a conformance review of other Designer of Record approved submittals, the submittals will be identified and returned, as described above.

1.11.1 Review Notations

Submittals will be returned to the Contractor with the following notations:

a. Submittals marked "approved" or "accepted" authorize proceeding with the work covered.

b. Submittals marked "approved as noted" or "approved, except as noted, resubmittal not required," authorize proceeding with the work covered provided that the Contractor takes no exception to the corrections.

c. Submittals marked "not approved," "disapproved," or "revise and resubmit" indicate incomplete submittal or noncompliance with the contract requirements or design concept. Resubmit with appropriate changes. Do not proceed with work for this item until the resubmittal is approved.

d. Submittals marked "not reviewed" indicate that the 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.

e. Submittals marked "receipt acknowledged" indicate that submittals have been received by the Government. This applies only to "information-only submittals" as previously defined.

1.12 DISAPPROVED SUBMITTALS

Make corrections required by the Contracting Officer. If the Contractor considers any correction or notation on the returned submittals to constitute a change to the contract drawings or specifications, give notice to the Contracting Officer as required under the FAR clause titled CHANGES. The Contractor is responsible for the dimensions and design of

connection details and the construction of work. Failure to point out variations may cause the Government to require rejection and removal of such work at the Contractor's expense.

If changes are necessary to submittals, make such revisions and resubmit in accordance with the procedures above. No item of work requiring a submittal change is to be accomplished until the changed submittals are approved.

1.13 APPROVED SUBMITTALS

The Contracting Officer's approval of submittals is not to be construed as a complete check, and indicates only that the general method of construction, materials, detailing, and other information are satisfactory. the design, general method of construction, materials, detailing, and other information appear to meet the Solicitation and Accepted Proposal.

Approval or acceptance by the Government for a submittal does not relieve the Contractor of the responsibility for meeting the contract requirements or for any error that may exist, because under the Quality Control (QC) requirements of this contract, the Contractor is responsible for ensuring information contained with in each submittal accurately conforms with the requirements of the contract documents.

After submittals have been approved or accepted by the Contracting Officer, no resubmittal for the purpose of substituting materials or equipment will be considered unless accompanied by an explanation of why a substitution is necessary.

1.14 APPROVED SAMPLES

Approval of a sample is only for the characteristics or use named in such approval and is not be construed to change or modify any contract requirements. Before submitting samples, provide assurance that the materials or equipment will be available in quantities required in the project. No change or substitution will be permitted after a sample has been approved.

Match the approved samples for materials and equipment incorporated in the work. If requested, approved samples, including those that may be damaged in testing, will be returned to the Contractor, at its expense, upon completion of the contract. Unapproved samples will also be returned to the Contractor at its expense, if so requested.

Failure of any materials to pass the specified tests will be sufficient cause for refusal to consider, under this contract, any further samples of the same brand or make as that material. The Government reserves the right to disapprove any material or equipment that has previously proved unsatisfactory in service.

Samples of various materials or equipment delivered on the site or in place may be taken by the Contracting Officer for testing. Samples failing to meet contract requirements will automatically void previous approvals. Replace such materials or equipment to meet contract requirements.

1.15 WITHHOLDING OF PAYMENT

Payment for materials incorporated in the work will not be made if

required approvals have not been obtained.No payment for materials incorporated in the work will be made unless all required DOR approvals or required Government approvals have been obtained. No payment will be made for any materials incorporated into the work for any conformance review submittals or information-only submittals found to contain errors or deviations from the Solicitation or Accepted Proposal.No payment will be made for deliverables not accepted by the Government.

1.16 CERTIFICATION OF SUBMITTAL DATA

Certify the submittal data as follows: "I certify that the above submitted items had been reviewed in detail and are correct and in strict conformance with the contract drawings and specifications except as otherwise stated.

_____NAME OF CONTRACTOR _____ SIGNATURE OF CONTRACTOR"

PART 2 PRODUCTS

Not Used

PART 3 EXECUTION

Not Used

ATT-1 - AF Form 3000

ATTACHED IN APPENDIX A

ATT-2 - Submittal Register

ATTACHED IN APPENDIX A

-- End of Section --

SECTION 01 35 13.20 00

SPECIAL PROJECT PROCEDURES-CAD
03/26

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. For references without a year, use the current published version.

U.S. ARMY CORPS OF ENGINEERS (USACE)

ERDC/ITL SR-23-1	(2023) A/E/C Graphics Standard, Release 2.2
ERDC/ITL SR-24-3	(2024) A/E/C CAD Standard - Release 6.2

1.2 SUBMITTALS

Government approval is required for submittals with a "G" or "S" classification. Refer to Section 01 33 00 SUBMITTAL PROCEDURES for requirements when a classification other than "G" or "S" are used. Submittals not having a classification are for information only. Submit the following in accordance with Section 01 33 00 SUBMITTAL PROCEDURES:

[SD-05 Design Data

Drawing Submittals; R

CAD Review Checklist; G

] SD-11 Closeout Submittals

Drawing Submittals; [G][R]

CAD Review Checklist; G

1.3 PURPOSE

This specification provides the Joint Base San Antonio (JBSA) requirements for drawing submittals and interpretation of ERDC/ITL SR-24-3 and ERDC/ITL SR-23-1. The specification provides various clarifications that may alter the meaning of certain statements in the documents and shall take precedence over those documents. If there is any doubt by the Contractor as to requirements, the contractor shall submit Requests for Information (RFIs) in accordance with Section 01 33 00 SUBMITTAL PROCEDURES.

PART 2 PRODUCTS

Not Used

PART 3 EXECUTION

3.1 DRAWING SUBMITTALS

Drawing submittals required by this project shall be in accordance with this specification and others to the extent they apply to drawing submittals. The Contractor shall provide complete sheet files along with all model files referenced into these sheet files. For example, if a final design consists of 40 hardcopy sheets, then a minimum of 40 CAD sheet files and all external reference files (model CAD files, image files, etc.) used for the 40 sheets shall be provided. Each submittal shall also include ATT-1.[Refer to ATT-2 for templates to be used in the creation of all CAD files.]

3.1.1 ASSOCIATED FILES

The Contractor shall provide all associated files used in the production of drawings (i.e. plot styles, line types, external references, etc.) and be fully functional to reproduce submitted drawings. The preferred method of transmitting CAD files is to use the AutoCAD "eTransmit" command. The resultant transmittable file shall be transmitted using the DoD Safe system.

3.1.2 METADATA/SUPPORTING FILES

Include metadata, control points, topographic, planimetric, and any additional supporting data.Include other native formats if used - (i.e. MS Word, Excel, Access, Microstation, etc.). Contact the 802d CES PM for current versions required.

3.2 A/E/C COMPUTER-AIDED DESIGN (CAD) STANDARD

The comments in this sub-part pertain to the paragraph in the ERDC/ITL SR-24-3.

3.2.1 REF: 1.6 TARGET SYSTEMS

The target system for JBSA is AutoCAD [2020]. The contractor's choice of software for internal production is not limited. However, the contractor shall ensure that CAD files shall be provided in the Joint Base San Antonio target CAD system drawing format (.dwg). The Contractor shall ensure that delivered CAD digital files and data (e.g., base files, reference files, block libraries) are compatible with the Government's target CAD systems and operating systems, and adhere to the standards and requirements specified herein.

NOTE: *The term "compatible" means that data are in native digital format (i.e. .dwg , .pdf, .docx, .xlsx, etc.) and can be accessed directly by the target CAD system without translation, proxy errors, pre-processing, or post processing of the digital data files. It is the responsibility of the Contractor to ensure this level of compatibility.*

3.2.2 REF: 2.1.2 FILE ACCURACY (UNITS)

Drawings shall be in imperial units at a 1:1 scale and either in Architectural or decimal feet as appropriate. Generally, Architectural type drawings are inch units (example: 5 feet 3 inches) while Civil drawings shall be in decimal feet (example: 5.25 feet).

3.2.3 REF:2.1.4 ORIGIN (GLOBAL)

The global origin for drawings shall be 0,0,0.

3.2.4 REF: 2.2.1.2 SHEET FILES

Sheet Files shall be created through use of the Sheet Set Manager in AutoCAD or in like manner. The sheet file is created by attaching model files in the "model" space of the AutoCAD sheet file. The exception is the Border sheet model which is attached in the 'Paper space' of the AutoCAD sheet file and then a view port is created in the paper space to view the model below.

3.2.5 REF: 2.4.1 PROJECT CODE

Special characters shall not be used in model filenaming.

3.2.6 REF: 2.4.2 MODEL FILE NAMING CONVENTION

The final field, listed as "User Definable" shall be sequence number in form of 0001, 0002. If the Contractor wishes to use other definable code, it must be submitted and approved in accordance with Section 01 33 00 SUBMITTAL PROCEDURES.

3.2.7 REF: 3.1 PRESENTATION GRAPHICS

Any reference throughout this chapter to any relationship between color and plotted lineweight is not applicable. Sheet files, model files, etc., shall be set to plot with a named plotstyle and shall use aecstdbandw.stb as the pen table for use. This file is included in the sample files provided with the project.

3.2.8 REF: 3.2 TEXT

The only text font that shall be used is arial. Specialty fonts or shapefiles shall not be used for text, including logos.

3.2.9 REF: 4.1 LEVEL/LAYER NAMING CONVENTIONS

Only the layer names in the provided templates shall be used. Any additional layers the Contractor wishes to use shall be submitted as an RFI.

3.2.10 REF: 4.2.1 LEVEL/LAYER ASSIGNMENT TABLES

These tables are good for reference and in understanding the entity / layer relationships. The CONTRACTOR is not held the color, lineweights, or linetypes in these tables or templates. The intention is that the contractor produces the drawings in such a manner as needed to clearly convey the information. Layer names and descriptions are the guiding anchors in these tables and templates.

3.2.11 REF: 5.2 SYMBOLOGY RESOURCES

The supplied symbology should be used to the maximum extent possible. If the contractor needs additional or modified symbology, the new symbology shall be submitted and approved as an RFI. General construct requirements are that the insertion point for new symbols shall be 0,0,0 with all properties set to 'bylayer', and shall not have a mix of 'bylayer',

'byblock', or direct assigned entities.

3.2.12 REF: 5.2 LINE STYLES

Only those line types supplied with the templates shall be used.

3.3 A/E/C GRAPHICS STANDARD, V2.2

The comments in this sub-part pertain to the paragraph in the ERDC/ITL SR-23-1.

3.3.1 REF 2.1.1 SHEET SIZES

The ANSI size 'D' sheet shall be used for drawings unless otherwise requested and approved. Additionally, only the border sheets provided by JBSA with the template files shall be used.

3.3.2 REF 2.1.7 DESIGNER IDENTIFICATION BLOCK

This block contains the Agency (802 CES) emblem and is only removed if the sheet must be sealed and signed. This is the location for the P.E. or Architect Seal or Stamp and signature.

3.3.3 REF 2.1.9 MANAGEMENT BLOCK

This block is divided into a LEFT and RIGHT side. On the LEFT side Top is the OWNER: information contains the JBSA information and shall not be altered. On the LEFT side Bottom is the DESIGN FIRM and is as stated in the standard.

The right side does not follow the guide in layout. The layout is not to be changed, the text is to be altered to fit the project. It has an area titled DRAWING CODE that is to be used by the contractor/designer for their use and may be used to record a 'project number' according to their schema.

3.3.4 REF 2.1.10 PROJECT IDENTIFICATION

This block does not use the layout from the guide. It is self explanatory.

3.3.5 REF 2.1.11 SHEET IDENTIFICATION

This block does not use the layout from the guide. It is self explanatory, but does contains some additional data. The Project Number refers to the Government provided Project Number, and has information for the sheet number sequencing.

3.3.6 REF 2.2 COVER SHEET

Our cover sheet uses a different layout and is self explanatory.

3.3.7 REF: 4.2.3.4 BACK REFERENCING

Back referencing is generally not required, if used the method shown in this standard is the only method to be used.

3.3.8 REF 4.3.1.1 NEW WORK VS DEMOLITION WORK

Demolition plans shall show existing work at a 60% or 70% screen and

actual demolition at 100%.

3.3.9 REF 4.3.1.2 NEW WORK VS EXISTING WORK

Screen shall be 60% to 70% vice 20% to 60%.

3.3.10 REF 5.1.5 FONT

ARIAL is the only font to be used (for text or dimensions), and may be in the various states as needed to clearly convey the information, (regular, Bold, underline, Italic, etc)

ATT-1 - CAD Review Checklist

ATTACHED IN APPENDIX A

[**ATT-2 - JBSA CAD Template**

ATTACHED IN APPENDIX A

] -- End of Section --

SECTION 01 35 13.30 00

SPECIAL PROJECT PROCEDURES-GIS
03/26

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. For references without a year, use the current published version.

FEDERAL GEOGRAPHIC DATA COMMITTEE (FGDC)

FGDC-STD	Federal Geographic Data Committee Standards https://www.fgdc.gov/standards

1.2 SUBMITTALS

Government approval is required for submittals with a "G" or "S" classification. Refer to Section 01 33 00 SUBMITTAL PROCEDURES for requirements when a classification other than "G" or "S" are used. Submittals not having a classification are for information only. Submit the following in accordance with Section 01 33 00 SUBMITTAL PROCEDURES:

[SD-05 Design Data

GIS Files; R

Survey Data; R

] SD-11 Closeout Submittals

GIS Files; [G][R]

Survey Data; [G][R]

1.3 FILE FORMAT

All DESIGN COMPLETE, FINAL, and INTERIM review plans shall include native format files, i.e. GIS file geodatabase. Email 802CES.CENME.GEOBASE@us.af.mil for current version, native format documents (*.docx, *.xlsx) and PDF files of same.

PART 2 PRODUCTS

Not Used

PART 3 EXECUTION

3.1 GIS FILES

Varying Text size for like items shall be avoided, Rule of thumb - final printable layouts must be readable by the unaided eye.

Our data set is in WGS 1984 UTM Zone 14N (meters). For any questions

contact 802CES.CENME.GEOBASE@us.af.mil. In general, all work shall meet the following Technical Requirements:

3.1.1 Horizontal Control

WGS 1984 UTM Zone 14N (meters); will comply with Corps of Engineers 3rd Order, Class I standards.

3.1.2 Vertical Control

NAVD 88; will comply with Corps of Engineers 3rd Order

3.1.3 Measurements

All measurements will be collected using an electronic data collector; all elevations will be measured at hundredths-of-feet (0.00)

3.1.4 Unit of Measure

U.S. Survey Feet

3.1.5 Map Scale

Any ArcMap .mxd files or ArcGIS Pro Project files will maintain a readable (un-aided) text size when the layout is printed at it's formatted scale.

3.1.6 Contour Interval

1-foot

3.1.7 Metadata

FGDC-STD, refer to the following link that contains information and tools for metadata: http://www.fgdc.gov/metadata

3.1.8 CADD Standard

If the final deliverable is in CAD standard follow Section 01 35 13.20 00 SPECIAL PROJECT PROCEDURES-CAD. If the final deliverable is specified elsewhere as UTM, follow this section's requirements and contact 802CES.CENME.GEOBASE@us.af.mil for any further requirements.

3.2 GOVERNMENT FURNISHED ITEMS

The government will furnish the following material:

a. Location map of area covered by the contract

b. Network Control Points

c. A file geodatabase containing the minimum required data attributes, known feature classes, and other data requirements. Feature classes may or may not contain up to date data and attributes may or may not be populated. The contractor shall be responsible for field verifying all data and making corrections as necessary to meet contract work requirements.

d. Template Files

e. Utility maps - not in coordinate system and may be paper, scanned, or CAD files.

f. Geodetic Control Form

3.3 DELIVERABLE FORMAT AND MEDIA

3.3.1 Survey Data

The draft and final survey data shall be submitted through DoD SAFE in accordance with Section 01 33 00 SUBMITTAL PROCEDURES. Survey information shall be compliant with Section 01 35 13.10 00 SPECIAL PROJECT PROCEDURES-SURVEYING.

3.3.2 Format

GIS FILES in ESRI file geodatabase format. Email 802CES.CENME.GEOBASE@us.af.mil for current version.

3.4 TITLE BLOCKS

All and any title-blocks used for final map layout must contain the information "Joint Base San Antonio" and may contain the Installation location (e.g. Sam Houston). The phrase "Joint Base San Antonio" must be equal in size or larger than the Installation location.

3.5 FINAL PRINTS

Final deliverable prints shall be color on heavy bond.

-- End of Section --

SECTION 01 35 26

GOVERNMENTAL SAFETY REQUIREMENTS
06/25

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. For references without a year, use the current published version.

AMERICAN SOCIETY OF SAFETY PROFESSIONALS (ASSP)

ANSI/ASSP A10.34	(2021) Protection of the Public on or Adjacent to Construction Sites
ANSI/ASSP A10.44	(2020) Control of Energy Sources (Lockout/Tagout) for Construction and Demolition Operations

INTERNATIONAL SAFETY EQUIPMENT ASSOCIATION (ISEA)

ANSI/ISEA Z89.1	(2014; R 2019) American National Standard for Industrial Head Protection

NATIONAL FIRE PROTECTION ASSOCIATION (NFPA)

NFPA 51B	(2024) Standard for Fire Prevention During Welding, Cutting, and Other Hot Work
NFPA 70	(2026) National Electrical Code
NFPA 70E	(2024) Standard for Electrical Safety in the Workplace
NFPA 241	(2022; ERTA 22-1) Standard for Safeguarding Construction, Alteration, and Demolition Operations

U.S. ARMY CORPS OF ENGINEERS (USACE)

EM 385-1-1	(2024) Safety -- Safety and Occupational Health (SOH) Requirements

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

10 CFR 20	Standards for Protection Against Radiation
29 CFR 1910	Occupational Safety and Health Standards
29 CFR 1910.1000	Air Contaminants
29 CFR 1926	Safety and Health Regulations for Construction

49 CFR 173	Shippers - General Requirements for Shipments and Packagings

1.2 DEFINITIONS

The following definitions are for the convenience of the reader. If there is a referenced document in the text of this specification section, that is the document that should define terms for that paragraph. If further clarification is needed, contact the Contracting Officer.

1.2.1 Site Safety and Health Officer (SSHO)

A Contractor Employee that is responsible for overseeing and ensuring implementation of the prime Contractor's Safety and Occupational Health (SOH) program according to the Contract, EM 385-1-1, applicable federal, state, and local requirements.

1.2.1.1 Level One SSHO

A designated employee with full-time SOH responsibility that meets and follows the requirements of EM 385-1-1.

1.2.1.2 Level Two SSHO

A designated employee with Level Two SSHO responsibility that meets and follows the requirements of EM 385-1-1. Level Two SSHOs cannot be assigned to projects that have a residual Risk Assessment Code (RAC) of high or extremely high.

1.2.1.3 Level Three SSHO

A designated Qualified Person or Competent Person with SOH responsibility that meets and follows the requirements of EM 385-1-1. Level 3 SSHOs cannot be assigned to projects that have a residual RAC of high or extremely high.

1.2.1.4 Alternate SSHO

An employee that meets the definition of the contract-required level SSHO, but is not the primary SSHO.

1.2.2 Competent Person (CP)

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

1.2.3 Qualified Person (QP)

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

1.3 SUBMITTALS

Government Acceptance or Approval does not remove responsibility from the Contractors for their actions or liability.

Government approval is required for submittals with a "G" or "S" classification. Refer to Section 01 33 00 SUBMITTAL PROCEDURES for requirements when a classification other than "G" or "S" are used. Submittals not having a classification are for information only. Submit the following in accordance with Section 01 33 00 SUBMITTAL PROCEDURES:

SD-01 Preconstruction Submittals

Accident Prevention Plan (APP) Design; G

Accident Prevention Plan (APP) Construction; G

Final IAQ Management Plan; S

Indoor Air Quality (IAQ) Management Plan; G

SD-06 Test Reports

Accident Reports; G

LHE Inspection Reports

Monthly Exposure Reports; G

SD-07 Certificates

Crane Operators/Riggers

Activity Hazard Analysis (AHA); G

Certificate of Compliance

Hot Work Permit

License Certificates

Portable Gauge Operations Planning Worksheet; G

Radiography Operation Planning Work Sheet; G

Standard Lift Plan; G

Critical Lift Plan; G

1.4 PUBLIC HEALTH EMERGENCIES

In the event of a declared public health emergency, follow safety precautions as required by the Occupational Safety and Health Administration (OSHA) www.osha.gov, the Centers for Disease Control and Prevention (CDC) www.cdc.gov, and as required by federal, state and local requirements.

1.5 MONTHLY EXPOSURE REPORTS

Provide a Monthly Exposure Report by the fifth of each month for the previous month. This report is a compilation of employee-hours worked each month for all site workers, both Prime and subcontractor. Failure to submit the report may result in retention of up to 10 percent of the progress payment.

1.6 REGULATORY REQUIREMENTS

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

1.7 SITE QUALIFICATIONS, DUTIES, AND MEETINGS

1.7.1 Site Safety and Health Officer (SSHO)

1.7.1.1 Qualifications of SSHO

All SSHOs will have met the training, experience requirements identified in the EM 385-1-1 and this Contract.

1.7.1.2 Duties of SSHO

All SSHOs will carry out the roles and responsibilities as identified in this Contract and the EM 385-1-1. All SSHOs will be designated on an ENG Form 6282 (ATT-4), provided by the Contracting Officer. Superintendent, QC Manager, and SSHO are subject to dismissal if their required duties are not being effectively carried out. If either the Superintendent, QC Manager, or SSHO are dismissed, project work will be stopped and will not be allowed to resume until a suitable replacement is approved and the above duties are again being effectively carried out.

1.7.1.3 Safety Meetings

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

1.7.2 Roles and Responsibilities of Prime Contractor and SSHO

The Prime Contractor and SSHO must ensure that the requirements of all applicable OSHA and EM 385-1-1 are met for the project. The Prime Contractor must ensure an SSHO or an equally qualified Alternate SSHO(s)

is at the worksite at all times to implement and administer the Contractor's safety program and Government accepted Accident Prevention Plan. If the required SSHO has to temporarily (that is, up to 24 hours / 1 day) leave the site of work due to unforeseen or emergency situations, a Level One, Two, or Three SSHO may be used in the interim and must be on the site of work at all times when work is being performed.

If the SSHO must be off-site for a period longer than 24 hours / 1 day, a qualified alternate that meets the contract requirements must be onsite.

a. Prime contractor must ensure all SSHOs:

(1) Are designated on an ENG Form 6282 (ATT-4).

(2) Meet minimum training and experience requirements identified in EM 385-1-1.

(3) Execute roles and responsibilities identified in EM 385-1-1.

1.7.3 Additional Requirements

The Level One SSHO may also serve as the Quality Control Manager. The Level Two SSHO may also serve as the Superintendent. The SSHO may serve in all three roles.

1.7.4 Contract Site Safety And Health Officer(s)(SSHOs) Minimum Requirements

Provide a minimum of one Level One SSHO that meets the requirements of EM 385-1-1 for this project.

1.7.5 Contract Site Safety and Health Officer(s)(SSHOs) Minimum Requirements for Projects with Limited Scope,

Provide a separate full-time Level One SSHO at each of the following worksites:

a. INDICATE WORKSITE LOCATION Level One SSHO

b. INDICATE WORKSITE LOCATION Level Two SSHO

c. INDICATE WORKSITE LOCATION Level Three SSHO

The SSHOs for the worksites listed above must each have the required training, experience, and qualifications in accordance with EM 385-1-1.

Each SSHO is responsible for implementing and managing the Safety and Occupational Health (SOH) program at the worksite indicated, while ensuring that the 29 CFR 1926, EM 385-1-1, Contracts, and all applicable federal, state, and Local requirements are met.

1.7.6 Preconstruction Conference

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

(AHAs) and special plans, program and procedures associated with it).

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

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

1.8 ACCIDENT PREVENTION PLAN (APP)

1.8.1 Accident Prevention Plan (APP) Design

Provide a site-specific Accident Prevention Plan (APP), including Activity Hazard Analyses (AHA), in accordance with EM 385-1-1, ENG Form 6293 (ATT-5), for the design team to follow during site visits and investigations. For subsequent visits, update the plan if there are changes in the personnel who will be attending, or the tasks to be performed. Submit the APP for review and acceptance by the Government at least 15 calendar days prior to the start of the design field work after being given Notice to Proceed. Field work must not begin until the design APP is accepted by the Contracting Officer. Prior to the start of construction incorporate the Design APP into the Construction APP so that one site specific APP exists for the project and submit to the Contracting Officer for acceptance.

If the design scope includes borings or other subsurface investigations, include in the APP the type of field investigation and verification techniques, such as visual, local utility locating service scanning and third party subcontractor scanning, potholing, or hand digging within two feet of a known utility that will be required. Mark underground utilities before starting any ground-disturbing actions. Notify the Contracting Officer 15 days prior to the start of soil borings or sub-surface investigations.

1.8.2 Accident Prevention Plan (APP) Construction

Submit the Accident Prevention Plan (APP) for review and acceptance by the Government at least 15 calendar days prior to the start unless otherwise specified by Section 01 33 00 SUBMITTAL PROCEDURES, after being given Notice to Proceed. A competent person must prepare the written site-specific APP. Prepare the APP in accordance with the format and requirements of EM 385-1-1, ENG Form 6293 (ATT-5), and herein. The APP must be job-specific and address any unusual or unique aspects of the project or activity for which it is written. The APP must interface with the Contractor's overall safety and occupational health program referenced in the APP in the applicable APP element, and made site-specific. Describe the methods to evaluate past safety performance of potential subcontractors in the selection process. Also, describe innovative methods used to ensure and monitor safe work practices of subcontractors. The Government considers the Prime Contractor to be the "controlling

employer" for all worksite safety and health of the subcontractors. Contractors are responsible for informing their subcontractors of the safety provisions under the terms of the Contract and the penalties for noncompliance, coordinating the work to prevent one craft from interfering with or creating hazardous working conditions for other crafts, and inspecting subcontractor operations to ensure that accident prevention responsibilities are being carried out. The APP must be signed in accordance with the APP and ENG Form 6293 Accident Prevention Plan Worksheet. The SSHO must provide and maintain the APP and a log of signatures by each subcontractor foreman, attesting that they have read and understand the APP, and make the APP and log available on-site to the Contracting Officer. If English is not the foreman's primary language, the Prime Contractor must provide an interpreter.

Work cannot proceed without an accepted APP. Once reviewed and accepted by the Contracting Officer, the APP and attachments will be enforced as part of the Contract. Disregarding the provisions of this Contract or the accepted APP is cause for stopping of work, at the discretion of the Contracting Officer, until the matter has been rectified. Continuously review and amend the APP, as necessary, throughout the life of the Contract. Changes to the accepted APP must be made with the knowledge and concurrence of the Contracting Officer, project superintendent, SSHO and Quality Control Manager. Incorporate unusual or high-hazard activities not identified in the original APP as they are discovered. Should any severe hazard exposure (i.e., imminent danger) become evident, stop work in the area, secure the area, and develop a plan to remove the exposure and control the hazard. Notify the Contracting Officer within 24 hours of discovery. Eliminate and remove the hazard. In the interim, take all necessary action to restore and maintain safe working conditions in order to safeguard onsite personnel, visitors, the public (as defined by ANSI/ASSP A10.34), and the environment.

1.8.3 Names and Qualifications

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

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

b. As a minimum, designate and submit qualifications of Competent Persons (CP) for each of the following major areas: excavation; scaffolding; fall protection; hazardous energy; confined space; health hazard recognition, evaluation and control of chemical, physical and biological agents; and personal protective equipment and clothing to include selection, use and maintenance. Designate and submit qualifications for additional CPs as applicable to the work performed under this Contract.

1.8.4 Plans

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

1.8.4.1 Lead, Cadmium, and Chromium Compliance Plan

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

1.8.4.2 Asbestos Hazard Abatement Plan

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

1.8.4.3 Site Safety and Health Plan

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

1.8.4.4 Polychlorinated Biphenyls (PCB) Plan

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

1.8.4.5 Site Demolition Plan

Identify the safety and health aspects, and prepare in accordance with Section 02 41 00 DEMOLITION AND DECONSTRUCTION and referenced sources.

1.9 ACTIVITY HAZARD ANALYSIS (AHA)

Before beginning each activity, task or Definable Feature of Work (DFOW) involving a type of work presenting hazards not experienced in previous project operations, or where a new work crew or subcontractor is to perform the work, the Contractor(s) performing that work activity must prepare an AHA. AHAs must be developed by the Prime Contractor, subcontractor, or supplier performing the work, and provided for Prime Contractor review and approval before submitting to the Contracting Officer. AHAs must be signed by the SSHO, Superintendent, QC Manager and the subcontractor Foreman performing the work. Format the AHA in accordance with EM 385-1-1 or as directed by the Contracting Officer. Submit the AHA for review in accordance with the requirements of Section 01 33 00 SUBMITTAL PROCEDURES, prior to the start of each activity task, or DFOW. The Government reserves the right to require the Contractor to revise and resubmit the AHA if it fails to effectively identify the work sequences, specific anticipated hazards, site conditions, equipment, materials, personnel and the control measures to be implemented.

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

1.9.1 AHA Management

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

1.9.2 AHA Signature Log

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

1.10 SITE SAFETY REFERENCE MATERIALS

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

1.11 EMERGENCY MEDICAL TREATMENT

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

1.12 NOTIFICATIONS AND REPORTS

1.12.1 Accident Notification

Notify the Contracting Officer in accordance with the EM 385-1-1 Accident Reporting Timeline.

Table
Accident Reporting Required Timeline

Accident Type	Notify CO or COR	Complete Final Accident Report on ENG 3394 (ATT-6) and provide to CO
Fatality, in-patient hospitalization, amputation, eye loss, or property damage over $600,000.	Immediately, no later than (NLT) 8 Hours	Within 7 Days
All other accidents and near misses	Immediately, no later than (NLT) 24 Hours	Within 7 Days

Within notification 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 (for example, type of construction equipment used and PPE used). Preserve the conditions and evidence on the accident site until the Government investigation team arrives on-site and Government investigation is conducted. Assist and cooperate fully with the Government's investigation(s) of any accident or near miss.

1.12.2 Accident Reports

a. Conduct an accident investigation for recordable injuries and

illnesses, property damage, and near misses as defined in EM 385-1-1, to establish the root cause(s) of the accident. All accidents are reportable, regardless of whether or not it is recordable. Provide the report to the Contracting Officer within 7 calendar days of the accident. The Contracting Officer will provide copies of any required or special forms.

b. Near Misses: Near miss reports are considered positive and proactive Contractor safety management actions.

1.12.3 LHE Inspection Reports

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

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

1.12.4.1 Certificate of Compliance

Provide a Certificate of Compliance for LHE entering an activity under this Contract and in accordance with Section 16-7 of the EM 385-1-1. Post certifications on the crane. Certifications of the Crane Operators/Riggers shall be included.

1.12.4.2 Pre-Lift Plans

Develop either a Standard Lift Plan (SLP) or Critical Lift Plan (CLP) as required in accordance with EM 385-1-1. Utilize the Standard Lift Plan ENG Form 6203 (ATT-2) for routine crane lifts and use the Critical Lift Plan ENR Form 6213 (ATT-3) for non-routine crane lifts requiring more detailed planning and additional safety precautions, as defined by Section 16-2j of the EM 385-1-1. Comply with load testing requirements in accordance with EM 385-1-1. Submit lift plans to the Contracting Officer for approval within 15 calendar days in advance of planned standrad lifts or 30 calendar days in advance of planned critical lifts. In addition, Critical Lift Plans are required for the following:

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

b. For lifts with anticipated binding conditions.

c. When erecting cranes.

d. Lifts of personnel.

1.13 HOT WORK PERMIT

1.13.1 Permit and Personnel Requirements

Submit and obtain a written permit prior to performing "Hot Work" (i.e., welding or cutting) or operating other flame-producing/spark producing devices, from the the installation's local Fire Department. A permit is required from the Explosives Safety Office for work in and around where explosives are processed, stored, or handled. Contractors are required to meet all criteria before a permit is issued. Provide at least two 20 pound 4A:20 BC rated extinguishers for normal "Hot Work". The extinguishers

must be current inspection tagged, and contain an approved safety pin and tamper resistant seal. It is also mandatory to have a designated FIRE WATCH for any "Hot Work" done at this activity. The Fire Watch must be trained in accordance with NFPA 51B and remain on-site for a minimum of 1 hour after completion of the task or as specified on the hot work permit.

When starting work in the facility, require personnel to familiarize themselves with the location of the nearest fire alarm boxes and place in memory the emergency services phone number. Report any fire, no matter how small, to the responsible Fire Department immediately.

1.13.2 Work Around Flammable Materials

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

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

1.14 RADIATION SAFETY REQUIREMENTS

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

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

1.14.1 Radiography Operation Planning Work Sheet

Submit a Gamma and X-Ray Radiography Operation Planning Work Sheet to Contracting Officer 14 days prior to commencement of operations involving radioactive materials or radiation generating devices. For portable machine sources of ionizing radiation, including moisture density and XRF, use and submit the Portable Gauge Operations Planning Worksheet instead. The Contracting Officer will review the submitted worksheet and provide questions and comments.

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

1.14.2 Site Access and Security

Coordinate site access and security requirements with the Contracting Officer for all radiological materials and equipment containing ionizing radiation that are proposed for use on a government facility. For gamma

radiography materials and equipment, a Government escort is required for any travels on the Installation. The Government authorized representative will meet the Contractor at a designated location outside the Installation, ensure safety of the materials being transported, and will escort the Contractor for gamma sources onto the Installation, to the job site, and off the Installation. For portable machine sources of ionizing radiation, including moisture density and XRF, the Government authorized representative will meet the Contractor at the job site.

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

1.14.3 Loss or Release and Unplanned Personnel Exposure

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

1.14.4 Site Demarcation and Barricade

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

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

1.14.5 Security of Material and Equipment

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

1.14.6 Transportation of Material

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

1.14.7 Schedule for Exposure or Unshielding

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

1.14.8 Transmitter Requirements

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

1.15 UNEXPLODED ORDINANCE (UXO)

Project site has been determined to potentially contain UXOs. Contractor shall perform a UXO survey/clearance for the site, to include access & utility routes and a minimum of a 15' wide clear zone beyond grading operations. Should UXO be encountered during operations, all work shall cease immediately and access to the area restricted. Immediate notification shall be made to the Contracting Officer and the Contracting Officer's Technical Representative. Do not, under any circumstances, attempt excavation or handling of UXO.

PART 2 PRODUCTS

Not Used

PART 3 EXECUTION

3.1 CONSTRUCTION AND OTHER WORK

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

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

a. Head Protection that meets ANSI/ISEA Z89.1

b. Long Pants

c. Appropriate Safety Footwear

d. Appropriate Class Reflective Vests

3.1.1 Worksite Communication

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

3.1.2 Hazardous Material Exclusions

Notwithstanding any other hazardous material used in this Contract, radioactive materials or instruments capable of producing ionizing/non-ionizing radiation (with the exception of radioactive

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

3.1.3 Unforeseen Hazardous Material

Contract documents identify materials such as PCB, lead paint, and friable and non-friable asbestos and other OSHA regulated chemicals (i.e., 29 CFR 1910.1000). If material(s) that may be hazardous to human health upon disturbance are encountered during demolition, repair, renovation, or construction operations, stop portions of work that would disturb the material and notify the Contracting Officer immediately. Within 21 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.

3.2 UTILITY OUTAGE REQUIREMENTS

Apply for utility outages in accordance with Section 01 14 00 JBSA WORK RESTRICTIONS. The request must include the location of the outage, utilities being affected, duration of outage, any necessary sketches, a description of the means to fulfill energy isolation requirements in accordance with EM 385-1-1, and other items required by Section 01 14 00 JBSA WORK RESTRICTIONS. In accordance with EM 385-1-1, where outages involve Government or Utility personnel, coordinate with the Government on all activities involving the control of hazardous energy.

These activities include, but are not limited to, a review of Hazardous Energy Control Program (HECP) and HEC procedures, as well as applicable Activity Hazard Analyses (AHAs). In accordance with EM 385-1-1 and NFPA 70E, work on energized electrical circuits must not be performed without prior Government authorization. Government permission is considered through the permit process and submission of a detailed AHA. Energized work permits are considered only when de-energizing introduces additional or increased hazard or when de-energizing is infeasible.

3.3 OUTAGE COORDINATION MEETING

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

protective equipment is required during switching operations, inspection, and verification.

3.4 CONTROL OF HAZARDOUS ENERGY (LOCKOUT/TAGOUT)

Provide and operate a Hazardous Energy Control Program (HECP) in accordance with EM 385-1-1, 29 CFR 1910, ANSI/ASSP A10.44, NFPA 70E.

3.4.1 Safety Preparatory Inspection Coordination Meeting with the Government or Utility

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

3.4.2 Lockout/Tagout Isolation

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

3.4.3 Lockout/Tagout Removal

Upon completion of work, conduct lockout/tagout removal procedure in accordance with the HECP. In accordance with EM 385-1-1, each lock and tag must be removed from each energy isolating device by the authorized individual or systems operator who applied the device. Provide formal notification to the Government (by completing the Government form if provided by Contracting Officer's Representative), confirming that steps of de-energization and lockout/tagout removal procedure have been conducted and certified through inspection and verification. Government or Utility locks and tags used to support the Contractor's work will not be removed until the authorized Government employee receives the formal notification.

3.5 FALL PROTECTION PROGRAM

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

3.5.1 Fall Protection Equipment and Systems

Enforce use of personal fall protection equipment and systems designated

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

Provide personal fall protection equipment, systems, subsystems, and components that comply with EM 385-1-1 and 29 CFR 1926.

3.5.1.1 Additional Personal Fall Protection Measures

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

3.5.1.2 Personal Fall Protection Equipment

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

ATT-1 - FORM 6209 CoC for LHE

ATTACHED IN APPENDIX A

ATT-2 - FORM 6203 Standard Lift Plan

ATTACHED IN APPENDIX A

ATT-3 - FORM 6213 Critical Lift Plan

ATTACHED IN APPENDIX A

ATT-4 - ENG Form 6282

ATTACHED IN APPENDIX A

ATT-5 - ENG Form 6293

ATTACHED IN APPENDIX A

ATT-6 - ENG Form 3394

ATTACHED IN APPENDIX A

-- End of Section --

SECTION 01 35 29.13

HEALTH, SAFETY, AND EMERGENCY RESPONSE PROCEDURES FOR CONTAMINATED SITES
11/15

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. For references without a year, use the current published version.

INTERNATIONAL SAFETY EQUIPMENT ASSOCIATION (ISEA)

ANSI/ISEA Z358.1	(2014; R 2020) American National Standard for Emergency Eyewash and Shower Equipment

U.S. ARMY CORPS OF ENGINEERS (USACE)

EM 385-1-1	(2024) Safety -- Safety and Occupational Health (SOH) Requirements
EM 385-1-97	(2013) Explosives -- Safety and Health Requirements Manual
ER 385-1-92	(2018) Safety -- Safety and Occupational Health Requirements for Environmental Cleanup Projects
ER 385-1-95	(2014) Safety -- Safety and Health Requirements for Operations and Activities Involving Munitions and Explosives of Concern

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

29 CFR 1904	Recording and Reporting Occupational Injuries and Illnesses
29 CFR 1910	Occupational Safety and Health Standards
29 CFR 1910.120	Hazardous Waste Operations and Emergency Response
29 CFR 1926	Safety and Health Regulations for Construction
29 CFR 1926.65	Hazardous Waste Operations and Emergency Response

1.2 PRECONSTRUCTION SAFETY CONFERENCE

Conduct a preconstruction safety conference prior to the start of site activities and after submission of the Accident Prevention Plan/Site Safety And Health Plan (APP/SSHP). The objective of the meeting is to discuss health and safety concerns related to the impending work, discuss

project health and safety organization and expectations, review and answer comments and concerns regarding the APP/SSHP or other health and safety concerns . Ensure that those individuals responsible for health and safety at the project level are available and attend this meeting.

1.3 SUBMITTALS

Government approval is required for submittals with a "G" or "S" classification. Refer to Section 01 33 00 SUBMITTAL PROCEDURES for requirements when a classification other than "G" or "S" are used. Submittals not having a classification are for information only. Submit the following in accordance with Section 01 33 00 SUBMITTAL PROCEDURES:

SD-02 Shop Drawings

Work Zones; G

Decontamination Facilities; G

SD-03 Product Data

Amendments to the APP/SSHP; G

Exposure Monitoring/Air Sampling Program

Site Control Log

SSHO's Daily Inspection Logs

SD-07 Certificates

Certificate Of Worker/Visitor Acknowledgement

SD-11 Closeout Submittals

Safety And Health Phase-Out Report; G

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

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

1.4.1 Acceptance and Modifications

Prior to submittal, the APP/SSHP must be signed and dated by the Safety and Health Manager and the Site Superintendent. Submit for review [__10 ___] days prior to the Preconstruction Safety Conference. Deficiencies in the APP/SSHP will be discussed at the preconstruction safety conference, and must be revised to correct the deficiencies and resubmitted for acceptance. Onsite work must not begin until the plan has been accepted. Maintain a copy of the written APP/SSHP onsite. Changes and modifications to the APP/SSHP must be made with the knowledge and concurrence of the Safety and Health Manager, the Site Superintendent, and the Contracting Officer. Bring to the attention of the Safety and Health Manager, the Site Superintendent, and the Contracting Officer any unforeseen hazard that becomes evident during the performance of the work, through the Site Safety and Health Officer (SSHO) for resolution as soon as possible. In the interim, take necessary action to re-establish and maintain safe working conditions in order to safeguard onsite personnel, visitors, the public, and the environment. Disregard for the provisions of this specification or the accepted APP/SSHP is cause for stopping work until the matter has been rectified.

1.4.2 Availability

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

1.5 STAFF ORGANIZATION, QUALIFICATION AND RESPONSIBILITIES

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

1.5.1 Safety and Health Manager

Safety and Health Manager must be an Industrial Hygienist certified by the American Board of Industrial Hygiene a safety professional certified by the Board of Certified Safety Professionals a health physicist certified by the American Board of Health Physicists.

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

1.5.1.1 Additional Qualifications

The Safety and Health Manager must have the following qualifications:

a. A minimum of 3 years experience in developing and implementing safety and occupational health programs at HTRW sites in the HTRW disposal industry in the chemical industry in the petroleum processing industry at underground storage tank removal projects.

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

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

d. Documented experience in managing personal protective equipment (PPE) programs and conducting PPE hazard evaluations for the types of

activities and hazards likely to be encountered on the project.

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

1.5.1.2 Responsibilities and Duties

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

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

c. Conduct initial site-specific training.

d. Be present onsite available for consultation during the first 3 days of remedial activities and at the startup of each new major phase of work.

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

f. Be available for emergencies.

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

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

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

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

k. Review accident reports and results of daily inspections.

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

1.5.2 Site Safety and Health Officer

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

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

1.5.2.1 Qualifications

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

a. A minimum of 1 year experience in implementing SOH programs at HTRW sitesin the HTRW disposal industryat underground storage tank removal projectsin the chemical or petroleum processing industryradioactive waste cleanup projects where Level B personal protective equipment was required.

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

c. Specific training in personal and respiratory protective equipment, confined space entry and in the proper use of air monitoring instruments and air sampling methods including monitoring for ionizing radiation.

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

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

1.5.2.2 Responsibilities and Duties

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

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

b. Be assigned to the site on a full time basis for the duration of field activities. The SSHO will have no duties other thancan have collateral duties in addition to SOH related duties. If operations are performed during more than 1 work shift per day, a site Safety and Health Officer must be present for each shift and when applicable, act as the radiation safety officer (RSO) as defined in paragraph 06.F.02 of EM 385-1-1 on radioactive waste cleanup projects.

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

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

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

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

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

h. Conduct accident investigations and prepare accident reports.

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

1.5.3 Additional Certified Health and Safety Support Personnel

Retain health physics support from a health physicist certified by the American Board of Health Physics to develop radiation protection requirements of the APP/SSHP and, when necessary, visit the site to help implement ionizing radiation protection requirements of the APP/SSHP. safety support from a safety professional certified by the Board of Certified Safety professionals to develop written occupational safety procedures for the APP/SSHP and, when necessary, visit the site to help implement APP/SSHP requirements.industrial hygiene support from an industrial hygienist certified by the American Board of Industrial Hygiene to develop occupational health practices for the APP/SSHP and, if necessary, visit the site to help implement APP/SSHP requirements.

1.5.4 Occupational Physician

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

1.5.5 Persons Certified in First Aid and CPR

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

1.5.6 Safety and Health Technicians

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

1.6 EMERGENCY RESPONSE AND CONTINGENCY PROCEDURES

Develop and implement an Emergency Response Plan, that meets the requirements of EM 385-1-1 Section 33.G, 29 CFR 1910.120 (l) and 29 CFR 1926.65 (l), as a section of the APP/SSHP. In the event of any emergency associated with remedial action, without delay, alert all onsite employees and as necessary offsite emergency responders that there is an emergency situation; take action to remove or otherwise minimize the cause of the emergency; alert the Contracting Officer; and institute measures

necessary to prevent repetition of the conditions or actions leading to, or resulting in, the emergency. Train employees that are required to respond to hazardous emergency situations to their level of responsibility according to 29 CFR 1910.120 (q) and 29 CFR 1926.65 (q) requirements. Rehearse the plan regularly as part of the overall training program for site operations. Review the plan periodically and revised as necessary to reflect new or changing site conditions or information. Provide copies of the Emergency Response Portion of the accepted APP/SSHP to the affected local emergency response agencies. Address, as a minimum, the following elements in the plan:

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

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

c. Emergency recognition and prevention.

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

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

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

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

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

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

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

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

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

(3) Date and time of the incident.

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

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

(6) Cause of the incident, if known.

(7) Casualties (fatalities, disabling injuries).

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

(9) Estimated property damage, if applicable.

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

(11) Action taken to ensure safety and security.

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

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

1.7 CERTIFICATE OF WORKER/VISITOR ACKNOWLEDGEMENT

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

1.8 INSPECTIONS

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

1.9 SAFETY AND HEALTH PHASE-OUT REPORT

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

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

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

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

d. Signatures of Safety and Health Manager and SSHO.

PART 2 PRODUCTS

2.1 REGULATORY REQUIREMENTS

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

2.2 PERSONAL PROTECTIVE EQUIPMENT

2.2.1 Site Specific PPE Program

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

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

2.2.2 Levels of Protection

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

2.2.2.1 Initial PPE Components

The following items constitute initial minimum protective clothing and equipment ensembles.

Level D	
Modified Level D	
Level C	
Level B	B

2.2.3 PPE for Government Personnel

Three clean sets of personal protective equipment and personal dosimeters for work on radioactive waste cleanup sites and clothing (excluding

air-purifying negative-pressure respirators and safety shoes, which will be provided by individual visitors), as required for entry into the Exclusion Zone and Contamination Reduction Zone, must be available for use by the Contracting Officer or official visitors. The items must be cleaned, maintained and stored in the clean room of the decontamination facility and clearly marked: "FOR USE BY GOVERNMENT ONLY." Provide basic training in the use and limitations of the PPE provided.

2.3 EMERGENCY EQUIPMENT AND FIRST AID REQUIREMENTS

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

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

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

c. Emergency-use respirators. For escape purposes, supply 5- to 15-minute emergency escape masks. For rescue purposes, Supply 2 positive pressure self-contained breathing apparatus (SCBA). Dedicate these for emergency use only and maintained onsite in the Contamination Reduction Zone.

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

PART 3 EXECUTION

3.1 SITE DESCRIPTION AND CONTAMINATION CHARACTERIZATION

3.1.1 Project/Site Conditions

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

3.1.1.1 CERCLA Documents

.

3.1.1.2 RCRA Documents

.

3.1.1.3 UST Documents

.

3.1.2 Ordnance and Explosives (OE)

Establish the site Munitions and Explosives of Concern (MEC) probability assessment prior to starting work in accordance with EM 385-1-97 and ER 385-1-92. Produce a probability assessment to establish the MEC support requirements. Brief personnel on Recognize, Retreat and Report (3R's) and the POC list. EM 385-1-97, Chapter 1 provides follow-on actions necessary before going back to work status.

Stop work and contact the Contracting Officer if ordnance and explosives (OE), explosive media or chemical agent contaminated media (CACM) are

discovered during HTRW site cleanup activities. Proceed with work after the Contracting Officer gives permission and, according to ER 385-1-95 requirements.

3.2 SITE CONTROL MEASURES

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

3.2.1 Work Zones

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

3.2.1.1 Exclusion Zone (EZ)

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

3.2.1.2 Contamination Reduction Zone (CRZ)

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

3.2.1.3 Support Zone (SZ)

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

3.2.2 Site Control Log

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

3.2.3 Communication

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

3.2.4 Site Security

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

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

-- End of Section --

SECTION 01 45 00

QUALITY CONTROL
01/26

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. For references without a year, use the current published version.

U.S. ARMY CORPS OF ENGINEERS (USACE)

EM 385-1-1	(2024) Safety -- Safety and Occupational Health (SOH) Requirements
ER 1110-3-12	(2021) Military Engineering and Design Quality Management

1.2 PAYMENT

Separate payment will not be made for providing and maintaining an effective Quality Control program. Include all associated costs in the applicable Bid Pricing Schedule item.

1.3 SUBMITTALS

Government approval is required for submittals with a "G" or "S" classification. Refer to Section 01 33 00 SUBMITTAL PROCEDURES for requirements when a classification other than "G" or "S" are used. Submittals not having a classification are for information only. Submit the following in accordance with Section 01 33 00 SUBMITTAL PROCEDURES:

SD-01 Preconstruction Submittals

Contractor Quality Control (CQC) Plan; G

Additional Requirements For Design Quality Control (DQC) Plan; G

SD-05 Design Data

Design Quality Control

Discipline-Specific Checklists

Design Quality Control Documentation (DQCD)

SD-06 Test Reports

Verification Statement

SD-07 Certificates

Certificate Of Readiness; G

1.4 GENERAL REQUIREMENTS

Establish and maintain an effective quality control (QC) system that complies with FAR 52.246-12 Inspection of Construction. QC is comprised of plans, procedures, and organization necessary to produce an end product that complies with the Contract requirements. The QC system covers all design and construction operations, both onsite and offsite, and must be keyed to the proposed design and construction sequence. The Quality Control Manager, Superintendent, Site Safety and Health Officer (SSHO), and all on-site supervisors are responsible for the quality of work and are subject to removal by the Contracting Officer for non-compliance with the quality requirements specified in the Contract. The Quality Control Manager must maintain a physical presence at the work site at all times and is the primary individual responsible for all quality control.

1.5 QUALITY CONTROL (QC) PROGRAM REQUIREMENTS

Establish and maintain a QC program as described in this section. This QC program is a key element in meeting the objectives of the Commissioning Process (Cx). The QC program consists of a QC Organization, QC Plan, QC Plan Meeting(s), a Coordination and Mutual Understanding Meeting, QC meetings, three phases of control, submittal review and approval, testing, completion inspections, QC certifications, independent Special Inspections in accordance with Section 01 45 35 SPECIAL INSPECTIONS, and documentation necessary to provide materials, equipment, workmanship, fabrication, construction and operations that comply with the requirements of this Contract. The QC program must cover on-site and off-site work and be keyed to the work sequence. No construction work or testing may be performed unless the QC Manager is on the work site. The QC Manager must report to an officer of the firm and not be subordinate to the Project Superintendent or the Project Manager. The QC Manager, Project Superintendent and Project Manager must work together effectively. Although the QC Manager is the primary individual responsible for quality control, all individuals will be held responsible for the quality of work on the job.

1.5.1 Meetings

1.5.1.1 Quality Control Plan Meeting

Prior to submission of the QC Plan, the Contractor may request a meeting 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 and to agree on the Contractor's list of Definable Feature of Work (DFOW).

1.5.1.2 Coordination and Mutual Understanding Meeting

After the Preconstruction Conference,Post Award Conference, before start of design or construction, and prior to acceptance by the Government of the CQC Plan, meet with the Contracting Officer and discuss the Contractor's quality control system. During the meeting, a mutual understanding of the system details must be developed, including the forms for recording the CQC operations, design activities, control activities, testing, administration of the system for both onsite and offsite work, and the interrelationship of Contractor's Management and control with the Government's Quality Assurance. Minutes of the meeting will be prepared

by the QC Manager and signed by the Contractor, the Architect/Engineer (A/E), and the Government. Provide a copy of the signed minutes to all attendees and incorporate into the relevant QC Plan. At a minimum the Coordination and Mutual Understanding Meeting must be repeated when a new QC Manager is appointed. There can be other occasions when subsequent conferences will be called by either party to reconfirm mutual understandings or address deficiencies in the CQC system or procedures which can require corrective action by the Contractor.

1.5.1.2.1 Purpose

The purpose of this meeting is to develop a mutual understanding of the QC details, including documentation, administration for on-site and off-site work, design intent, Cx in accordance with Section 01 91 00.15 BUILDING COMMISSIONING, environmental requirements and procedures, coordination of activities to be performed, Special Inspections, and the coordination of the Contractor's management, production, and QC personnel. At the meeting, the Contractor must explain in detail how three phases of control will be implemented for each DFOW, as well as how each DFOW will be affected by each management plan or requirement as listed below:

a. Waste Management Plan.

b. Procedures for noise and acoustics management.

c. Environmental Protection Plan.

d. Environmental regulatory requirements.

e. Cx Plan requirements in accordance with Section 01 91 00.15 BUILDING COMMISSIONING.

f. Special Inspections.

g. Indoor Air Quality (IAQ) Management Plan.

1.5.1.2.2 Coordination of Activities

Coordinate activities included in various sections to assure efficient and orderly installation of each component. Coordinate operations included under different sections that are dependent on each other for proper installation and operation. Schedule construction operations with consideration for indoor air quality as specified in the IAQ Management Plan.Coordinate Special Inspections.

1.5.1.2.3 Attendees

As a minimum, the Contractor's personnel required to attend include an officer of the firm, the Project Manager, Project Superintendent, QC Manager, Alternate QC Manager, Assistant QC Manager, QC Specialists, Special Inspector, Special Inspector of Record, Commissioning Provider (CxC), Environmental Manager, and subcontractor representatives. Each subcontractor who will be assigned QC responsibilities must have a principal of the firm at the meeting.

1.5.1.3 Quality Control (QC) Meetings

After the start of construction, conduct weekly QC meetings led by the QC Manager at the work site with the Project Superintendent, the QC

Specialists, the Special Inspector, the Special Inspector of Record, CxC, and the other personnel as necessary. The QC Manager is to 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. As a minimum, accomplish the following at each meeting:

a. Review the minutes of the previous meeting.

b. Review the schedule and the status of work and deficiencies/rework. Review the most current approved schedule (in accordance with schedule specification) and the status of work and deficiencies/rework.

c. Review the status of submittals and Request For Information (RFIs).

d. Review the work to be accomplished in the next 3 weeks as defined by the schedule section paragraph WEEKLY PROGRESS MEETINGS in Section 01 32 01.00 30 PROJECT SCHEDULE3-WEEK LOOK AHEAD SCHEDULE in Section 01 32 16.00 30 SMALL PROJECT CONSTRUCTION PROGRESS SCHEDULES and all quality control documentation required for that work.

e. Review Testing Plan and Log including status of tests performed since last QC Meeting.

f. Resolve QC and production problems. Discuss status of pending change orders.

g. Address items that may require revising the QC Plan.

h. Review Accident Prevention Plan (APP) and effectiveness of the safety program.

i. Review environmental requirements and procedures.

j. Review Environmental Management Plan.

k. Review Waste Management Plan.

l. Review the status of training completion.

m. Review Cx Plan and progress. Review Issues Log and resolution.

n. Review IAQ Management Plan.

1.5.2 Contractor Quality Control (CQC) Plan

Submit no later than 30 days after receipt of notice to proceed, the CQC Plan proposed to implement the requirements FAR 52.246-12 Inspection of Construction. The Government will consider an interim plan for the first 15 days of operation. Design and Construction will be permitted to begin only after acceptance of the CQC Plan and other Contract requirements or acceptance of an interim plan applicable to the particular feature of work to be started. Work outside of the accepted interim plan will not be permitted to begin until acceptance of a CQC Plan or another interim plan containing the additional work. Design work is not permitted to start prior to approval of a Design Quality Control Plan.

1.5.2.1 Content of Contractor Quality Control (CQC) Plan

Provide a CQC Plan, prior to start of construction that includes a table of contents, with major sections identified, pages numbered sequentially, and that documents the proposed methods and responsibilities for accomplishing quality control during the construction of the project. The CQC Plan must at a minimum include the following sections:

a. A description of the quality control organization and acknowledgment that the CQC staff will implement the three phase control system for all aspects of the work specified.

b. An organizational chart showing the quality control organization with individual names and job titles and lines of authority up to an executive of the company at the home office.

c. NAMES AND QUALIFICATIONS: Names and qualifications, in resume format, (including position titles and durations for qualifying experiences) for each person in the QC organization. Include the Construction Quality Management (CQM) for Contractors course certifications for the QC personnel as required by the paragraph CONSTRUCTION QUALITY MANAGEMENT TRAINING.

d. DUTIES, RESPONSIBILITY AND AUTHORITY OF QC PERSONNEL: Duties, responsibilities, and authorities of each person in the QC organization.

e. OUTSIDE ORGANIZATIONS: 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. APPOINTMENT LETTERS: Letters signed by an officer of the firm appointing the QC Manager and Alternate QC Manager, Design Quality Control Manager, CxC, and stating that they are responsible for implementing and managing the QC program as described in this Contract. Include in this letter the responsibility of the QC Manager and Alternate QC Manager to implement and manage the three phases of control, and their authority to stop work that is not in compliance with the Contract. Letters of direction are to be issued by the QC Manager to the Assistant QC Manager and all other QC Specialists or quality control representatives outlining their duties, authorities, and responsibilities. Include copies of the letters in the QC Plan.

g. SUBMITTAL PROCEDURES AND INITIAL SUBMITTAL REGISTER: Procedures for reviewing, approving, scheduling, and managing submittals, including those of subcontractors, designers of record, consultants, architect-engineers (AE), offsite fabricators, suppliers, and purchasing agents. Provide the name(s) of the person(s) in the QC organization authorized to review and certify submittals prior to approval. Provide the initial submittal of the Submittal Register as specified in Section 01 33 00 SUBMITTAL PROCEDURES.

h. TESTING LABORATORY INFORMATION: Testing laboratory information required by the paragraph ACCREDITATION REQUIREMENTS, as applicable.

i. TESTING PLAN AND LOG: A Testing Plan and Log that includes the tests required, associated feature of work required, referenced by the specification paragraph number requiring the test, the frequency, and

the person responsible for each test.

j. Procedures to complete design and construction deficiencies from identification through acceptable corrective action. Establish verification procedures that identified deficiencies have been corrected. This phase is performed prior to beginning work on each definable feature of work, after all required plans, documents, materials are approved, and after copies are at the work site.

k. Reporting procedures, including proposed reporting formats.

l. Procedures for submitting and reviewing design changes/variations prior to submission to the Contracting Officer.

m. LIST OF DEFINABLE FEATURES: A Definable Feature of Work (DFOW) is a task that is separate and distinct from other tasks and has control requirements and work crews unique to that task. A DFOW is identified by different trades or disciplines, or it is work by the same trade in a different environment. A DFOW is by definition any item or activity on the construction schedule, and the schedule specification provides direction regarding how the DFOWs are to be structured. Include in the list of DFOWs for all activities on the Construction Schedule. Provide separate DFOWs in the Network Analysis Schedule for each design development stage and submittal package. Although each section of the specifications can generally be considered as a definable feature of work, there are frequently more than one definable features under a particular section. Identify the specification section number and schedule activity ID for each DFOW listed. The DFOW list will be reviewed in coordination with the construction schedule and agreed upon during the Coordination of Mutual Understanding Meeting.

n. PROCEDURES FOR PERFORMING AND TRACKING THE THREE PHASES OF CONTROL: Identify procedures used to ensure the three phases of control to manage the quality on this project. For each Definable Feature of Work (DFOW), a Preparatory and Initial phase checklist will be filled out during the Preparatory and Initial phase meetings. Conduct the Preparatory and Initial Phases and meetings with a view towards obtaining quality construction by planning ahead and identifying potential problems for each DFOW.

o. Coordinate scheduled work with Special Inspections required by Section 01 45 35 SPECIAL INSPECTIONS, the Statement of Special Inspections and the Special Inspections Project Manual. Where the applicable code issued by the International Code Council (ICC) calls for inspections by the Building Official, the Contractor must include the inspections in the Quality Control Plan and must perform the inspections required by the applicable ICC. The Contractor must perform these inspections using independent qualified inspectors. Include the Special Inspections Project Manual requirements in the QC Plan.

p. PROCEDURES FOR COMPLETION INSPECTION: Procedures for identifying and documenting the completion inspection process. Include in these procedures the responsible party for punch out inspection, pre-final inspection, and final acceptance inspection.

q. TRAINING PROCEDURES AND TRAINING LOG: Procedures for coordinating and documenting the training of personnel required by the Contract.

r. ORGANIZATION AND PERSONNEL CERTIFICATIONS LOG: Procedures for

coordinating, tracking and documenting all certifications required for entities such as subcontractors, testing laboratories, suppliers, and personnel. The QC Manager will ensure that certifications are current, appropriate for the work being performed, and will not lapse during any period of the Contract that the work is being performed.

1.5.2.2 Additional Requirements for Design Quality Control (DQC) Plan

The following additional requirements apply to the DQC Plan:

a. Submit and maintain a DQC Plan as an effective quality control program which assures that all services required by this Contract are performed and provided in a manner that meets professional architectural and engineering quality standards. As a minimum, all documents must be technically reviewed by competent, independent reviewers identified in the DQC Plan. The same element that produced the product may not perform the Technical Review. Correct errors and deficiencies in the design documents prior to submitting them to the Government.

b. Include the design schedule in the master project schedule, showing the sequence of events involved in carrying out the project design tasks within the specific Contract period. Schedule must include sufficient detail to identify all major design tasks, including those that control the flow of work. Include review and correction periods associated with each item. Schedule must be a forward planning as well as a project monitoring tool. The schedule reflects calendar days and not dates for each activity. If the schedule is changed, submit a revised schedule reflecting the change within 7 calendar days.

c. Include in the DQC Plan the discipline-specific checklists to be used during the design and quality control of each submittal. Submit at each design phase as part of the project documentation these completed discipline-specific checklists. ER 1110-3-12 provides some useful information in developing checklists.

d. Implement the DQC Plan by a Design Quality Control Manager who has the responsibility of being cognizant of and assuring that all documents on the project have been coordinated and who coordinates work with and reports to the Contracting Officer via the QC Manager. Notify the Contracting Officer, in writing, of the name of the individual and the name of an alternate person assigned to the position.

e. Provide Quality Control Documentation procedures such as QC review sets and QC comments to demonstrate that cross checking of all engineering disciple's design drawings and specifications has taken place. The QC review documentation must exhibit a checking process of the design documents for completeness, accuracy, and constructability.

f. Names of the individuals, including their respective firm names, who will be serving as the Designer of Record (DOR) in their respective design discipline.

g. Submit a formal Communication Plan that indicates the frequency of design meetings and what information is covered in those meetings, key design decision points tied to the Network Analysis Schedule and how the DOR plans to include the Government in those decisions, peer review procedures, interdisciplinary coordination, design review procedures, and comment resolution.

(1) The Communication Plan must emphasize key decisions and possible problems the Contractor and Government may encounter during the design phase of the project.

(2) Provide a plan to discuss design alternatives and design coordination with the stakeholders at the key decision points as they arise on the project.

(3) Identify individual stakeholders and suggested communication methods that will be employed to expedite and facilitate each anticipated critical decision. Communication methods may include:

(a) Concept Design Workshop

(b) Over-the-shoulder review meetings

(c) Presentation at client's office

(d) Lifecycle cost analysis presentation

(e) Technical phone conversation

(f) Formal review meeting

(4) The design portion of the Communication Plan must be written by the DQC Manager and confirmed during the Post Award Kick-off Partnering.

(5) Update the Communication Plan at every Partnering meeting.

h. A statement of Life Safety and Fire Protection Features Inspections and Testing must be prepared by the Fire Protection DOR. Examples of life safety and fire protection features include, but are not limited to, water distribution systems including fire pumps and fire hydrants, fire resistive assemblies such as fire rated walls/partitions, through -penetration firestop systems, spray-applied fireproofing of structural components, fire alarm and detection systems, fire suppression and standpipe systems, means of egress components, emergency and exit lighting fixtures. The plan must include a listing of the individuals, approved agencies or firms that will be retained for conducting the required inspections and tests accompanied by a description of individual inspector's experience, and a copy of all required certifications.

(1) Comprehensive list of systems, components or features to be inspected and tested.

(2) Description of performance verification testing activities for each system or component.

(3) Procedures and schedules for functional performance tests of all systems requiring functional testing.

1.5.3 Acceptance of the Quality Control (QC) and Design Quality Control (DQC) Plan

The Contracting Officer's acceptance of the Contractor QC Plan, or interim plan applicable to the particular feature of work to be started, and

Design Quality Control Plan is required prior to the start of design and construction. The Government will consider an interim plan for the first 15 days of operation. Work outside of the accepted interim plan will not be permitted to begin until acceptance of a CQC Plan or another interim plan containing the additional work. The Contracting Officer reserves the right to require changes in the QC and DQC Plan and operations as necessary, including removal or addition of personnel, to ensure the specified quality of work. The Contracting Officer reserves the right to interview any member of the QC and DQC organization at any time to verify the submitted qualifications. All QC and DQC organization personnel are subject to acceptance by the Contracting Officer. The Contracting Officer may require the removal of any individual for non-compliance with quality requirements specified in the Contract.

1.5.4 Notification of Changes

Notify the Contracting Officer, in writing, in advance of any proposed changes in the QC Plan or changes to the QC organization personnel. Proposed changes are subject to acceptance by the Contracting Officer.

1.5.5 Special Inspections

Perform all required Special Inspections per Section 01 45 35 SPECIAL INSPECTIONS, the statement of Special Inspections and the Schedule of Special Inspections.

1.6 QUALITY CONTROL (QC) ORGANIZATION

1.6.1 Personnel Requirements

The requirements for the CQC organization are a Site Safety and Health Officer (SSHO), QC Manager, a Design Quality Manager, and enough qualified personnel to ensure safety and Contract compliance. The SSHO reports directly to a senior project (or corporate) official independent from the QC Manager. The SSHO will also serve as a member of the CQC Staff Personnel identified in the technical provisions as requiring specialized skills to assure the required work is being performed properly. The CQC staff always maintains a presence at the site during progress of the work and have complete authority and responsibility to take any action necessary to ensure Contract compliance. The CQC staff will be subject to acceptance by the Contracting Officer. Provide adequate office space, filing systems and other resources as necessary to maintain an effective and fully functional CQC organization. Promptly complete and furnish all letters, material submittals, shop drawing submittals, schedules, and all other project documentation to the CQC organization. The CQC organization is responsible for always maintaining these documents and records at the site, except as otherwise acceptable to the Contracting Officer.

1.6.2 Quality Control (QC) Manager

1.6.2.1 Duties

Provide a QC Manager at the work site to implement and manage the QC program, and to serve as the Level two Site Safety and Health Officer (SSHO) as detailed in Section 01 35 26 GOVERNMENTAL SAFETY REQUIREMENTS. The QC Manager must be employed by the Prime Contractor. In addition to implementing and managing the QC program, the QC Manager may perform the duties of Project Superintendent. The only duties and responsibilities of the QC Manager are to manage and implement the QC program on this Contract.

The QC Manager must attend the QC Plan Meetings,Coordination and Mutual Understanding Meeting, conduct the QC meetings,perform the three phases of control except for those phases of control designated to be performed by QC Specialists, perform submittal review and approval, ensure testing is performed and provide 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, testing laboratory personnel and any other inspection and testing personnel required by this Contract. The QC Manager is the manager of all QC activities. The QC manager is responsible for notifying the Special Inspector and Special Inspector of Record of activities which require their review. The QC manager is responsible for coordinating the Special Inspection activities, see paragraph CONTRACTOR'S QUALITY CONTROL (QC) MANAGER, in Section 01 45 35 SPECIAL INSPECTIONS. The QC manager is responsible for the quality control for Controlled Area perimeter construction.

1.6.2.2 Qualifications

The QC Manager must be an individual with a minimum of 5 years combined experience in the following positions: Project Superintendent, QC Manager, Project Manager, Project Engineer or Construction Manager on similar size and type construction Contracts which included the major trades that are part of this Contract. The individual must have at least 2 years experience as a QC Manager. The individual must be familiar with the requirements of EM 385-1-1 and have experience in the areas of hazard identification, safety compliance, and sustainability.

The QC Manager must possess at least a Bachelor's degree in engineering, architecture, or construction management, with a current professional engineer registration in the state of Texasin a US State or Territory or a current licensed architect in the state of Texasin a US State or Territory and a minimum of 10 years construction experience as a Project Superintendent, QC Manager, Project Manager, Project Engineer or Construction Manager on similar size and type construction Contracts which included the major trades that are part of this Contract. The individual must have at least 4 years experience as a QC Manager. The individual must be familiar with the requirements of EM 385-1-1 and have experience in the areas of hazard identification, safety compliance, and sustainability.

The QC Manager and all members of the QC organization must be capable of reading, writing, and conversing fluently in the English language.

1.6.2.3 Construction Quality Management Training

In addition to the above experience and education requirements, the QC Manager, Alternate QC Manager, Superintendent, QC Specialist, and DQCM must have completed the CQM for Contractors course. If the QC Manager does not have a current certification, obtain the CQM for Contractors course certification within 90 days of award. This course is periodically offered by the Naval Facilities Engineering Systems Command and the Army Corps of Engineers.

The Construction Quality Management Training certificate expires after 5 years. If the QC Manager's certificate has expired, retake the course to remain current.

1.6.2.4 Quality Control Requirements for Multiple Work Sites

Provide separate full-time QC Managers at the work sites listed below. Provide a separate full-time QC Manager at the following work sites:

a. INDICATE WORK SITE LOCATION

b. INDICATE WORK SITE LOCATION

c. INDICATE WORK SITE LOCATION

The QC Managers for the work sites listed above are each responsible for implementing and managing the QC Program at the designated work site. They must perform the three phases of control, perform submittal review, ensure testing is performed, and prepare QC certifications and documentation required by this Contract. The qualification requirements for the QC Managers at each site are listed in the paragraph QUALIFICATIONS.

1.6.3 Organizational Changes

Maintain the QC staff with personnel as required by the specification section at all times. When it is necessary to make changes to the QC staff, revise the CQC Plan to reflect the changes and submit the changes to the Contracting Officer for acceptance.

1.6.4 Design Quality Control (DQC) Manager

The DQC Manager must be a member of the QC organization, must coordinate actions with the QC Manager, and must not be subordinate to the Project Superintendent or the Project Manager. The DQC Manager may also act as the CxC if all CxC qualifications are met.

1.6.4.1 Qualifications

a. A minimum of 5 years experience as a design Architect or Engineer on similar size and type designs / or design-build Contracts. Provide education, experience, and management capabilities on similar size and type Contracts.

b. Be a registered professional engineer or architect with an active registration. Provide proof of registration as part of the resume submittal package.

1.6.4.2 Responsibilities

a. Be responsible for the design integrity, professional design standards, and all design services required.

b. Be a member of the DOR firm but may not be the DOR or the person stamping and approving final construction drawings or approving submittals.

c. Be responsible for development of the design portion of the QC Plan, incorporation and maintenance of the approved Design Schedule, and the preparation of DQC Reports and minutes of all design meetings.

d. Participate in the Post Award Kick-Off, all design planning meetings, design presentations, partnering, and QC meetings.

e. Be cognizant of and assure that all design documents on the project have been developed in accordance with the Contract.

f. Provide Design Quality Control Documentation (DQCD) which indicates design coordination of the engineering disciplines. Submit DQCD with the Interim, Final, and Design Complete submittals.

g. Certify and sign statement on each invoice that all work to be paid to the DOR under the invoice has been completed in accordance with the Contract requirements.

h. Prepare weekly DQC Reports that document the work the design team accomplished that week.

i. Coordinate all training requirements with the QC and in accordance with Section 01 78 23 OPERATION AND MAINTENANCE DATA.

1.6.5 Alternate Quality Control (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 qualification requirements for the Alternate QC Manager must be the same as for the QC Manager.

1.6.6 Assistant Quality Control (QC) Manager Duties and Qualifications

Provide a full-time assistant to the QC Manager at the work site to perform the three phases of control, perform submittal review, ensure testing is performed, and prepare QC certifications and documentation required by this Contract. The qualification requirements for the Assistant QC Manager must be submitted. The individual must be familiar with the requirements of EM 385-1-1 and have experience in the areas of hazard identification and safety compliance.

Provide a full-time assistant to the QC Manager at the work site to perform the three phases of control, perform submittal review, ensure testing is performed, and prepare QC certifications and documentation required by this Contract. The Assistant QC Manager must be on the work site during supplemental work shifts beyond the regular shift and perform the duties of the QC Manager during such supplemental shift work. The qualification requirements for the Assistant QC Manager must be FILL IN BASED ON NATURE AND COMPLEXITY OF JOB. The individual must be familiar with the requirements of EM 385-1-1 and have experience in the areas of hazard identification and safety compliance.

The Assistant QC Manager must be capable of reading, writing, and conversing fluently in the English language.

1.6.7 Designer of Record (DOR) Qualifications

The DOR must be a registered design professional, retained by the Prime Contractor, responsible for the overall design and review of submittal documents prepared by others. The DOR is registered or licensed to practice their respective design profession as defined by the statutory requirements of the professional registration laws in the State of Texasstate in which the design professional works. The DOR cannot serve as the DQC Manager.

1.6.8 Commissioning

Commissioning (Cx) is a systematic, quality-focused process for delivery of a project focusing on verifying and documenting all commissioned systems and assemblies are installed, tested, and operating as they were planned and designed to meet the project requirements. The Quality Control requirements outlined in this specification section are key in supporting the objectives of the Cx process, specifically coordinating testing, documenting, and verifying proper system operation. Properly executed the Quality Control support of Cx ensures timely execution of necessary tasks to deliver the fully commissioned and operating systems in coordination with the overall construction and project schedule.

Provide Cx in addition to the quality control requirements of this section and not as a substitute for quality control requirements. The QC Manager is responsible for carrying out the three phases of control while ensuring the functional performance and integrated systems tests are coordinated with the Cx provider as required for each system to be commissioned.

1.6.8.1 Certificate of Readiness

The QC Manager must issue a Certificate of Readiness for Government approval for each system to be commissioned. Schedule Functional Performance Tests for each system only after the Certificate of Readiness has been approved by the Government for the system. The Certificate of Readiness certifies that all required inspections have been completed and deficiencies that were identified through any prior review, inspection, or test activity have been corrected before the start of Functional Performance Tests. Refer to Cx requirements in Section 01 91 00.15 BUILDING COMMISSIONING for a list of systems to be commissioned and detailed requirements for the Cx provider.

1.6.9 [Enter Appropriate Subpart Title Here][Enter Appropriate Subpart Title Here][Enter Appropriate Subpart Title Here]Quality Control (QC) Specialists

Provide a separate QC Specialist at the work site for each of the areas as listed in the Matrix listed below, who must assist and report to the QC Manager and who may perform production related duties but must be allowed sufficient time to perform must have no duties other than their assigned quality control duties. These individuals or specialized technical companies are directly employed by the Prime Contractor and cannot be employed by a supplier or subcontractor on this project are employees of the Prime or subcontractor including Designer of Record (DOR). A single person can cover more than one area provided that the single person is qualified to perform quality control activities in each designated and that workload allows. QC Specialists must be physically present at the work site with frequency as indicated in the Experience Matrix below, to participate in the QC Meetings, perform the three phases of control, including participation in Preparatory and Initial Phase meetings, and to perform and document Follow-up inspections as an extension of the QC Manager for each definable feature of work in their area of responsibility. QC Specialist must assist and be present for training events, and Critical System Acceptance inspections by the Government. Qualification, experience, Area of Responsibility, and frequency of QC surveillance are provided in Matrix listed herein.

1.6.9.1 Fire Protection QC Specialist (FPQC)

Provide a Fire Protection Quality Control Specialist (FPQC) within the QC organization to perform quality control related activities as specified herein on fire protection and life safety systems installed under this Contract.

1.6.9.1.1 Qualifications

The FPQC must have the following qualifications:

a. Be a registered Professional Engineer (P.E.) licensed by the State of Texasa Licensing Board in the United States, the District of Columbia, Guam or Puerto Rico, having passed the National Council of Examiners for Engineering and Surveying (NCEES) examination specifically in the discipline of Fire Protection Engineering.

b. Have a minimum of 5 years of Fire Protection Engineering experience on projects of similar relevance and complexity to the fire protection work specified under this Contract.

c. Other than the contractual obligations with the Prime Contractor, the FPQC must have no other business relationship (i.e., employee, owner, partner, operating officer, distributor, salesman, technical representative, family relationship, or financial investment) with the Prime Contractor or subcontractors.

d. Be employed by an independent engineering firm or company or be the Fire Protection Engineer on the Prime Contractor's Design-Build team. The firm may identify multiple, to a maximum of five, licensed Fire Protection Engineers for the performance of the duties under this Contract but must submit the names and qualifications for Government approval for all individuals identified prior to them performing any work under this Contract. These individuals may not be substituted without prior approval from the Contracting Officer.

1.6.9.1.2 Responsibilities

FPQC duties and responsibilities:

a. Assist in the development of the QC Plan including the Testing Plan and Log and executing the three phases of control for work involving the installation and testing of fire protection and life safety systems as an extension of the QC Manager.

b. Participate in project QC Meetings. Participate in Preparatory and Initial Phase meetings and perform and Follow-up inspections for work involving the installation and testing of fire protection and life safety systems.

c. Review and certify that all submittals pertaining to fire protection and life safety systems are complete and accurate prior to submission to the Government for surveillance approval. Forward each submittal reviewed by the FPQC to the Government for surveillance within 10 working days of FPQC certification. The FPQC Specialist is responsible for ensuring submittals are complete and accurate and all corrections have been made prior to submission to the Government. The

Government reserves the right to reject any submittal that has not first been reviewed and certified by the FPQC and so marked, in writing, attesting to such review and completeness of the submittal.

d. The Government reserves the right to reject any submittal or construction that is not in compliance to Contract. Government reviews do not relieve the Contractor responsibility for providing adequate quality control measures and do not constitute or imply acceptance of Contract variation.

e. Perform construction surveillance in accordance with the Schedule of Fire Protection System Inspections (ATT-1) produced by the DOR. Construction surveillance includes but is not limited to performing periodic on-site inspections during construction at specified milestones, performing a pre-final inspection of installed systems and witnessing functional testing; and participating and documenting in an on-site final acceptance inspection of fire protection and life safety systems with the Government FPE.

f. Document inspection results on a FPQC report prepared each day inspections are performed. The report must include a description of the visual inspection or observation performed, a written summary of findings, a conclusion on compliance with the Contract documents, and signature of the FPQC Specialist. In person inspection and Remote inspections must be documented via photo (.jpeg), and optionally by video (.mp4). Video/photographic documentation must include before and after conditions and physical measurements. Forward the FPQC daily report to the QC Manager who must include the report with the submission of their daily QC Report to the Government each day. Every site visit by the FPQC must be documented on a FPQC daily report.

1.6.9.1.3 Schedule of Fire Protection System Inspections

A schedule, prepared by the Fire Protection DOR, which lists each of the required visual inspections and observations required by the FPQC. The schedule is included at the end of this UFGS section as ATT-1. The schedule shall be provided by the DOR.

1.6.9.2 Quality Control (QC) for Controlled Area Perimeter Construction

1.6.9.2.1 Periodic (Follow-Up Phase) Inspections

Once construction begins, perform periodic inspections of Controlled Area identified in the Contract drawings at least once every 2 weeks. Increase frequency to weekly inspections within 30 days of planned acceptance testing. Coordinate periodic inspections with the appointed Government Site Security Manager (SSM) responsible for ensuring the assembly meets the requirements for accreditation. Inspections must verify that construction and materials comply with the Contract documents, the description of the assembly in the ASTM E90 Factory Report for acoustical testing, and the approved submittals. Focus inspections on the construction of the sound rated assemblies, perimeter penetrations, perimeter doors, electronic security system, man-bar installation, inspection ports, and TEMPEST countermeasures. Document periodic inspections in Daily QC Reports.

1.6.9.2.2 Preliminary Inspection

The Government and QC Manager will perform a joint preliminary inspection

of the Controlled Area after construction of the assembly is complete to verify compliance with the design requirements and other Contract documents. The Contracting Officer and the appointed Government SSM will participate in the preliminary inspection. Provide the Contracting Officer a minimum 14 calendar days notification in advance of the preliminary inspection.

As a result of the preliminary inspection, prepare a Controlled Area punch list with deficiencies identified. Include with the punch list the estimated date by which the deficiencies will be corrected. Document the preliminary inspection in the Daily QC Report and attach the punch list. Notify the Contacting Officer when deficiencies are corrected. Deficiencies from the Preliminary Inspection must be corrected prior to scheduling the Final Acceptance Inspection.

1.6.9.2.3 Acceptance Testing for Sound Attenuation

Perform acceptance testing for sound transmission loss of sound rated door assemblies as required in Section 08 34 73 SOUND CONTROL DOOR ASSEMBLIES and Section 09 29 00 GYPSUM BOARD for sound rated assemblies. Acceptance testing must be performed during the preliminary inspection. The Contracting Officer and the appointed Government SSM must witness acceptance testing. Deficiencies identified during acceptance testing must be included in the Controlled Area punch list and corrected prior to the final acceptance inspection.

1.6.9.2.4 Acceptance Testing for Electronic Security Systems

Perform acceptance testing for Electronic Security Systems in accordance with Section 28 08 10 ELECTRONIC SECURITY SYSTEM ACCEPTANCE TESTING. Acceptance testing must be performed during the preliminary inspection. The Contracting Officer and the appointed Government SSM must witness acceptance testing. Deficiencies identified during acceptance testing must be included in the Controlled Area punch list and corrected prior to the Final Inspection.

1.6.9.2.5 Final Inspection

Perform a final inspection of the Controlled Area after required testing has been successfully completed as part of the preliminary inspection and all punch list items corrected. Testing is not permitted during the final inspection. QC Manager and Superintendent must attend the final inspection and Government attendees will include the Contracting Officer and appointed Government SSM. Request a final inspection by the Contracting Officer a minimum of 14 calendar days in advance.

1.6.10 Special Inspector and Special Inspector of Record

The Special Inspector (SI) and Special Inspector of Record (SIOR) must be an independent third party hired directly by the Prime Contractor. The SI and SIOR must not be a company employee of the Contractor or any subcontractor performing the work to be inspected. The qualifications of the SI and SIOR are defined in Section 01 45 35 SPECIAL INSPECTION.

1.6.11 Submittal Reviewers Duties and Qualifications

Provide a Submittal Reviewers, other than the QC Manager or CxC, qualified in the disciplines being reviewed, to review and certify that the submittals meet the requirements of this Contract prior to certification

or approval by the QC Manager.

Each submittal must be reviewed by an individual with 10 years of construction experience.

Each submittal must be reviewed by a registered architect or professional engineer.

Each of the following submittals must be reviewed by an individuals meeting the qualifications/experience specified below:

Qualification / Experience in Submittal Discipline	Submittals to be reviewed:	
	Section No	Submittal

1.7 SUBMITTAL AND DELIVERABLES REVIEW AND APPROVAL

Procedures for submission, review and approval of submittals are described in Section 01 33 00 SUBMITTAL PROCEDURES. Procedures must include field verification of relevant dimensions and component characteristics by the QC organization prior to submittal being sent to the Contracting Officer. The CQC organization is responsible for certifying that all submittals and deliverables are in compliance with the Contract. When Section 01 91 00.15 BUILDING COMMISSIONING are included in the Contract, the submittals required by those sections have to be coordinated with Section 01 33 00 SUBMITTAL PROCEDURES to ensure adequate time is allowed for each type of submittal required.

1.8 THREE PHASES OF CONTROL

CQC enables the Contractor to ensure that the construction, including that of subcontractors and suppliers, complies with the requirements of the Contract. At least three phases of control must be conducted by the QC Manager to adequately cover both on-site and off-site work for each definable feature of the construction work as follows:

1.8.1 Preparatory Phase

Document the results of the preparatory phase actions by separate minutes prepared by the QC Manager and attach to the daily CQC report. Instruct applicable workers as to the acceptable level of workmanship required to meet Contract specifications.

Notify the Contracting Officer at least 2 business days in advance of each preparatory phase meeting. The meeting will be conducted by the QC Manager and attended by the QC Specialists, the Project Superintendent, the CxC, the Special Inspector, the Special Inspector of Record, and the foreman responsible for the DFOW. When the DFOW will be accomplished by a subcontractor, that subcontractor's foreman must attend the preparatory phase meeting. This phase is performed prior to beginning work on each definable feature of work, after all required plans/documents/materials are approved/accepted, and after copies are at the work site. Perform the following prior to beginning work on each DFOW:

a. Review each paragraph of the applicable specification sections, reference codes, and standards. Make available during the prepatory inspection a copy of those sections of referenced codes and standards applicable to that portion of the work to be accomplished in the field. Maintain and make available in the field for use by Government personnel until final acceptance of the work.

b. Review the Contract drawings.

c. Verify that field measurements are as indicated on construction or shop drawings or both before confirming product orders, to minimize waste due to excessive materials.

d. 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.

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

f. Examine the work area to ensure that the required preliminary work has been completed and complies with the Contract and ensure any deficiencies/rework items in the preliminary work have been corrected and confirmed by the Contracting Officer.

g. Review coordination of product/material delivery to designated prepared areas to execute the work.

h. 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 and are properly stored.

i. Check to assure that all materials and equipment have been tested, submitted, and approved.

j. Discuss specific controls to be used, construction methods, construction tolerances, workmanship standards, and the approach that will be used to provide quality construction by planning ahead and identifying potential problems for each DFOW. Ensure any portion of the plan requiring separate Contracting Officer acceptance has been approved.

k. Review the APP and appropriate Activity Hazard Analysis (AHA) to ensure that applicable safety requirements are met, and that required Safety Data Sheets (SDS) are submitted.

l. Review the Cx requirements in accordance with Section 01 91 00.15 BUILDING COMMISSIONING and ensure all preliminary work items have been completed and documented.

m. Discussion of procedures for controlling quality of the work including repetitive deficiencies. Document construction tolerances and workmanship standards for that feature of work.

n. Discuss schedule and execution of the initial control phase and confirmation or construction quality compliance.

o. Review Special Inspections required by Section 01 45 35 SPECIAL INSPECTION, the Statement of Special Inspections and the Schedule of

Special Inspections.

1.8.2 Initial Phase

Notify the Contracting Officer at least 2 business days in advance of each initial phase. When construction crews are ready to start work on a DFOW, conduct the initial phase with the QC Specialists, the Project Superintendent, the Special Inspector, the Special Inspector of Record, and the foreman responsible for that DFOW. Observe the initial segment of the DFOW to ensure that the work complies with Contract requirements. Document the results of the initial phase in the daily CQC Report and in the Initial Phase Checklist. Repeat the initial phase for each new crew to work on-site when acceptable levels of specified quality are not being met. Indicate the exact location of initial phase for definable feature of work for future reference and comparison with follow-up phases. Perform the following for each DFOW:

a. Check work to ensure that it is in full compliance with Contract requirements. Review minutes of the preparatory meeting.

b. Verify adequacy of controls to ensure full Contract compliance. Verify required control inspection and testing comply with the Contract.

c. Establish level of workmanship and verify that it meets the minimum acceptable workmanship standards. Compare with required sample panels as appropriate.

d. Resolve any workmanship issues.

e. Ensure that testing is performed by the approved laboratory.

f. Check work procedures for compliance with the APP and the appropriate AHA to ensure that applicable safety requirements are met.

g. Review project specific work plans (i.e., Cx, HAZMAT Abatement, Stormwater Management) to ensure all preparatory work items have been completed and documented.

h. Coordinate scheduled work with Special Inspections required by Section 01 45 35 SPECIAL INSPECTIONS, the Statement of Special Inspections and the Schedule of Special Inspections.

1.8.3 Follow-Up Phase

Perform the following for on-going DFOW daily, or more frequently as necessary, until the completion of each DFOW. The Final Follow-Up for any DFOW will clearly note in the daily report the DFOW is completed, and all deficiencies/rework items have been completed in accordance with the paragraph DEFICIENCY/REWORK ITEMS LIST. Each DFOW that has completed the Initial Phase and has not completed the Final Follow-up must be included on each daily report. If no work was performed on that DFOW for the period of that daily report, it must be so noted. Document all Follow-Up activities for DFOWs in the daily CQC Report:

a. Ensure the work including control testing complies with Contract requirements until completion of that particular work feature. Record checks in the CQC documentation.

b. Maintain the quality of workmanship required.

c. Ensure that testing is performed by the approved laboratory.

d. Ensure that deficiencies/rework items are being corrected. Conduct final follow-up checks and correct all deficiencies prior to the start of additional features of work which may be affected by the deficient work.

e. Do not build upon nor conceal non-conforming work.

f. Assure manufacturers' representatives have performed necessary inspections if required and perform safety inspections.

g. Review the Cx requirements in accordance with Section 01 91 00.15 BUILDING COMMISSIONING.

h. Coordinate scheduled work with Special Inspections required by Section 01 45 35 SPECIAL INSPECTIONS, the Statement of Special Inspections and the Schedule of Special Inspections.

1.8.4 Additional Preparatory and Initial Phases

Conduct additional preparatory and initial phases on the same DFOW if the quality of on-going work is unacceptable, if there are changes in the applicable QC organization, if there are changes in the on-site production supervision or work crew, if work on a DFOW has not started within 45 days of the initial preparatory meeting or has resumed after 45 days of inactivity, or if other problems develop.

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

Notify the Contracting Officer at least 2 weeks prior to the start of the preparatory and initial phases.

1.8.6 Deficiency/Rework Items List

The QC Manager must maintain a list of work that does not comply with the Contract, identifying what items need to be corrected, the activity ID number associated with the item, the date the item was originally discovered, the date the item will be corrected by, and the date the item was corrected.

The QC Manager reviews the list at each weekly QC Meeting:

a. There is no requirement to report a deficiency/rework item that is corrected the same day it is discovered.

b. No successor task may be advanced beyond the preparatory phase meeting until all deficiencies/rework items have been cleared by the QC Manager and concurred with by the Contracting Officer. This must be confirmed as part of the Preparatory Phase activities.

c. Attach a copy of the "Deficiency/Rework Items List" to the last daily CQC Report of each month.

d. The Contractor is responsible for including those items identified by the Contracting Officer.

e. All deficiencies/rework items must be confirmed as corrected by the QC Manager, and concurred by the Contracting Officer, prior to commencement of any completion inspections per paragraph COMPLETION INSPECTIONS unless specifically exempted by the Contracting Officer.

f. Non-Compliance with these requirements is grounds for removal in accordance with paragraph ACCEPTANCE OF THE QUALITY CONTROL (QC) and DESIGN QUALITY CONTROL (DQC) PLAN.

g. All delays, concurrent or related to failure to manage, monitor, control, and correct deficiencies/rework items are entirely the responsibility of the Contractor and can not be made the subject, or any component of any request for additional time or compensation.

1.9 TESTING

Perform specified or required tests to verify that control measures are adequate to provide a product which conforms to Contract requirements. Upon request, furnish to the Government duplicate samples of test specimens for possible testing by the Government. Testing includes operation and acceptance tests when specified. Procure the services of an U.S. Army Corps of Engineers approved testing laboratory or establish an approved testing laboratory at the project site or within miles. Perform the following activities and record and provide the following data:

a. Verify that testing procedures comply with Contract requirements.

b. Verify that facilities and testing equipment are available and comply with testing standards.

c. Check test instrument calibration data against certified standards.

d. Verify that recording forms and test identification control number system, including all test documentation requirements, have been prepared.

e. Record results of all tests taken, both passing and failing on the CQC report for the date taken. Specification paragraph reference, location where tests were taken, and the sequential control number identifying the test. If approved by the Contracting Officer, actual test reports are submitted later with a reference to the test number and date taken. Provide an information copy of tests performed by an offsite or commercial test facility directly to the Contracting Officer. Failure to submit timely test reports as stated results in nonpayment for related work performed and disapproval of the test facility for this Contract.

1.9.1 Accreditation Requirements

Construction materials testing laboratories must be accredited by a laboratory accreditation authority and must submit a copy of the Certificate of Accreditation and Scope of Accreditation. The laboratory's scope of accreditation must include the appropriate ASTM standards (ASTM E329, ASTM C1077, ASTM D3666, ASTM D3740, ASTM E543) listed in the technical sections of the specifications. Laboratories engaged in Hazardous Materials Testing must meet the requirements of OSHA and EPA. The policy applies to the specific laboratory performing the actual testing, not just the Corporate Office.

1.9.2 Laboratory Accreditation Authorities

All testing laboratories must be validated by the USACE Material Testing Center (MTC) for the tests to be performed. Information on the USACE MTC with web-links to both a list of validated testing laboratories and for the laboratory inspection request for can be found at: https://mtc.erdc.dren.mil

1.9.3 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. Laboratories utilized for testing soils, concrete, asphalt, and steel must meet criteria detailed in ASTM D3740 and ASTM E329.

1.9.3.1 Capability Recheck

If the selected laboratory fails the capability check, the Contractor will be assessed a charge equal to the liquidated damages amount to reimburse the Government for each succeeding recheck of the laboratory or the checking of a subsequently selected laboratory. Such costs will be deducted from the Contract amount due the Contractor.

1.9.3.2 Onsite Laboratory

The Government reserves the right to utilize the Contractor's control testing laboratory and equipment to make assurance tests, and to check the Contractor's testing procedures, techniques, and test results at no additional cost to the Government.

1.9.4 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. If the item fails to conform, notify the Contracting Officer immediately. 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 must 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.

1.10 COMPLETION INSPECTIONS

1.10.1 Punch-Out Inspection

Near the completion of all work or any increment thereof, established by a completion time stated in the Contract Clause entitled "Commencement, Prosecution, and Completion of Work," or stated elsewhere in the specifications, the QC Manager must conduct an inspection of the work and develop a "punch list" of items which do not conform to the approved drawings, specifications, and Contract. Include in the punch list any remaining items on the "Deficiency/Rework Items List", that were not corrected prior to the Punch-Out Inspection as approved by the Contracting Officer in accordance with the paragraph DEFICIENCY/REWORK ITEMS LIST. Include within the punch list the estimated date by which the deficiencies

will be corrected. Provide a copy of the punch list to the Contracting Officer.

The QC Manager, or staff, must make follow-on inspections to ascertain that all deficiencies have been corrected. All punch list items must be confirmed as corrected by the QC Manager and concurred by the Contracting Officer. Once this is accomplished, notify the Government that the facility is ready for the Government "Pre-Final Inspection".

1.10.2 Pre-Final Inspection

The Government and QC Manager will perform this inspection to verify that the facility is complete and ready to be occupied. A Government "Pre-Final Punch List" will be documented by the QC Manager as a result of this inspection. The QC Manager will ensure that all items on this list are corrected and concurred by the Contracting Officer prior to notifying the Government that a "Final" inspection with the Client can be scheduled. All items noted on the "Pre-Final" inspection must be corrected and concurred by the Contracting Officer in a timely manner and be accomplished before the Contract completion date for the work, or any increment thereof, if the project is divided into increments by separate completion dates unless exceptions are directed by the Contracting Officer.

1.10.3 Final Acceptance Inspection

Notify the Contracting Officer at least 14 calendar days prior to the date a final acceptance inspection can be held. State within the notice that all items previously identified on the pre-final punch list will be corrected and acceptable, along with any other unfinished Contract work, by the date of the final acceptance inspection. The Contractor must be represented by the QC Manager, the Project Superintendent, and others deemed necessary. Attendees for the Government will include the Contracting Officer, other Government QA personnel, and personnel representing the Client. Failure of the Contractor to have all Contract work acceptably complete for this inspection will be cause for the Contracting Officer to bill the Contractor for the Government's additional inspection cost in accordance with the Contract Clause entitled "Inspection of Construction."

1.11 QUALITY CONTROL (QC) CERTIFICATIONS

1.11.1 Contractor Quality Control (CQC) Report Certification

Contain the following statement within the CQC Report: "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."

1.11.2 Completion Certification

Upon completion of work under this Contract, the QC Manager must furnish a certificate to the Contracting Officer attesting that "the work has been completed, inspected, tested and is in compliance with the Contract." Provide a copy of this final QC Certification for completion to the preparer of the Operation & Maintenance (O&M) documentation.

1.11.3 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, coordinated and attesting that the work for which payment is requested, including stored material that the Contracting Officer has allowed to be billed for, complies with Contract requirements.

1.12 DOCUMENTATION AND INFORMATION FOR THE CONTRACTING OFFICER

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

Prior to commencing work on construction, the Contractor must obtain a copy set of the current report forms. The report forms will consist of the Contractor Quality Control (CQC) Report, CQC Report (Continuation Sheet), Contractor Production Report, Contractor Production Report (Continuation Sheet), Preparatory Phase Checklist, Initial Phase Checklist, Testing Plan and Log, and Rework Items List. Unless otherwise provided by the Contracting Officer, Contractor may use the forms provided as related material located at https://www.wbdg.org/ffc/dod/unified-facilities-guide-specifications-ufgs/ufgs-01-45-00.

1.12.1 Construction Documentation

Reports are required for each day that work is performed and must be attached to the Contractor Quality Control Report prepared for the same day. Maintain current and complete records of on-site and off-site QC program operations and activities. Reports are required for each day work is performed. Account for each calendar day throughout the life of the Contract.

The Project Superintendent and the QC Manager must prepare and sign the Contractor Production and CQC Reports, respectively. Every space on the forms must be filled in. Use N/A if nothing can be reported in one of the spaces. The reporting of work must be identified by terminology consistent with the construction schedule. In the "Remarks" sections of the reports, enter 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, a record of visitors to the work site, quality control problem areas, deviations from the QC Plan, construction deficiencies encountered, and meetings held. For each entry in the report(s), identify the Schedule Activity No. that is associated with the entered remark.

1.12.2 Quality Control Activities

CQC and Contractor Production reports will be prepared daily to maintain current records providing factual evidence that required quality control activities and tests have been performed. Include in these records the work of subcontractors and suppliers on an acceptable form that includes, as a minimum, the following information:

a. The name and area of responsibility of the Contractors and any subcontractors.

b. Operating plant/equipment with hours worked, idle, or down for repair.

c. Work performed each day, giving location, description, and by whom. When a Network Analysis Schedule (NAS) is used, identify each item of work performed each day by NAS activity number.

d. Control phase activities performed. Preparatory, and Initial phase Checklists associated with the DFOW referenced to the construction schedule. Follow-up phase activities identified to the DFOW. If testing or specific QC Specialist activities are associated with the Follow-up phase activities for a specific DFOW note this and include those reports.

e. Test and control activities performed with results and references to specifications and drawings requirements. Identify the control phase (Preparatory, Initial, Follow-up). List of deficiencies noted, along with corrective action in accordance with the paragraph DEFICIENCY/REWORK ITEMS LIST.

f. Quantity of materials received at the site with statement as to acceptability, storage, and reference to specifications and drawings requirements.

g. Submittals and deliverables reviewed, with Contract reference, by whom, and action taken.

h. Offsite surveillance activities, including actions taken.

i. Job safety evaluations stating what was checked, results, and instructions or corrective actions.

j. Instructions given/received and conflicts in plans and specifications.

k. Provide documentation of design quality control activities. For independent design reviews, provide, as a minimum, identification of the team and their review comments, responses and the record of resolution of the comments.

1.12.3 Verification Statement

Indicate a description of trades working on the project; the number of personnel working; weather conditions encountered; and any delays encountered. Cover both conforming and deficient features and include a statement that equipment and materials incorporated in the work and workmanship comply with the Contract.

Furnish the original and one copy of these records in report form to the Government by 10:00 AM the next working day after the date covered by the report. As a minimum, prepare and submit one report for every 7 days of no work and on the last day of a no work period. All calendar days need to be accounted for throughout the life of the Contract. The first report following a day of no work will be for that day only. Reports need to be signed and dated by the QC Manager. Include copies of test reports and copies of reports prepared by all subordinate quality control personnel within the QC Manager Report.

1.12.4 Reports from the Quality Control (QC) Specialist(s)

Document inspection results on a QC specialist report prepared each day work is performed in their area of responsibility. The report must

include a description of the visual inspection or observation performed, a written summary of findings, a conclusion on compliance with the Contract documents, and signature of the QC Specialist. In person inspections must be documented with Video/photographs. Video/photographic documentation of deficiencies must include before and after conditions and physical measurements, as necessary. Forward the QC daily report to the QC Manager who must include the report with the submission of their daily QC Report to the Government each day. Every site visit by the QC Specialist must be documented on a QC Specialist daily report.

1.12.5 Quality Control Validation

Establish and maintain the following in an electronic folder. Divide folder into a series of tabbed sections as shown below. Ensure folder is updated at each required progress meeting.

a. CQC Meeting minutes in accordance with paragraph QUALITY CONTROL (QC) MEETINGS.

b. All completed Preparatory and Initial Phase Checklists, arranged by specification section, further sorted by DFOW referenced to the construction schedule. Submit each individual Phase Checklist the day the phase event occurs as part of the CQC daily report.

c. All milestone inspections, arranged by Activity Number referenced to the construction schedule.

d. An up-to-date copy of the Testing Plan and Log with supporting field test reports, arranged by specification section referenced to the DFOW to which individual reports results are associated. Individual field test reports will be submitted within 2 working days after the test is performed in accordance with the paragraph QUALITY CONTROL ACTIVITIES.

e. Copies of all Contract modifications, arranged in numerical order. Also include documentation that modified work was accomplished.

f. An up-to-date copy of the paragraph DEFICIENCY/REWORK ITEMS LIST.

g. Cx documentation in accordance with Section 01 91 00.15 BUILDING COMMISSIONING.

h. Special Inspection reports.

i. Upon commencement of Completion Inspections of the entire project or any defined portion, maintain up-to-date copies of all punch lists issued by the QC staff to the Contractor and subcontractors and all punch lists issued by the Government in accordance with the paragraph COMPLETION INSPECTIONS.

1.12.6 Testing Plan and Log

As tests are performed, the CxC and the QC Manager will record on the "Testing Plan and Log" the date the test was performed and the date the test results were forwarded to the Contracting Officer. Attach a copy of the updated "Testing Plan and Log" to the last daily CQC Report of each month. Provide a copy of the final "Testing Plan and Log" to the preparer of the Operation & Maintenance (O&M) documentation.

1.12.7 As-Built Drawings

The QC Manager must ensure the as-built drawings, required by Section 01 78 00 CLOSEOUT SUBMITTALS are kept current on a daily basis and marked to show deviations which have been made from the Contract drawings. The as-built drawings document commences with the QC Manager ensuring all amendments, or changes to the Contract prior to Contract award are accurately noted in the initial document set creating the accurate baseline of the Contract prior to any work starting. Ensure each deviation has been identified with the appropriate modifying documentation (e.g., PC No., Modification No., Request for Information No.). The QC Manager or QC Specialist assigned to an area of responsibility must initial each revision. Upon completion of work, the QC Manager will furnish a certificate attesting to the accuracy of the as-built drawings prior to submission to the Contracting Officer.

1.13 NOTIFICATION ON NON-COMPLIANCE

The Contracting Officer will notify the Contractor of any detected non-compliance with the Contract. Take immediate corrective action after receipt of such notice. Such notice, when delivered to the Contractor at the work site, is deemed sufficient for the purpose of notification. If the Contractor fails or refuses to comply promptly, the Contracting Officer may issue an order stopping all or part of the work until satisfactory corrective action has been taken. No part of the time lost due to such stop orders will be made the subject of a claim for extension of time for excess costs or damages by the Contractor.

1.14 DELIVERY, STORAGE, AND HANDLING

Designate receiving/storage areas for incoming material to be delivered according to installation schedule and to be placed convenient to work area in order to minimize waste due to excessive materials handling and misapplication. Store and handle materials in a manner as to prevent loss from weather and other damage. Keep materials, products, and accessories covered and off the ground, and store in a dry, secure area. Prevent contact with material that may cause corrosion, discoloration, or staining. Protect all materials and installations from damage by the activities of other trades.

PART 2 PRODUCTS

Not Used

PART 3 EXECUTION

Not Used

ATT-1 - Schedule of Fire Protection System Inspections

ATTACHED IN APPENDIX A

-- End of Section --

SECTION 01 57 20

ENVIRONMENTAL PROTECTION
06/23

PART 1 GENERAL

1.1 REQUIREMENTS

This specification covers the requirements for environmental protection during all construction and maintenance activities. The contractor shall minimize environmental pollution and damage during the course of the contract. The control of environmental pollution and damage requires consideration of land, water, and air resources. The environmental resources within the project boundaries and those affected outside the work area shall be protected during the entire duration of this contract.

This guidance applies to all contractor activities at Joint Base San Antonio (JBSA). These areas include JBSA Lackland (JBSA-LAK), JBSA Chapman Training Annex (JBSA-CTA), JBSA Port Annex (JBSA-PRT), JBSA Kelly Field Annex (JBSA-KFA), JBSA Randolph (JBSA-RND), JBSA Seguin Auxiliary Field (JBSA-SAF) JBSA Canyon Lake (JBSA-CAN), JBSA Sam Houston (JBSA-SAM), JBSA Medical Center Annex (JBSA-MCA), JBSA Grayson Street Annex (JBSA-GSA) and JBSA Bullis (JBSA-BUL).

The following lists are the general environmental phone numbers for JBSA Environmental point of contacts.

JBSA Environmental contact phone numbers
JBSA-RND/CAN/SAF: 210-652-4668
JBSA-SAM/BUL/MCA/GSA: 210-221-1142
JBSA-LAK/CTA/KFA/PRT: 210-671-4844

1.2 REFERENCES

The publications listed below form a part of this specification to the extent referenced and constitute only major areas of environmental concern. Contractor shall determine which federal, state, and local environmental regulations apply. The publications are referred to within the text by the basic designation only.

STATE OF TEXAS ADMINISTRATIVE CODE (TAC)

25 TAC 296	Texas Asbestos Health Protection
30 TAC 106	Permits by Rule
30 TAC 116	Control of Air Pollution by Permits for New Construction or Modification
30 TAC 213	Edwards Aquifer
30 TAC 290	Public Drinking Water
30 TAC 330	Municipal Solid Waste
30 TAC 334	Underground and Aboveground Storage Tanks

HSC 382.0518(a)	Preconstruction Permit

U.S. AIR FORCE (USAF)

AFMAN 32-7002	(2020) Environmental Compliance and Pollution Prevention

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

29 CFR 1926.62	Lead
40 CFR 745	Lead-Based Paint Poisoning Prevention in Certain Residential Structures
49 CFR SUBCHAPTER C	Hazardous Materials Regulations

1.2.1 TEXAS ADMINISTRATIVE CODE (TAC)

Texas Pollutant Discharge Elimination System (TPDES)Multi-Sector General Permit (CGP)) (Permit No. TXR150000) - contact 802 CES/CEIE https://www.tceq.texas.gov/permitting/stormwater/construction

Stormwater Pollution Prevention Plan (SWP3) - The CGP requires construction site operators to develop and implement a Stormwater Pollution Prevention Plan (SWP3) prior to commencing construction. https://www.tceq.texas.gov/permitting/stormwater/construction

JBSA Stormwater Management Plan (base specific) TPDES Municipal Separate Storm Sewer (MS4) (Permit No. TXR040000) - Contact 802 CES/CEIE

TPDES Multi-Sector General Permit (MSGP) (Permit No. TXR050000) Contact 802 CES/CEI

1.2.2 INSTRUCTIONS AND DIRECTIVES

All JBSA instructions and directives are available through 802 CES/CEIE Environmental Offices and the Enterprise Environmental Information System (provided upon request). It is the contractor's responsibility and requirement to coordinate all communications with the JBSA Environmental Office through the Contracting Officer's Technical Representative.

" Location-specific Spill Prevention Control and Countermeasure (SPCC) Plans

" JBSA-RND and Lackland Facility Response Plan

" JBSA Hazardous Waste Management Plan

" JBSA Integrated Solid Waste Management Plan

" JBSA Asbestos Management and Operations Plan

" JBSA Lead-Based Paint Management Plan

" JBSA Soil Management Plan

" JBSA Installation Restoration Program (IRP) and IRP Management Action Plan

" JBSA Location Specific, Storm Water Pollution Prevention Plans (SWP3)

" JBSA Location Specific, Storm Water Management Plans (SWMP)

" JBSA Integrated Cultural Resource Management Plan

" JBSA Integrated Natural Resource Management Plan

" 502d Air Base Wing Environmental Management System (EMS) Policy

" JBSA Critical Period Management Plan

1.2.3 USAF INSTRUCTIONS

AFI 32-1001 Chapter 15 Facility Asbestos Management

AFI 32-1001 Chapter 14 Corrosion Control Program

DAFMAN 32-1067 Sect. 4.3 Backflow Prevention Program

AFI 32-7001 Sect. 4.4 Pollution Prevention

1.3 SUBMITTALS

Government approval is required for submittals with a "G" or "S" classification. Refer to Section 01 33 00 SUBMITTAL PROCEDURES for requirements when a classification other than "G" or "S" are used. Submittals not having a classification are for information only. Submit the following, when applicable, in accordance with Section 01 33 00 SUBMITTAL PROCEDURES:

SD-01 PRECONSTRUCTION SUBMITTALS

ENVIRONMENTAL PROTECTION PLAN; G

Z Fish and Wildlife Protection Measures; G

Environmental Permit; G

Asbestos Work Plans; G

Asbestos Certifications; G

Asbestos Transporter License; G

Asbestos Medical clearances; G

Asbestos Training Certificates; G

Asbestos TDSHS License; G

Unsigned copy of State Renovation; G

Unsigned Demolition Notifications (15 days prior); G

Edwards Aquifer Protection Plan (As Applicable); G

Lead Work Plans; G

Lead Occupant Protection Plan; G

Texas Department of State Health Services Lead Licenses; G

Lead Notifications; G

Acknowledgement Of Api Std 650; G

Aboveground Piping Systems; G

Stormwater Pollution Prevention Plan; G

Equipment Inventory List; G

Waste Disposal Plan; G

Construction Tpdes Notice Of Intent And Site Notices; G

Construction Site Notice Or Notice Of Intent; G

Hazardous Waste Management Plan; G

Integrated Solid Waste Management Plan; G

Hazardous Material List; G

Emergency Response Plan And/Or Site Specific Spill Prevention Response Plan; G

Summary Transmittal Letter; G

SD-03 Product Data

Safety Data Sheets (SDS) For All Materials; G

SD-06 Test Reports

Commercial Facility Lead Contaminated Waste Shall Be Characterized, Profiled, And Manifested; G

Return Manifests And Weight Tickets; G

Monthly Diversion And Landfill Reports; G

Any Asbestos Inspection Reports That Were Not Included In The Original Assessment Or As A Result To A Change In The Sow Or Found As Unknown And Unforseen Discoveries During Any Phase Of He Project; G

Asbestos Inspection Reports That Have Not Been Provided By The Area Specific Env Office; G

Lead Based Paint Reports -Not Included In Original Assessment Or Results In Change Of Sow; G

Lead Inspection Reports- Not Provided By JBSA Env Office or by licensed Lead Inspector; G

OSHA Air Monitoring; G

Lead OSHA Negative Exposure Assessment; G

Asbestos Air Monitoring reports; G

(a) Baseline
(b) Aggressive sample reports
(c) All clearances

Lead Air Monitoring reports; G

(a) Air Baseline Survey
(b) Aggressive sample reports
(c) All clearances:
1. Visual Inspection
2. Dust Wipe Samples analyzed by a certified Environmental Lead Laboratory

Analytical Results; G

SD-07 Certificates

Certificate Of Training Asbestos; G

Certificate Lead Training; G

EPA Lead Training Or Lead Awareness Training (Min 8Hr); G

Stormwater Notice Of Change (for NPDES coverage under the general permit for construction activities); G

SD-11 Closeout Submittals

Notice Of Termination at end of construction; G

1.4 QUALITY ASSURANCE

Contractor shall establish and maintain quality control for environmental protection of all items set forth herein. The Contractor shall record on daily reports problems in complying with laws, regulations, permit requirements, ordinances, and corrective action taken. The Contractor shall immediately inform the Contracting Officer of any environmental problem.

The prime Contractor will have the sole responsibility to ensure all the subcontractors comply with all environmental protection requirements in this specification.

1.5 CONTRACTOR COMPLIANCE

1.5.1 Permits

The contractor shall ensure that all local, state, and federal environmental permits (to include notifications and authorizations for the remainder of this document) for this contract are obtained prior to start of construction and/or installing or operating any equipment or disturbing or clearing any land area. The contractor shall immediately notify 802

CES/CEIE of any conditions which may conflict with approved permits.

1.5.1.1 Permit Coordination

The contractor shall coordinate required permits with 802 CES/CEIE.

1.5.1.2 Permit Operations

The contractor shall be responsible for operating within permit limits and abiding by all permit conditions. Failure to comply with permit requirements, to include permits held by JBSA and/or any subsequent fines resulting from such failure are the sole responsibility of the contractor. 802 CES/CEIE shall be notified immediately of instance that exceeds the limits of the permit or a violation of permit conditions.

1.5.1.3 Permit Certifications

Certifications required by permits shall be the responsibility of the contractor. Copies of permits and certifications shall be submitted to the 802 CES/CEIE. The contractor shall maintain and have readily available a copy of required permits. The Contractor shall ensure personnel read, understand, and abide by all conditions and requirements of the environmental permits.

1.5.2 Wastewater

Contractors shall submit a summary transmittal letter to the 802 CES/CEIE Environmental to obtain approval from the Texas Commission on Environmental Quality (TCEQ) Wastewater Design Team, provide a copy to 802 CES/CEIE Environmental for projects that include work or modification of lift stations, treatment plants, and/or collection system lines. It is the contractor's responsibility and requirement to coordinate all communications and submittals of plans and documents with 802 CES/ CEMP Project Managers and Contracting Representative.

No Discharges to JBSA sanitary sewers are allowed unless prior approval by 802 CES/CEIE. Contractors shall not discharge any waste that will violate JBSA specific area wastewater discharge permits. A Request shall be submitted in writing along with documentation of waste to be discharged, i.e., Safety Data Sheets (SDS) or sample analysis results, to include chain-of-custody and QA/QC data.

The JBSA-RND sanitary sewer is owned by the San Antonio River Authority (SARA). It is the responsibility of the PM and contractor to ensure that any work dealing with installation or removal of sanitary sewer lines is done in coordination with and, if necessary, the approval of SARA. http://www.sara-tx.org

1.5.3 Public Water Systems

In accordance with 30 TAC 290 section 39, changes or additions to previously approved plans and specifications, existing systems, or supplies shall have approval from the TCEQ executive director prior to commencing construction or supporting activities. All applicable Pre-Construction Submittal documentation shall be submitted to 802 CES/CEIE for review. Construction shall not commence prior to written approval from the TCEQ executive director for each project, or partial section. TCEQ requires plans be submitted at least 30 days prior to the time that approval, comments, and recommendations are desired. For phased

projects, TCEQ approval can be obtained for each phase by submitting a certification of completion package for each phase as a partial completion of the entire project. All associated documentation (Certification of Completion Form, as-built drawings, bacteriological analysis, pressure test results, etc.) shall be submitted to 802 CES/CEIE and Bioenvironmental for review. The Base Utility Supervisor shall be provided a copy of the TCEQ clearance for each project or partial section before activating or reactivating the public water system to that area.

Disinfection and bacteriological testing of water system components shall be conducted in accordance with TCEQ regulations and American Water Works Association (AWWA)standards. Bioenvironmental and the Base Utility office shall be notified of all disinfection and bacteriological testing activities. New or repaired portions of the public water system shall not be placed into service until coordination with Bioenvironmental and bacteriological testing are complete. Contractors shall not obstruct drinking water sample collection specified points throughout distribution.

Contractors shall coordinate with installation Water Quality Program Manager for permitting requirements associated with any water well projects. Water system projects require review and approval by the 802 CES/CEIE.

1.5.4 Storm Water Pollution Prevention

Texas Pollutant Discharge Elimination System (TPDES) Construction General Permit (CGP) (Permit No. TXR150000) coverage shall be obtained, by the contractor, at least 7 days prior to commencing construction or construction support activities for projects disturbing one acre or greater of land, including equipment/material storage yards or temporary access roads. The contractor is responsible for submitting documentation (Notice of Intent (NOI), small/large construction site notice (CSN), inspection records, Notice of Termination (NOT), etc.), providing notifications, and paying applicable fees to local (MS4 Operator - 802 CES/CEIE), state, and federal authorities, as applicable.

Contract operators disturbing greater than 1 acre of land shall maintain compliance with applicable CGP conditions for Small or Large Construction Sites (defined in the CGP). Contract operators disturbing less than 1 acre of land shall implement best management practices (BMPs) to prevent the discharge of pollutants into the MS4.
https://www.tceq.texas.gov/permitting/stormwater/construction/index

The contract operators shall ensure Stormwater Pollution Prevention Plan (SWP3) is designed, implemented, and maintained in compliance with the CGP for the duration of the project (final stabilization and submittal of NOT to MS4 Operator - 802 CES/CEIE). The SWP3 and required documentation shall be maintained on site and made available for review upon request by local, state, and federal authorities.

1.5.5 Edwards Aquifer Recharge and Contributing Zones

Portions of JBSA-BUL are located in the Edwards Aquifer recharge and contributing zones. The TCEQ has developed specific requirements for construction within these areas in an effort to protect Edwards Aquifer groundwater. The contractor shall comply with all requirements listed in 30 TAC 213 relating to the Edwards Aquifer. Construction in the Edwards Aquifer Recharge Zone requires approval from the TCEQ and development of an Edwards Aquifer Abatement Plan. Construction which disturbs 5 acres or

greater in the Edwards Aquifer Contributing Zone requires TCEQ approval and the development of a Contributing Zone Plan. The contractor shall be responsible for all compliance costs associated with 30 TAC 213. The Contractor shall submit all Recharge and Contributing Zone Plans developed for construction activities at Camp Bullis to 802 CES/CEIE for review.

1.6 ENVIRONMENTAL PROTECTION PLAN

The Contractor shall submit an Environmental Protection Plan within 15 days after receipt of the notice to proceed. Approval of the Contractor's plan will not relieve the Contractor of responsibility for adequate and continuing control of pollutants and other environmental protection measures. The contractor shall obtain approval from the Contracting Officer prior to the start of construction, modification, or demolition for all
project facilities and/or equipment. The plan shall include, but shall not be limited to, the following:

a. Environmental protection procedures to be implemented to provide the required environmental protection of features to be protected within the work area (e.g., trees, grasses, air and water quality, historical, and cultural resources, etc.). All projects that take place over the Edwards Aquifer Recharge or contributing zones will require a specific Edwards Aquifer Protection Plan.

b. Drawings showing locations of any proposed BMPs, temporary excavations or embankments for haul roads, stream crossings, material and/or waste storage areas, structures, sanitary facilities, and temporary stockpiles of excess or spoil materials shall be included.

c. Solid Waste Management Plan and summary of solid waste generated, in accordance with paragraph INTEGRATED SOLID WASTE MANAGEMENT (NON-HAZARDOUS WASTE AND RECYCLING).

d. Emergency Response and Spill Prevention Plan, IAW paragraph 3.12 EMERGENCY RESPONSE, SPILL PROCEDURES, FUEL TANKS and paragraph 3.16 Explosive Ordnance.

e. Hazardous Material List, IAW paragraph 3.10.3 Coordination.

f. Prior to start of construction, a site-specific certified Storm Water Pollution Prevention Plan shall be developed for projects over 1 acre and shall be made available for review by 802 CES/CEIE Environmental throughout the duration of the project. For construction projects disturbing greater than 1 acre, contractor shall provide a copy of the Notice of Intent (NOI) and/or Construction Site Notice(s), as applicable, to the 802 CES/CEIE, IAW paragraph 3.3 Water Quality and Texas Pollutant Discharge Elimination System Construction General Permit (TPDES CGP). (NOI copy shall be maintained on site at all times).

g. Notice of Termination documents shall be submitted to the TCEQ when the site meets final stabilization and temporary BMPs have been removed, and a copy shall be submitted to the 802 CES/CEIE, IAW the TPDES CGP and JBSA Storm Water Management Plan (SWMP)as a Close Out Requirement.

h. Hazardous Waste Management Plan, that addresses all the applicable items in paragraph 3.8 Hazardous Waste. Contractor should have

Department of Transportation (DOT) and HAZWOPER trained personnel.

i. Green Procurement Purchases, IAW paragraph 3.6.1 Executive Order 14057, Catalyzing Clean Energy and Jobs Through Federal Sustainability.

j. Provide and maintain, during the life of the contract, environmental protection as defined. Plan for and provide environmental protective measures to control pollution that develops during 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. Protect the environmental resources within the project boundaries and those affected outside the limits of permanent work during the entire duration of this Contract. Comply with federal, state, and local regulations pertaining to the environment, including water, air, solid waste, hazardous waste and substances, oily substances, and noise pollution.

k. Tests and procedures assessing whether construction operations comply with Applicable Environmental Laws may be required. Analytical work must be performed by qualified laboratories; and where required by law, the laboratories must be certified.

1.7 MEETINGS

1.7.1 Environmental Brief

Attend an environmental brief to be included in the PRECONSTRUCTION CONFERENCE. Provide the following information: types, quantities, and use of hazardous materials that will be brought onto the installation; and types and quantities of wastes/wastewater that may be generated during the Contract. Discuss the current results of the Preconstruction Survey. Prior to initiating any work on site, meet with the Contracting Officer, the 802 CES/CEPM Project Managers and installation Environmental Office to discuss the proposed Environmental Protection Plan (EPP). Develop a mutual understanding relative to the details of environmental protection, including measures for protecting natural and cultural resources, required reports, required permits, permit requirements (such as mitigation measures), waste management plans and practices, how waste diversion requirements will be met, and other measures to be taken. The requirements of this meeting may be fulfilled during the coordination and mutual Understanding meeting outlined in Section 01 45 00 QUALITY CONTROL.

1.7.2 Integrated Solid Waste Management

Discuss integrated solid waste and recycling management at contractor's regular meetings. Request attendance of 802 CES/CEIE personnel as appropriate to address waste management issues and ensure compliance with the approved EPP. It is the contractor's responsibility and requirement to coordinate all communications with 802 CES/CEIE Environmental Offices through the 802 CES/CEPM Project Managers and Contracting Representative. The requirements of these discussions may be fulfilled during Pre-construction meetings, regular site or quality control meetings. At a minimum, discuss and document waste management goals (as applicable) at following meetings:

a. [Preconstruction][Pre-demolition] meeting
b. Regular [progress meetings][Quality Control] meetings
c. Work safety meeting (if applicable)

1.8 PRECONSTRUCTION CONFERENCE

After award of this contract but prior to commencement of any work at the site, the contractor shall meet with the contracting officer, 802 CES/CEPM project manager and 802 CES/CEIE environmental office to discuss and develop a mutual understanding relative to the administration of the contract, preparation of the schedule, contractor's general intent on direction of execution, submittals, scheduling, programming, prosecution of the work, and the submittals process review. Principles of any major 1st tier subcontractors who will engage in the work shall also attend.

PART 2 PRODUCTS

Not Used

PART 3 EXECUTION

3.1 NATURAL RESOURCES

3.1.1 Environmental Resources

The environmental resources within the project boundaries and those affected outside the limits of work under this contract shall be protected during the entire period of this contract. The Contractor shall confine activities to areas defined by the drawings and specifications and provide adequate maps depicting the project area. All contractors shall comply with JBSA Integrated Natural Resources Management Plan (INRMP), DAFMAN 32-7003, Environmental Conservation, Endangered Species Act, Clean Water Act, and Migratory Bird Treaty Act. Environmental protection measures shall be as stated in the following subparagraphs.

3.1.1.1 Land Resources

Prior to work, the Contractor shall identify the Natural Resources within the boundaries of the project. The Contractor shall not remove, cut, deface, injure, dredge, fill, disturb soil or destroy land resources including trees, shrubs, vines, grasses, topsoil, floodplains, wetlands, and landforms without prior coordination with Natural Resources Management.

3.1.1.2 Tree Trimming and Removal

Prior to trimming or removal of trees, contractor shall coordinate with Natural Resources Management office. Approved removal or trimming of trees, shrubs, or other vegetation, shall be conducted between 15 SEP - 28 FEB. Oak species trimmed or accidentally damaged during construction, shall be painted with pruning paint immediately, to include damaged roots.

3.1.1.3 Protection of Vegetation

Trees, shrubs, and other vegetation not identified for removal shall be protected against removal, injury, defacing, and scarring. No ropes, cables, or guys shall be fastened to or attached to trees for anchorage unless specifically authorized. Where such emergency use is approved, the Contractor shall provide effective protection for land and vegetation resources at all times.

Trees, shrubs, and other vegetation to be preserved shall be clearly

identified by marking, fencing, or wrapping with boards, or any other approved technique.

3.1.1.4 Best Management Practices (BMPs)

Per requirements of the JBSA Integrated Natural Resource Management Plan (INRMP), the Contractor shall follow the BMPs for tree protection to ensure prevention of oak wilt compliance and to ensure vegetation removal will not affect protected species.

3.1.1.5 Parking

The Contractor shall not park vehicles or equipment within the drip line of trees. The Contractor shall coordinate all communications with 802 CES/CEIE Environmental Offices through the 802 CES/CEPM Project Managers and Contracting Representative.

3.1.1.6 Contractor Facilities

The Contractor's field offices, staging areas, storage, and temporary buildings shall be placed in areas designated on approved project design drawings or as directed by the Contracting Officer. Submittals are required with siting approval from the facility board prior to any action related to staging, fencing, or installation of temporary facilities or equipment, temporary movement or relocation of Contractor facilities shall be made only when approved through coordination with 802 CES/CEIE. Borrow and/or spoil areas shall be managed and controlled to limit spoil intrusion into designated areas, minimize erosion and to prevent soil or sediment from entering nearby waters or storm drains. Temporary excavation and embankments for plant and/or work areas shall be controlled to protect adjacent areas from despoilment.

3.1.1.7 Fish And Wildlife Protection

The Contractor shall minimize interference and disturbance to, and damage of, fish and wildlife. Species that require specific attention along with measures for their protection shall be coordinated with 802 CES/CEIE prior during the planning process and prior to beginning construction operations.

If contract activities risk destroying or disrupting migratory birds or bird nests, prior coordination with 802 CES/CEIE is required. Immediately halt all activities and contact the Contracting Officer and Project Manager.

3.2 CULTURAL RESOURCES

3.2.1 Historical, Archaeological and Cultural Resources

Existing historical, archaeological, and cultural resources within the Contractor's work area will be so designated by the Contracting Officer if any have been identified. The Contractor shall take precautions to preserve all such resources as they existed at the time they were first identified. If during construction activities previously unidentified or unanticipated resources are discovered or found, the Contractor shall stop work immediately and notify the Contracting Officer and the 802d Cultural Resources Media team for consultation. The Contractor shall provide and install protection measures for these resources and be responsible for their preservation during the life of the contract. Protection measures

will be provided by 802 CES/CEIE after consultation with the State Historic Preservation Officer on a case-by-case basis. All communications with the SHPO shall be conducted by the Federal Agency Official or their appointed representative and shall not be contacted by the Contractor.

3.2.2 Artifacts

If during excavation or other construction activities previously unidentified or unanticipated resources are discovered or found, the Contractor shall stop work immediately and notify the Contracting Officer and the 802 CES/CEPM Project Manager as simultaneously as possible, who will in-turn notify the 802d Cultural Resources Media team for consultation. It is the contractor's responsibility and requirement to coordinate all communications with 802 CES/CEIE Environmental Offices through the 802 CES/CEPM Project Managers and Contracting Representative. Resources covered by this paragraph include but are not limited to any human skeletal remains or burials; artifacts; shell, bone, charcoal, or other deposits; rocks or coral alignments, paving, walls, or other constructed features, and any indication of agricultural or other human activities. Upon such discovery or find, the Contractor shall immediately stop work and notify the Contracting Officer and the 802 CES/CEPM Project Manager, as simultaneously as possible. The CEPM will in-turn notify the 802 CES Cultural Resources Media Team.

3.3 WATER QUALITY

3.3.1 Pollution Prevention

The Contractor shall keep construction activities under surveillance, management, and control to prevent pollutants from entering the MS4 (roads, ditches, and similar means of collecting and conveying stormwater), surface and ground waters of the state. Toxic and/or hazardous chemicals shall not be applied to soil or vegetation when such application may cause contamination. All de-watering shall be in accordance with the requirements of local, state, and federal regulations and the TCEQ CGP. Monitoring of land and water impacted by construction and supporting activities shall be the Contractor's responsibility.

3.3.2 Potable Water

Contractors shall be certified and licensed within the State of Texas for the installation of all potable water lines and backflow prevention devices. Accessibility to potable water must be requested and coordinated with Bioenvironmental, fire and emergency services and CEO utility offices prior to temporary connections and hookups from any fire hydrants. Fire hydrant temporary connections shall meet state mandated backflow prevention requirements or approved air gaps on lines. Backflow devices shall be tested and certified immediately after installation on fire hydrant. Testing certifications shall be submitted to 502 CES/CEO Plumbing Shop upon installation of devices for incorporation into Backflow Program records. Requests must include usage quantities and be approved prior to proceeding with any connections to fire hydrants. Hose bib use from facilities is authorized if coordinated through the utilities office, and appropriate backflow devices are used when required. The use of hose bibs from housing residents is not authorized for contractor use.

Installation or repair of water mains must be coordinated with Bioenvironmental and utility office prior to start of work. The contractor

shall follow TCEQ regulations and American Water Works Association (AWWA) standards for water main disinfection. The water main shall not be placed into service until bacteriological samples are collected and results are negative.

JBSA-LAK/CTA/KFA/PRT, JBSA-SAM/BUL/MCA/GSA Bioenvironmental: 210-671-7061
JBSA-RND/CAN/SAF Bioenvironmental: 210-652-3256

Water Conservation is in effect all year on Joint Base San Antonio and each stage of water conservation is highly emphasized. Use of reclaimed/recycled water for irrigation is encouraged at JBSA and is available at most locations. The contractor shall comply with TCEQ requirements established in 30 TAC 210 when utilizing reclaimed water.

3.3.2.1 Backflow Preventers Certificate

Certificate of Full Approval from FCCCHR List, University of Southern California, Manual of Cross-Connection Control Tenth Edition. A manufacturer's certificate 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.

3.3.2.2 Backflow Assembly Tester License

Prior to testing, submit to the Contracting Officer a copy of the Texas licensed Backflow Assembly Tester's license. Tester must not be affiliated with any company participating in any other phase of this Contract. The local Utility is American Water. The AHJ for the purpose of water and water testing is the CEPM. Typical deliverables are:

SD-06 Test Reports
Backflow Preventer Tests
SD-07 Certificates
Backflow Tester License
Backflow Preventers Certificate of Full Approval

3.3.3 Storm Water

The contractor shall use proper control and management techniques to ensure storm water criteria are met in accordance with federal, state, and local storm water regulations. Runoff from the construction site or from storms shall be controlled, retarded, and diverted as indicated on the drawings to protect drainage courses by means of diversion ditches, benches, berms, sediment basins, inlet protection devices, stabilization, and by any measures required by area-wide plans under the Clean Water Act. Prior to any project that disturbs greater than one acre, the contractor must follow permit coverage requirements as stated in paragraph 1.5.1. Contractors are required to incorporate Low Impact Development design techniques into sites which develop or redevelop areas greater than 5000 square feet IAW the Energy Independence and Security Act (EISA) Section 438. Contractors are encouraged to incorporate Low Impact Development design techniques into all projects as referenced in UFC 3-210-10. Low Impact Development (LID) is a storm water management strategy designed to maintain site hydrology and mitigate the adverse impacts of storm water runoff and nonpoint source pollution. The San Antonio River Authority has published a LID Technical Guidance Manual for the implementation of LID in the San Antonio River Basin. This manual is available for download at:

https://www.sariverauthority.org/resources/san-antonio-river-basin-low-impact-developm

3.3.3.1 Sediment Control

Temporary sediment and erosion controls shall be adequate to prevent potential pollutants discharging from the site, installed as per manufacturer's specifications, and maintained in effective operating condition. Temporary sediment control devices will remain in place and be properly maintained until the site meets the final stabilization requirements defined in the TPDES Construction General Permit.

3.3.3.2 Severe Erosion

In some cases where severe erosion results in waters becoming turbid despite control measures, regular turbidity monitoring and documentation shall be necessary. Any such documentation shall be forwarded to 802 CES/CEIE for review via the contracting officer and 802 CES/CEPM using AF3000 Material Approval Submittal Form, which can be obtained on the Department of the Air Force E-Publishing site.

3.3.3.3 Stream Crossings

Stream crossings shall allow movement of materials or equipment without violating federal, state, or local government water pollution control standards or impeding waters of the state regulations. **Contractor shall check the AF Project Form 813 report to verify if any environmental impact is foreseen and any mitigation is needed. It is the contractor's responsibility and requirement obtain this form through the 802 CES/CEPM Project Managers and Contracting Representative.**

3.3.3.4 Sewage Holding Tanks

Contractor is not authorized sewage-holding tanks on base and shall procure a portable toilet service contract with the exception of job site trailers and temporary swing space. All temporary swing space includes either plumbing to existing nearby sanitary sewer lines or the use of black water tanks that are professionally pumped out weekly. The portable toilet contract shall include the correct removal of sewage and removal of the portable toilet upon completion of the project by a TCEQ licensed septic waste hauler.

3.3.3.5 Equipment Maintenance

Maintenance of Contractor vehicles and heavy equipment (including oil changing, lubrication, and vehicle washing) is not authorized on JBSA properties.

3.3.3.6 Concrete Washout

Contractor shall provide concrete truck washout facilities to contain wash water and material generated from truck washout. The concrete washout shall be maintained to prevent the discharge of pollutants and materials disposed of in accordance with solid waste rules and regulations. Concrete trucks are not authorized to be washed out onto the ground.

3.3.3.7 Best Management Practices (BMPs)

JBSA Regulatory Guidance (RG-348) on storm water BMPs can be found in the TCEQ guidance manual "Complying with the Edwards Aquifer Rules: Technical

Guidance on Best Management Practices." This guidance can be found at:

https://www.tceq.texas.gov/downloads/publications/rg/complying-with-the-edwards-aquife
Guidance on Low Impact Development BMPs can be found in the SARA technical manual at:

https://www.sariverauthority.org/resources/san-antonio-river-basin-low-impact-developm

3.3.3.8 Documentation

Contractor shall provide engineering plans, technical/product specifications, and Operation and Maintenance manuals for all storm-water management structures (Structural BMPs, detention structures, conveyance structures, permeable pavements, bio retention structures, etc.) to the Contracting representative and the 802 CES/CEPM via the AF3000 process. The CEPM will provide 502 CES/CEO-Operations, CEIE-Environmental Management, and CEN-GeoBase offices. The Contractor shall allow a minimum 20 days for review.

3.4 PETROLEUM, OILS & LUBRICANTS (POL)/ STORAGE TANKS AND EQUIPMENT

POL Usage: Contractor is not authorized to set up aboveground storage tanks for fuel at any JBSA installation. Fuel for vehicles shall be brought to the installation, as needed. Storage of small amounts of POL as well as fueling and lubrication of equipment must be conducted in a manner that affords the maximum protection against spill and evaporation. Manage and store equipment fuel and POL in approved containers for flammable and combustible products in accordance with all Federal, State, and Local requirements. Store on secondary containment pallets, covered impermeable surfaces or in approved storage containers with appropriately sized (110% of largest container) secondary containment and keep liquids away from storm water sewers, grids, channels, and waterways. Fire extinguishers and spill kits must be available, and no smoking signs posted. Prior approval and coordination through 802 CES Environmental office is required for any fuel/POL storage containers greater than 50 gallons and contractor shall submit a plan for such storage 30 days prior to bring fuel onto the installation. It is the contractor's responsibility and requirement to coordinate all communications with 802 CES/CEIE Environmental Offices through the 802 CES/CEPM Project Managers and Contracting Representative. Contractor must ensure compliance with the JBSA facility specific Spill Prevention, Control, and Countermeasures (SPCC) Plans.

3.4.1 Vehicle and Equipment Refueling

Use of fuel and POL in greater than 50-gallon containers are not allowed on JBSA properties, without prior approval from the 802 CES Environmental offices. It is the contractor's responsibility and requirement to coordinate all communications with 802 CES/CEIE Environmental Offices through the 802 CES/CEPM Project Managers and Contracting Representative. Aboveground Storage Tanks for fuel and POL are not authorized on any JBSA installation. Fuel must be brought to the site each day that work is performed, or as needed. Contractor personnel obtaining fuels from refuelers agree to follow all 30 TAC 334 requirements and the following list of Air Force Technical Orders to ensure compliance: AFTO 37-1-1 Department of the Air Force, General Operation and Inspection of Installed Fuel Storage and Dispensing System, AFTO 37A-1-101 General Instructions, USAF Fuel, Water, and Lubricant Dispensing Equipment, AFTO 42B-1-1 Quality

Control of Fuels and Lubricants, and Compressed Gas Association Pamphlet CGA P-1 Safe Handling of Compressed Gases. Used lubricants and used oil to be discarded must be stored in marked corrosion-resistant containers and recycled or disposed of off-site in accordance with 40 CFR 279.

3.4.2 Tank Installation/Modifications

POL Tank/Equipment prior to tank installation: Tanks and equipment must be installed in accordance with all Federal, state, and local laws and regulations. At least ***60 days prior to installation***, 802 CES/CEIE must be notified of all planned tank/equipment specifications, including location, installation date, product to be stored, quantity of product, volume of tank, material of construction, containment type, Stage I Vapor recovery, and tank dimensions and any additional required information to comply with State tank regulations 30 TAC 334. Any planned tank installation, to include emergency generator belly tanks, that are 1,100 gallons or larger requires registration with the State. Contractor ***must notify*** the 802 CES Environmental Office as soon as known, prior to installation, for the tank to be registered with the State. All notifications to the TCEQ on tank installations/registrations will be made by 802 CES/CEIE Environmental Office with contractor provided information. It is the contractor's responsibility and requirement to coordinate all communications with 802 CES/CEIE Environmental Offices through the 802 CES/CEPM Project Managers and Contracting Representative. Installation of underground storage tanks and/or vaulted aboveground storage tanks are not authorized on any JBSA properties.

Modification to Existing Tanks/Equipment: The Contractor must notify 802 CES Environmental at least 60 days prior to beginning any removal or repair/modification to existing tank/equipment as the state may be required to be notified in advance with a Construction Notification. If confined space entry into an existing tank is required, then a confined space permit must be coordinated with JBSA Safety, Fire Department and 802 CES/CEIE Environmental office. The Contractor shall provide 802 CES/CEIE Environmental Office with a description of work being performed prior to beginning work. It is the contractor's responsibility and requirement to coordinate all communications with 802 CES/CEIE Environmental Offices through the 802 CES/CEPM Project Managers and Contracting Representative.For work on underground and aboveground storage tanks, the Contractor must be licensed and registered in accordance with 30 TAC 334 section 401.

3.5 EROSION CONTROLS

The Contractor shall construct or install temporary and permanent erosion and sedimentation control features as indicated on the drawings prior to start of construction. Berms, dikes, drains, sedimentation basins, grassing, and mulching shall be maintained until permanent drainage and erosion control facilities are completed and operative. **Reference the JBSA Storm Water Management Plan (SWMP) and contact 802 CES/CEIE Water Quality Team. The Contractor shall coordinate all communications with 802 CES/CEIE Environmental Offices through the 802 CES/CEPM Project Managers and Contracting Representative.**

3.6 EARTHWORK

Earth work shall be planned and conducted IAW this specification and the JBSA Soil Management Plan to minimize length of exposure time for unprotected soils. Side and back slopes shall be protected as soon as

practicable upon completion of rough grading. Earthwork brought to final grade shall be finished as indicated by approved project design specification.

3.6.1 Waste Characterization of Waste Materials

Excavated spoils shall either be reused on site or removed from the installation throughout the project or must ensure it is removed from the installation at the completion of the project. No permanent stockpiling of soil whatsoever is authorized on JBSA. Refer to the JBSA Soil Management Plan for excavated spoils.

3.6.1.1 Waste Determination

Based on review of required analytics data, the 802 CES/CEIE will make a Hazardous/Non-hazardous determination delineating soil in accordance with TCEQ guidance (30 TAC Chapter 335 Subchapter R sections 335-501-508)

3.6.1.2 Excess Waste Material

All excess soil/waste materials shall be properly manifested/transported to an TCEQ-permitted landfill (Covel Gardens or Tessman Rd Landfill are locally available) and approved by 802 CES/CEIE.

3.6.1.3 Waste Generator

All manifests will list JBSA 802 CES/CEIE as the Generator and returned to JBSA 802 CES/CEIE by the final receiving facility, along with weight tickets, when fully executed.

3.6.1.4 Lead Waste Manifest

All Waste Manifests for Lead-containing materials shall be signed (approved) by JBSA area specific Environmental Office, without exception.

3.6.1.5 Return Manifests

Contractor provided return manifests and weight tickets are required for the development of Annual Waste Summary totals.

3.6.1.6 Required Testing

Prior to waste removal, the contractor's qualified sampler, who has the requisite training required by the Department of Transportation (DOT) and the Environmental Protection Agency's Resource Conservation and Recovery Act (RCRA)shall perform the following test methods and analytical parameters for every 200 CY of soil/waste materials that are to be removed from JBSA:

a. RCRA 11 metals (method SW 7000 series, TCLP extraction)

b. Organochlorine Pesticides/Polychlorinated Biphenyl (PCBs) (method SW 8081a/8080, TCLP extraction)

c. Semi-Volatile Organic Compounds (SVOCs) (method SW 8270, TCLP extraction)

d. Volatile Organic Compounds (VOCs) (method SW 8260 TCLP extraction) to include BTEX

e. Total Petroleum Hydrocarbons (TPH) (TCEQ method 1005)

f. Non-halogenated Organics (SW 8015, TCLP extraction)

g. Reactivity, Corrosivity, Ignitibility (RCI)

Note: Contact 802 CES/CEIE for guidance on which TCEQ certified Labs offer all the above methods.

Additional sampling may be necessary based on JBSA historic information or additional landfill requirements.

Contractor shall submit all analytical results to 802 CES/CEIE for review prior to removal of waste from area specific location.

For Questions regarding Hazardous/Non-hazardous determinations, contact HazWaste Program Manager at 210-652-6204/210-452-8929.

It is the contractor's responsibility and requirement to coordinate all communications with 802 CES/CEIE Environmental Offices through the 802 CES/CEPM Project Managers and Contracting Representative.

3.7 LANDSCAPING

All new landscaping must follow the JBSA INRMP requirements. All new landscape plant species must be regionally native and follow the JBSA Critical Management Plan for current watering restrictions. Compliance with the JBSA Critical Period Management Plan is mandatory. **No planting of new turf or plants in Stage III water restrictions is authorized unless absolutely necessary. Coordinate with the JBSA Natural Resource Manager for help determining if your project is absolutely essential. In Stage IV and V, the installation of new turf and plants is prohibited.** It is the contractor's responsibility and requirement to coordinate all communications with 802 CES/CEIE Environmental Offices through the 802 CES/CEPM Project Managers and Contracting Representative.

3.8 AIR QUALITY

3.8.1 National Ambient Air Quality Standards

Equipment operation and activities or processes performed by the Contractor in accomplishing the specified construction shall be in accordance with all federal and state air emission regulations and performance standards. Contractor shall ensure that the National Ambient Air Quality Standards (NAAQS) set by the Environmental Protection Agency are maintained and modeled if needed. New construction, renovation, or modification to a facility that will impact air quality emissions will require a New Source Review (NSR) permitting process PRIOR to any construction beginning. In addition, an Air Conformity Applicability Model (ACAM) questionnaire must be completed (for all new construction, renovation, and modification projects) and submitted to the JBSA Air Team. For an electronic copy of the questionnaire, please contact the JBSA Air Team. It is the contractor's responsibility and requirement to coordinate all communications with 802 CES/CEIE Environmental Offices through the 802 CES/CEPM Project Managers and Contracting Representative. All equipment to be installed within any facility (i.e., Boilers, chillers, stationary generators, etc.) are subject to this permitting process.

Title V of the Clean Air Act requires major sources of air pollutants, and certain other sources, to obtain and operate in compliance with an operating permit. Sources with these "Title V permits" are required by the Act to certify compliance with the applicable requirements of their permits at least annually. The Title V permit only applies to JBSA-LAK.

3.8.2 Equipment Inventory Requirements

The contractor shall provide the 802 CES/CEIE Air Quality Media Team and 502 CONS (or the respective contracting agency of the Proponent) a list of proposed equipment which may have an impact on JBSA Air Emissions or Air Quality and comply with the Clean Air Act when conducting construction or other work at JBSA. Inventory data, in the form of a picture of all emission source ID data plates, shall be submitted to the Air Program Manager for all air emission sources, including but not limited to: Water Heater(s), Boiler(s), Generator(s), A/C Unit(s), and Water-Cooling Tower(s).

It is the contractor's responsibility and requirement to coordinate all communications and documentation with 802 CES/CEIE Environmental Offices through the 802 CES/CEPM Project Managers and Contracting Representative.

3.8.2.1 State Permitting

Prior to construction, per 30 TAC 116 section 110 any person who plans to construct any new facility that will emit or modify any existing facility which may emit air contaminants into the air shall take one of these steps BEFORE any actual work on the facility begins:

a. Obtain a state air permit by following the general application process described in 30 TAC Section 116.111

b. Satisfy the conditions for a standard permit described in 30 TAC 116 Subchapter F, 30 TAC 321 Subchapter B, 30 TAC 332, or 30 TAC 330 Subchapter N

c. Satisfy the conditions for a flexible permit described in 30 TAC 116 Subchapter G

d. Satisfy the conditions for all relevant permits by rule (PBR) described in 30 TAC 106

e. Ensure that the criteria for a de minimums facility or source stated in 30 TAC 116 section 119 are satisfied

In accordance with the HSC 382.0518(a) (relating to preconstruction authorization), "Before work is begun on the construction of a new facility or modification of an existing facility that may emit air contaminants, the person planning the construction or modification must obtain a permit from the [TCEQ]."

The TCEQ has issued guidelines that anything other than site clearance or site preparation is considered "start of construction."

All work such as excavation, form erection, or steel laying pertaining to foundations upon which permit units will rest shall be considered construction. For permit units not requiring a concrete foundation, the erection or construction of associated items like earthen dams, placement

of piling, soil stabilization, storage tank fills, or retaining structures shall be considered construction, and will NOT be allowed without prior receipt of the required construction permit.

Land clearing, soil load bearing tests, leveling of the area, sewer and utility lines, road building, power line installation, fencing, construction shack building, etc., are considered "site clearance / preparation." However, once the soil and site are ready for foundations, the first excavation into the readied soil is considered "start of construction."

Note: After an application has been submitted for a permit, construction may not begin until JBSA receives a copy of the Pre-Construction Authorization (PCA) from TCEQ.

For JBSA permitting requirements, contractor shall provide to 502 CONS or the respective contracting agency of the Proponent and the installation Air Quality Media Team any and all data related to processes to be conducted in a facility to include, but not limited to, any process or procedure which might entail or include anodizing, brushing, blasting, electroplating, evaporation, exhausting, misting, splashing, smoking, spraying, welding, melting, smelting, reacting, (forms from resins), vaporizing, or otherwise releases Volatile Organic Compounds (VOCs), Particulates, or other air emissions into the air. Equipment that requires permitting by the TCEQ must be approved before being utilized. If any doubt exists, please contact the Air Quality Media Team at the general contact numbers in paragraph 1.1, Requirements, Contact information. The 802 CES/CEIE will perform the permitting paperwork for projects, provided all supporting documents and emissions calculations are certified and supplied to the Air Quality Program Manager in a timely manner, at least 180 days PRIOR to the land clearing.

It is the contractor's responsibility and requirement to coordinate all communications and documentation with 802 CES/CEIE Environmental Offices through the 802 CES/CEPM Project Managers and Contracting Representative.

3.8.3 Ozone-Depleting Substance

The contractor shall adhere to Air Force and JBSA policies regarding halons and chlorofluorocarbons (CFCs). The contractor shall not introduce any Class I Ozone-Depleting Substances (ODS) to JBSA during the course of this contract. The contractor shall be responsible for the recovery and recycling of all Class II ODS, including any necessary sampling, marking, labeling, and disposal. All ODSs recovered are the property of the US Government and must be turned in to the JBSA Refrigerant Management Shop. The contractor may refer to AFMAN 32-7002 Environmental Compliance and Pollution Prevention Chapter 3 paragraphs 2.15 and 3.3.5 for further guidance. The contractor shall remain ultimately responsible for any ODS work related to these tasks. Contractors shall follow paragraph 3.10.4 when submitting their hazardous materials listing for use on the installation to the Hazardous Material & Air Program Managers to determine if material will be tracked for environmental purposes.

3.8.4 Control Of Emissions

The contractor shall ensure prevention of dust, air pollution and odors.

3.8.4.1 Particulate Control

Dust particles, aerosols and gaseous by-products from construction activities, and processing and preparation of materials shall be controlled at all times. The Contractor shall maintain excavations, stockpiles, haul roads, permanent and temporary access roads, plant sites, spoil areas, borrow areas, and other work areas within or outside the project boundaries free from particulates which would cause the air pollution standards to be exceeded or which would cause a hazard or a nuisance. Particulate control shall be performed as the work proceeds and whenever a particulate nuisance or hazard occurs. Such emissions of airborne particulate matter shall not exceed 20% opacity as defined in 40 CFR 60.11 Appendix A, method 9. Approved practices for control are as follows:

a. Watering: Apply water by means of trucks and/or hoses during construction activities.

b. Chemical Stabilizers: During periods of high winds apply chemical stabilizers per manufacturer's directions and prior to any forecasted or expected wind events. Apply water as necessary, and prior to expected wind events. If chemical stabilizers are to be used, contractor shall contact the JBSA Water Quality Team prior to use.

It is the contractor's responsibility and requirement to coordinate all communications and documentation with 802 CES/CEIE Environmental Offices through the 802 CES/CEPM Project Managers and Contracting Representative.

c. Pre-grading planning: Grade each phase and apply chemical stabilizers or ground cover to graded areas where construction is scheduled to begin.

d. Wind fencing: Provide three-to-five-foot barriers with 50% or less porosity, adjacent to roadways or urban areas. Normally, used in conjunction with watering or chemical stabilization. Use trees and shrubs for long-term sites.

e. Material coverage: For hauling vehicles cover entire surface of hauled material once vehicle is full. Do not overload haul vehicle. Freeboard should not be less than 3 inches.

f. Mix material with water prior to loading, and/or to entire surface of material after loading. Apply water as necessary during loading operation.

g. Empty loader slowly and keep bucket close to the truck while dumping.

h. Altering loading and unloading procedures. Confine loading and unloading procedures to the downwind side of storage piles. Loading activities may require wind fencing.

i. Coverings: Tarps, plastic, or other materials can be used as a temporary covering. When used, coverings must be anchored to prevent movement of coverings from wind.

j. Vegetation: Establish as quickly as possible when active operations have ceased.

k. Prevent Access: Install fencing around the perimeter of property. Install "No trespassing" signs.

l. Paving or chip sealing: Requires routine street sweeping if subject to material accumulation.

m. Gravel/Recycled Asphalt: Maintain milling activities to a size and depth effective in controlling dust.

o. Eliminate unnecessary travel and restrict access to reduce vehicle trips.

p. Locate haul roads as far from existing housing as possible.

q. Stay on established routes.

r. Stop work activities temporarily if required.

s. Properly maintain equipment to reduce pollutant emissions.

t. Wheel Washers: Wheel washers shall be placed where vehicles exit unpaved areas onto paved areas.

3.8.4.2 Vehicles

All vehicles used to haul materials of any kind shall have their receptacle covered at all times when materials are not being accessed. Additionally, vehicles are authorized an idling period no more than 15 minutes on JBSA properties before they must be shut off.

3.8.4.3 Site Access

Install a gravel pad or stabilized entrance at the access point to the construction site and designate a single entrance and exit. Stay on established routes.

3.8.4.4 Roadways

Sweep/Clean roadways. Sweeping of roadways on a regular basis shall be used to prevent dust/particulate build-up. Do not clean streets or roadways with water. Do not discharge water or debris into the Storm Drain.

3.9 INTEGRATED SOLID WASTE MANAGEMENT (NON-HAZARDOUS WASTE AND RECYCLING)

Numerous Executive Orders direct all federal activities to develop and implement a mandatory recycling program. Recycling across JBSA is focused on the elimination of recyclable materials from the trash and burial in a landfill. DOD mandates diversion of 60% of all non-hazardous solid waste generated by Construction, Demolition, and Renovation projects through recycling or reuse. The ISWMP shall include the contractor's plan(s) for a minimum 60 percent diversion rate or justification for not meeting this goal due to time and/or cost constraints.

Contractors shall be responsible for properly recycling or disposing of all solid waste generated by their activities. Follow applicable industry standards in the management of waste. Apply sound environmental principles in the management of waste. (1) Practice efficient waste management when sizing, cutting, and installing products and materials and (2) use all

reasonable means to divert construction waste and demolition debris/waste from landfills and incinerators and to facilitate the recycling or reuse of excess construction materials.

3.9.1 Points of Contact

- Qualified Recycling Program (QRP) Manager - 210-671-5371/4844
- Concrete, Asphalt, Asphalt Milling Materials recycling - 210-671-0331/4844
- Pollution Prevention (P2) Program Manager - 210-671-8015/4844

It is the contractor's responsibility and requirement to coordinate all communications and documentation with 802 CES/CEIE Environmental Offices through the 802 CES/CEPM Project Managers and Contracting Representative.

3.9.2 Meetings

3.9.2.1 Design/Planning

Project designers and planners shall meet with environmental management staff during the planning phase of the project to identify possible pollution prevention and solid waste diversion opportunities. If this is a contract to construct or renovate a facility, discuss opportunities to add dedicated recycling areas for use by future occupants.

3.9.2.2 Pre-Construction

After award of the Contract and prior to commencement of work, schedule and conduct a meeting, IAW Section (Meetings), with the Contracting Officer, 802 CES/CEPM and 802 CES/CEIE to discuss the proposed EPP and ISWMP and to develop a mutual understanding relative to the management of the project wastes and how waste diversion requirements will be met.

It is the contractor's responsibility and requirement to coordinate all communications and documentation with 802 CES/CEIE Environmental Offices through the 802 CES/CEPM Project Managers and Contracting Representative.

3.9.2.3 Regular Project Meetings

Discuss integrated solid waste and recycling management at regular meetings, IAW Section 1.7 MEETINGS.

3.9.3 Definitions

3.9.3.1 Co-Mingle

The practice of placing unrelated materials together in a single container, usually for benefits of convenience and speed.

3.9.3.2 Construction Waste

Waste generated by construction activities, such as scrap materials, damaged or spoiled materials, temporary and expendable construction materials, and other waste generated by the workforce during construction activities.

3.9.3.3 Demolition Debris/Waste

Waste generated from demolition activities, including minor incidental

demolition waste materials generated as a result of Intentional dismantling of all or portions of a building, to include clearing of building contents that have been destroyed or damaged.

3.9.3.4 Disposal

Depositing waste in a solid waste disposal facility, usually a managed landfill or incinerator, regulated in the US under the Resource Conservation and Recovery Act (RCRA).

3.9.3.5 Diversion

The practice of diverting waste from disposal in a landfill or incinerator, by means of eliminating or minimizing waste, recycling, or reuse of materials.

3.9.3.6 Green waste

Materials that can be composted or used as mulch, including plant materials (trees, shrubs, limbs, brush, leaves), sawdust, raw lumber (not treated, painted, pressed, or particleboard), and certain food scraps.

3.9.3.7 Recycling

The series of activities, including collection, separation, and processing, by which products or other materials are diverted from the solid waste stream for use in the form of raw materials in the manufacture of new products sold or distributed in commerce, or the reuse of such materials as substitutes for goods made of virgin materials, other than fuel.

3.9.3.8 Reuse

The use of a product or materials again for the same purpose, in its original form or with little enhancement or change.

3.9.3.9 Salvage

Usable, salable, salvageable items derived from buildings undergoing demolition or deconstruction, parts from vehicles, machinery, other equipment, or other components.

3.9.3.10 Source Separation

The practice of administering and implementing a management strategy to identify and segregate unrelated waste at the first opportunity.

3.9.4 Integrated Solid Waste Management

Implement an Integrated Solid Waste Management Program (Construction Waste Management Program) for the project. Take a pro-active, responsible role in the management of construction waste, recycling processes, disposal of demolition debris/waste, and require all subcontractors, vendors, and suppliers to participate in the Integrated Solid Waste Management Program. Establish a process for clear tracking and documentation of construction waste and demolition debris/waste.

3.9.4.1 Implementation of Integrated Solid Waste Management Program

Develop and document how the Integrated Solid Waste Management Program will be implemented in an Integrated Solid Waste Management Plan. Submit an Integrated Solid Waste Management Plan to the Contracting Officer, 802 CES/CEPM and the 802 CES/CEIE for approval, IAW Section 1.6 ENVIRONMENTAL PROTECTION PLAN.

It is the contractor's responsibility and requirement to coordinate all communications and documentation with 802 CES/CEIE Environmental Offices through the 802 CES/CEPM Project Managers and Contracting Representative.

Construction waste and demolition debris/waste materials include un-used construction materials not incorporated in the final work, as well as demolition debris/waste materials from demolition activities or deconstruction activities. In the management of waste, consider the availability of viable markets, the condition of materials, the ability to provide material in suitable condition and in a quantity acceptable to available markets, and time constraints imposed by internal project completion mandates.

3.9.4.2 Special Programs

Implement special programs involving rebates or similar incentives related to recycling of construction waste and demolition debris/waste materials. Contractor may retain revenue or savings from salvaged or recycling, unless otherwise directed. Contractor is encouraged to utilize the JBSA Qualified Recycling Program (QRP) for recycling of metals and other items accepted by the QRP; the QRP will retain revenues from these recycled materials; contact the QRP POC listed above for information and coordination. Ensure firms and facilities used for recycling, reuse, and disposal are permitted for the intended use to the extent required by federal, state, and local regulations and are approved for use by the 802 CES/CEIE.

3.9.4.3 Special Instructions

Provide on-site instruction of appropriate separation, handling, recycling, salvage, reuse, and return methods to be used by all parties at the appropriate stages of the projects. Designation of single source separating or commingling will be clearly marked on the containers.

3.9.5 Integrated Solid Waste Management Plan

The contractor shall develop an Integrated Solid Waste Management Plan (ISWMP). This plan shall be in lieu of the Construction Waste Management Plan required by 01 74 19 CONSTRUCTION WASTE MANAGEMENT AND DISPOSAL and shall address all materials addressed in 01 74 19. The ISWMP shall be submitted with the Environmental Protection Plan IAW Section 1.6 ENVIRONMENTAL PROTECTION PLAN. The ISWMP shall be revised and resubmitted as required to obtain approval from the 802 CES/CEIE. Manage demolition debris/waste or deconstruction materials in accordance with the approved ISWMP.
It is the contractor's responsibility and requirement to coordinate all communications and documentation with 802 CES/CEIE Environmental Offices through the 802 CES/CEPM Project Managers and Contracting Representative.

An approved ISWMP will not relieve the Contractor of responsibility for compliance with applicable environmental regulations or meeting project

cumulative waste diversion requirement. Ensure all subcontractors receive a copy of the approved ISWMP. The plan demonstrates how to meet the project waste diversion requirement.

The ISWMP shall include, but not be limited to, the following:

a. Names of individuals responsible for waste management and waste management tracking, along with roles and responsibilities on the project.

b. Actions that will be taken to reduce solid waste generation, including coordination with subcontractors to ensure awareness and participation.

c. Description of the regular meetings to be held to address waste management.

d. Description of the specific approaches to be used in recycling/reuse of the various materials generated, including the areas on site and equipment to be used for processing, sorting, and temporary storage of materials.

e. Description and estimated quantities of the proposed job-site waste, including recyclable materials, salvable materials, and construction and demolition debris (C&D debris) to be generated. This includes waste that is separated for re-use, salvage, recycling, or disposal. Manage all waste streams associated with the project. Indicate whether materials will be salvaged for resale, salvaged and reused on the current project, salvaged and stored for reuse on a future project, recycled, or disposed. Typical waste streams are listed below. Include additional waste and recycling streams not listed.

JBSA expects materials with an asterisk (*) to be recycled to the maximum extent practicable.

1. *Asphalt and asphalt milling materials
2. Carpet
3. Ceiling Tiles
4. *Clean air conditioning units, refrigerators, and freezers - after refrigerant removal (See Section 3.6.3 regarding removal of refrigerants)
5. *Clean concrete, and concrete with rebar
6. *Corrugated cardboard
7. Glass
8. Gypsum
9. *Ink and toner (printer) cartridges
10. Insulation
11. Land Clearing Debris
12. *Masonry and Concrete Masonry Units (CMU)
13. *Non-hazardous paint and paint cans
14. Paper, including newspapers, magazines, books, phone books, envelopes
15. Plastics (PET, HDPE,PVC,LDPE,PP,PS, Other)
16. *Tanks and vessels - only if triple-rinsed, if necessary, and cut open
17. Trash (lunch wastes, miscellaneous municipal solid waste items)
18. *Used oils
19. Wood, including pallets

20. *Ferrous and non-ferrous Metals (includes, but is not limited to: banding, aluminum, aluminum tracks from partitions, boilers, bronze, cable, chillers, copper, copper wire, door and window frames, ductwork, galvanized, gutters and flashing, iron, metal doors, metal framing, metal roofing, metal shelving, other trim, pipes, piping, plumbing fixtures/fittings/faucets, rebar, roofing, sheet metal, stainless steel, steel, steel from decking, steel handrails and stairs, stud trim, transformers, zinc)

f. Identification of the recycling facilities to be used by name, address, and phone number. Transfer stations are not acceptable recycling or disposal facilities.

g. Identification of local and regional re-use programs to be used by name, location, and phone number (non-profit organizations, local housing agencies, material exchange networks, resale stores).

h. Identification of landfill(s) where solid waste will be disposed, applicable landfill tipping fee(s), and the projected cost of disposing of all project waste in the landfill(s). (Only Waste Management Covel Gardens landfill & Republic Services Tessman Road landfill are approved by TCEQ and JBSA. (Transfer Stations are not acceptable recycling or disposal facilities.)

i. Projected cost of disposing of all project waste in the landfill(s). Actual costs and cost savings will be reported to 802 CES/CEIE monthly.

j. Identification of materials that cannot be recycled or reused with an explanation or justification, to be approved by the Contracting Officer.

k. Description of how materials identified in item (e) above will be protected from contamination.

l. Description of the means of transportation of the recyclable materials (whether materials will be site-separated and self-hauled to designated centers, or whether mixed materials will be collected by a waste hauler and removed from the site).

m. Copy of training plan for subcontractors and other services to prevent contamination by co-mingling materials identified for diversion and waste materials.

n. Facilities or subcontractors offering construction waste transport on-site or off-site must ensure that proper shipping orders, bills of lading, manifests, or other shipping documents containing waste diversion information meet requirements of 40 CFR 273 Universal Waste Management, 49 CFR 173 Shippers - General Requirements for Shipments and Packagings, and 49 CFR 178 Specifications for Packaging. Only appropriately appointed and trained 802 CES/CEIE personnel will sign manifests.

o. List of supplier(s) who delivers construction materials in bulk, or packages products in returnable containers or returnable packaging, or has take-back programs. List each program and the applicable material to actively monitor and track to assist in meeting waste diversion requirements on the project.

p. For projects requiring Third Party Certification, also include:

1. Identification of at least 5 construction or demolition material streams for diversion.

2. Detailed plan and distribution of waste diversion between buildings when project is a part of a campus

3.9.6 ISWMP Implementation

The Contractor Shall:

a. Designate an on-site party (or parties) responsible for instructing workers and overseeing and documenting results of the ISWMP for the project

b. Distribute copies of the ISWMP to key personnel and submit the plan to the Contracting Officer and 802 CES/CEIE as part of the Environmental Protection Plan required per Section 1.3 Submittals and Section 1.6 Environmental Protection Plan.

c. Provide on-site instruction of appropriate separation, handling, and recycling, salvage, re-use, and return methods to be used by all parties.

d. Lay out and label a specific area to facilitate separation of materials for potential recycling, salvage, re-use, and return. Recycling and waste bin areas are to be kept neat and clean and clearly marked to avoid contamination of materials. Reduce the amount of solid waste generated through procurement of products with less or reusable packaging, buying only the amounts needed, investigating new recycling/re-use opportunities, and altering operations to reduce wastes (e.g., using double-sided copies).

e. Ensure safe and effective solid waste management through the proper storage of solid waste and recyclables.

f. Coordinate with 802 CES/CEIE on all matters involving solid waste management and recycling, to include sampling, lab analysis, and characterization of waste streams as required by the 802 CES/CEIE.

g. Ensure firms and facilities used for recycling, reuse, and disposal are permitted for the intended use to the extent required by federal, state, and local regulations, and are approved for use by the 802 CES/CEIE. Provide a copy of the permit or license to the 802 CES/CEIE if requested.

h. Ensure no wastes from the project are placed in trash dumpsters or roll-off containers on JBSA that are not associated with the project's waste management plan without express written approval of the 802 CES/CEIE and the Contracting Officer.

3.9.7 Specific Materials

a. Universal wastes (lamps, ballasts, mercury-containing equipment, batteries, paint and paint-related waste, aerosol cans) will be properly manifested and managed IAW the JBSA Hazardous Waste Management Plan. Refer to Section 3.8 HAZARDOUS WASTE.

b. Recyclable metal that has tested positive for lead-based paint will be managed IAW the JBSA Lead-Based Paint Management Plan and will require a waste manifest, weight ticket, and certificate of disposal from the selected recycling facility. Refer to Section 3.10 TOXIC SUBSTANCES.

c. Asbestos-containing C&D Debris will be properly profiled, manifested, and managed IAW the JBSA Asbestos Management and Operations Plan. Refer to Section 3.10 TOXIC SUBSTANCES.

d. Compressed gas and liquid fuel cylinders MUST NEVER be placed into any containers, recycling bins in buildings, scrap metal dumpsters, or base refuse and trash dumpsters. Contact the Hazardous Waste Manager at 210-652-6204/210-671-4844 for specific guidance on disposal of these items.

e. Scrap metal recycling may be coordinated through the JBSA Qualified Recycling Program. Proceeds from these scrap metal sales will be retained by the QRP. Contact the QRP POC listed above for information and coordination. Trip tickets and weight tickets for all recycled metal shall be submitted to 802 CES/CEIE monthly.

f. Other recyclable items accepted by the JBSA QRP may be given to the QRP for recycling, including paper, cardboard, certain plastics, aluminum cans, ink & toner cartridges, and wood pallets. Contact the QRP or P2 POC listed above for a current list of accepted items. Items must be separated by type before transport to a JBSA Recycle Center. Proceeds from sales of these items will be retained by the QRP.

g. Used oil - manage IAW 40 CFR Parts 260-278, Hazardous Waste and Used Oil Management

3.9.8 Manifesting Requirements

a. All manifests will list JBSA 802 CES/CEIE as the Generator and will be returned to JBSA 802 CES/CEIE by the final receiving facility, along with weight tickets, when fully executed. Only appropriately appointed 802 CES/CEIE personnel will sign manifests.

b. Concrete, asphalt, and asphalt milling materials to be recycled will be manifested and delivered directly to the recycling facility. All manifests will be generated and signed only by appropriately appointed 802 CES/CEIE personnel. Contact Concrete, Asphalt, Asphalt Milling Materials POC listed above for procedures.

c. C&D debris to be landfilled and/or recycled will be characterized, sampled as required by 802 CES/CEIE, manifested, and delivered directly to a TCEQ-permitted landfill approved by 802 CES/CEIE. All landfill profiles and manifests will be signed only by appropriately appointed 802 CES/CEIE personnel. Refer to Section 3.8.2 Disposal and contact 802 CES/CEIE POC listed above for profile sheet and manifest procedures, including identification of any sampling requirements. Transfer stations are not acceptable recycling or disposal facilities.

d. Facilities or subcontractors offering construction waste transport on-site or off-site must ensure that proper shipping orders, bills of lading, manifests, or other shipping documents containing waste diversion information meet requirements of 40 CFR 273 Universal

Waste Management, 49 CFR 173 Shippers - General Requirements for Shipments and Packagings, and 49 CFR 178 Specifications for Packaging. Only appropriately appointed 802 CES/CEIE personnel will sign manifests.

3.9.9 Collection

Collect, store, protect, and handle reusable and recyclable materials at the site in a manner which prevents contamination, and provides protection from the elements to preserve their usefulness and monetary value. Provide receptacles and storage areas designated specifically for recyclable and reusable materials and label them clearly and appropriately to prevent contamination from other waste materials. Keep receptacles or storage areas neat and clean.

Train subcontractors and other service providers to either separate waste streams or use the co-mingling method as described in the ISWMP. Handle hazardous waste and hazardous materials in accordance with applicable regulations, other Sections within this ENVIRONMENTAL SPECIFICATION, and Section 02 81 00 TRANSPORTATION AND DISPOSAL OF HAZARDOUS MATERIALS. Separate materials by one of the following methods described herein:

3.9.9.1 Source Separation Method

Separate waste products and materials that are recyclable from trash and sort into appropriately marked separate containers and then transport to the respective recycling facility for further processing. Deliver materials in accordance with recycling or reuse facility requirements (e.g., free of dirt, adhesives, solvents, petroleum contamination, and other substances deleterious to the recycling process). Separate materials into the category types as defined in the ISWMP.

3.9.9.2 Co-Mingled Method

Place waste products and recyclable materials into a single container and then transport to an authorized recycling facility, which meets all applicable requirements to accept and dispose of recyclable materials in accordance with all applicable local, state and federal regulations. The Co-mingled materials must be sorted and processed in accordance with the approved ISWMP. Transfer stations are not acceptable recycling or disposal facilities.

3.9.9.3 JBSA Qualified Recycling Program

Source separated recyclable materials, of the types accepted by the QRP, may be delivered to a JBSA Recycle Center. Contact the QRP POC listed above for locations, hours, and accepted materials list. Scrap metals, including large equipment items, may be recycled through the Installation QRP. Contact the QRP POC listed above for delivery instructions or coordination with the QRP and a local metal recycler for collection/delivery.

3.9.9.4 Other Methods

Other methods proposed by the Contractor may be used when approved by the 802 CES/CEIE and the Contracting Officer.

3.9.10 DISPOSAL

Control accumulation of waste materials and trash. Recycle or dispose of collected materials off-site at intervals approved by the Contracting Officer and in compliance with waste management procedures as described in the ISWMP. Except as otherwise specified in other sections of the specifications, dispose of in accordance with the following:

3.9.10.1 Reuse

Give first consideration to reusing construction and demolition materials as a disposition strategy. Recover for reuse materials, products, and components as described in the approved ISWMP. Coordinate with the Contracting Officer and the 802 CES/CEIE to identify onsite reuse opportunities or material sales or donation available through Government resale or donation programs. Sale of recovered materials is not allowed on the Installation. Consider the use of surplus industrial supply broker services, who match entities with reusable or repurpose industrial materials with entities with need of such materials.

It is the contractor's responsibility and requirement to coordinate all communications and submittals with 802 CES/CEIE Environmental Offices through the 802 CES/CEPM Project Managers and Contracting Representative.

3.9.10.2 Recycle

Recycle non-hazardous construction and demolition/debris materials that are not suitable for reuse. Track rejection of contaminated recyclable materials by the recycling facility. Rejected recyclables materials will not be counted as a percentage of diversion calculation. Recycle all fluorescent lamps, HID lamps, mercury (Hg)-containing thermostats and ampoules, and PCB-containing ballasts and electrical components as directed by the Contracting Officer and the JBSA Hazardous Waste Program Manager. Do not crush lamps on site as this creates a hazardous waste stream with additional handling requirements.

3.9.10.3 Compost / Green Waste

Consider separating items that can be composted or mulched (trees, limbs, brush, raw lumber, sawdust, etc.) and deliver these materials to off-base compost or mulch facilities. Ensure materials meet or exceed the compost or mulch facility requirements for material type, size, and contamination level. Track rejection of materials by the compost or mulch facility and document reason(s) for rejection. Rejected materials will not be counted as a percentage of diversion calculation.

3.9.10.4 Waste

Dispose by landfill or incineration only those waste materials with no practical use, economic benefit, or recycling opportunity, IAW the approved ISWMP.

3.9.11 Records (Documentation)

3.9.11.1 General

Maintain records to document the types and quantities of waste generated and diverted though re-use, recycling, and sale to third parties or

through disposal to a landfill or incinerator facility. Provide explanations for materials not recycled, reused, or sold. Collect and retain manifests, weight tickets, sales receipts, and invoices specifically identifying diverted project waste materials or disposed materials.

3.9.11.2 Accumulated

Maintain a running record of materials generated and diverted from landfill disposal, including accumulated diversion rates for the project. Make records available to the Contracting Officer during construction or incidental demolition activities. Provide a copy of the diversion records to the Contracting Officer upon completion of the construction, incidental demolitions, or minor deconstruction activities.

3.9.12 Reports

3.9.12.1 General

Maintain current integrated solid waste (construction waste) diversion information on site for periodic inspection by the Contracting Officer. It is the contractor's responsibility and requirement to coordinate all communications and submittals with 802 CES/CEIE Environmental Offices through the 802 CES/CEPM Project Managers and Contracting Representative.

Include in the monthly reports, annual reports, and final reports: the project name; contract information; information for waste generated, diverted, and disposed of for the current reporting period and show cumulative totals for the project. Reports must identify material types, weights, disposal costs, recycling costs, and estimated cost savings for all materials salvaged, reused/donated, recycled, and disposed. Also include in each report supporting documentation to include manifests, weigh tickets, receipts, and invoices specifically identifying the project and waste material type and weighted sum. This requirement is mandatory on all projects. All material donated, recycled, or disposed of from across JBSA shall be documented and tracked to meet Environmental Reporting requirements.

Also include proof of reclamation of oil from compressors and other equipment prior to recycling or disposal and documentation of proper disposal of the used oil.

3.9.12.2 Monthly Diversion and Landfill Report

Provide cumulative reports at the end of each month to the 802 CES/CEIE. Reports may be submitted with monthly waste disposal reports required by other Sections herein.

3.9.12.3 Annual Diversion and Landfill Report

Provide a cumulative diversion and landfill report annually. Submit annual report not later than 30 calendar days after the preceding fiscal year has ended.

3.9.12.4 Final Diversion and Landfill Report

A Final Diversion and Landfill Report is required at the end of the project. Provide Final Diversion and Landfill Report 60 days prior to the Beneficial Occupancy Date (BOD).

3.10 HAZARDOUS WASTE

JBSA is the primary generator, and the Contractor shall be considered the primary co-generator for all hazardous wastes (includes Universal Waste) generated throughout the duration of the contract. The Contractor shall follow guidelines established in the JBSA Hazardous Waste Management Plan. All hazardous waste management activities shall be coordinated through and approved by 802 CES/CEIE. Under no circumstances may hazardous, special, or universal waste be disposed of in municipal waste dumpsters.

It is the contractor's responsibility and requirement to coordinate all communications and submittals with 802 CES/CEIE Environmental Offices through the 802 CES/CEPM Project Managers and Contracting Representative.

3.10.1 Regulations

The contractor shall be familiar with and have immediate access to the following regulations: 40 CFR Parts 260-278, Hazardous Waste and Used Oil Management, 48 CFR, Parts 171-177, and the JBSA Hazardous Waste Management Plan for Hazardous and Special Waste (including Universal Waste).

3.10.2 Disposal

All construction debris, hazardous waste, and non-hazardous waste, to include all construction recycling and construction soils, shall be characterized by the lab analysis defined in paragraph 3.1.4.1, profiled, reviewed by the JBSA Hazardous Waste Media Team, manifested as required and signed by appropriately appointed 802 CES/CEIE personnel before leaving any JBSA properties.

All integrated solid waste, C&D waste and Recycling Shall be sampled, characterized, and manifested per section 3.7 Integrated Solid Waste Management (Non-Hazardous Waste and Recycling)

All Asbestos and Lead-contaminated materials, PCBs and Mercury Shall be sampled, characterized and manifested per section 3.10 Toxic Substances

In order to obtain manifests from State-permitted local landfills, the following must be accomplished:

1) The Contractor must inform Environmental Waste Management Team of the type and quantity of waste requiring disposal.

2) The Environmental Waste Management Team will identify the number of samples to be taken and if any additional testing is required.

3) The Contractor shall collect and transport the samples to a State of Texas accredited laboratory for analysis.

4) Upon receipt of the analytical report, the Contractor shall forward the report to the Environmental Waste Management Team for waste characterization.

5) The Environmental Waste Management Team shall characterization the waste as hazardous or non-hazardous and inform the Contractor of approved State-permitted local landfills eligible to receive the waste.

6) The Contractor must request and complete the State-permitted landfill's Waste Profile Sheet.

7) The Contractor shall provide a copy of the completed Waste Profile Sheet for review and prior to any electronic submissions. Non-electronic submission shall require a completed Waste Profile Sheet sent to the Environmental Waste Management Team for QA/QC review and signature approval. **JBSA 802 CES/CEIE will be listed as the Generator on all profiles.**

8) The Contractor must deliver the signed Waste Profile Sheet and the analytical report to the State-permitted landfill. Electronic waste profiles shall be entered by the Waste Management Team after analytical review, into the appropriate system specific to landfill requirements.

9) If approved by the State-permitted landfill, the permitted landfill will print the required number of shipping waste manifests.

10) The State-permitted landfill will notify the Contractor when the shipping waste manifests are ready for pick-up.

11) The Contractor shall deliver the shipping waste manifests to the Environmental Waste Management Team for signature.

12) The Environmental Waste Management Team will notify the Contractor when the shipping waste manifests are signed and ready for pick-up.

Please note that all waste classification is performed by the State-permitted landfill in accordance with TCEQ regulations. JBSA Environmental personnel are not authorized to, or responsible for, classifying waste.

Instructions on how to fill out Waste Manifests are as follows:

1. One (1) manifest per truck.
2. Write in block 1 & 11 the amount of waste being hauled off.
3. Write in block 12 the unit of measurement (i.e., CY = cubic yards).
4. 802 CEI/CEIEC personnel will date and sign block 15 for the Generator, prior to the Transporter receiving waste.
5. Have the Transporter driver print, sign and date in block 17 for Transporter.
6. Remove the last copy of the manifest (Generator's Copy) and provide to Hazardous Waste Program Personnel at the end of each workday.
7. The driver takes all remaining copies to the landfill.
8. Landfill personnel will print, sign and date in block 20 for the Facility receipt of waste.
8. Landfill personnel will provide the driver the Transporter's Copy of the Manifest.
10. Landfill personnel will mail the original manifest to Hazardous Waste Program Personnel within 45 days.

The contractor shall be responsible for all actions and expenses associated with disposal of wastes generated by their project(s) at each JBSA location. The contractor shall have only DOT and HAZWOPER trained personnel to manage all waste.

Disposal shall be accomplished in compliance with all local, state, and

federal rules and instructions, including mandated recycling requirements. This responsibility also includes preparation, packaging, marking, and labeling of wastes in accordance with 49 CFR SUBCHAPTER C. The contractor shall not sign any manifests. All manifests, regardless of waste classification, will be signed only by appropriately appointed 802 CES/CEIE personnel. This includes manifests for all recyclable materials or construction debris.

3.10.3 Light Bulbs

Lamps shall not be disposed of in municipal dumpsters or managed as municipal solid waste. All lights shall be checked for mercury containing lamps. If the lamp is a sodium vapor, fluorescent, or metal halide bulb, the bulbs shall be shipped as Universal Waste or recycled at an approved EPA recycling center. Universal Waste manifests shall be signed by appropriately appointed 802 CES/CEIE personnel before leaving JBSA properties.

The contractor shall prove that the recycler is an EPA approved recycling facility. A non-hazardous waste manifest shall be used for shipping. Copies of shipment manifests and associated weight tickets shall be provided to the 802 CES/CEIE personnel to enable tracking of shipments from cradle to grave.

3.10.4 Light Ballasts

When fluorescent and mercury vapor fixtures are removed, the ballast must be examined for PCB labeling. Ballast is presumed to contain PCBs unless clearly labeled "NO PCBs". Suspected ballast must be removed and recycled through a licensed recycling center for PCBs. All PCB ballasts will be manifested before leaving the borders of any contiguous JBSA location. See paragraph 3.8.2 Disposal for instructions.

3.11 HAZARDOUS AND/OR TOXIC MATERIALS

3.11.1 Regulations

Hazardous Materials used shall be used IAW FAR 52.223-3 and AFMAN 32-7002 Environmental Compliance and Pollution Prevention.

3.11.2 Safety Data Sheets

Hazardous Materials shall be used IAW AFMAN 32-7002 Environmental Compliance and Pollution Prevention and the following Federal Acquisition Regulation (FAR) Clauses:

52.223-3	Hazardous Materials and Material Safety Data Sheets
52.223-5	Pollution Prevention (P2) and EPCRA
52.223-11	Ozone Depleting Substances
52.223-14	Toxic Release Reporting

3.11.3 Coordination

All hazardous materials to be used in the project by the contractor and its subcontractors shall be coordinated through the JBSA Contracting Office. A current copy of all manufacturer-specific SDSs shall be submitted to the Contracting Officer a minimum of 9 calendar days prior to the delivery of the materials via an AF Form 3000. The Contracting Office will transmit the contractor submittal to the respective JBSA Project

Manager for processing IAW AFMAN 32-7002. Additionally, the size and/or weight of each container must be provided with the SDS. The Hazardous Materials Manager is responsible for the approval of all hazardous materials proposed in the project.

It is the contractor's responsibility and requirement to coordinate all communications and submittals with 802 CES/CEIE Environmental Offices through the 802 CES/CEPM Project Managers and Contracting Representative.

This requirement is mandatory on all projects, as all hazardous materials used across JBSA shall be documented and tracked to meet Environmental Reporting requirements. Also, due to Bexar County being designated as Non-Attainment by the U.S. Environmental Protection Agency (US EPA), contractor can only use materials with Low Volatile Organic Compounds (VOCs) which include, but not limited to:

a. Paints
b. Adhesives
c. Primers
d. Sealants
e. Specialty Coatings
f. Solvents

3.11.3.1 Refrigerants

During renovations or modifications performed on a building HVAC or Chiller unit, if the refrigerant is to be evacuated/removed, contractor is required, by AFMAN 32-7002 Environmental Compliance and Pollution Prevention, to turn over the evacuated refrigerant to the Government. Contact the CE Refrigerant Shop at JBSA-LAK (210)671-4738, JBSA-SAM (210)808-913/6032 and JBSA-RND (210)652-3202.

It is the contractor's responsibility and requirement to coordinate all communications and submittals with JBSA installation offices through the 802 CES/CEPM Project Managers and Contracting Representative.

3.11.3.2 Halons

3.11.3.2.1 New Construction

During the construction of a new facility which specifies the installation of Halon for fire suppression contact the JBSA Hazardous Materials Office **PRIOR** to installation via the 802 CES/CEPM Project Managers and Contracting Representative. Halon systems are no longer allowed on DoD installations.

3.11.4 Hazardous Material Tracking

Once all SDSs have been reviewed, an inventory listing will be provided to the Contracting Officer who in-turn will provide copies to the area specific HAZMAT manager for tracking, consumption and reporting purposes. The inventory list will include the stock number, nomenclature (trade name/part number), manufacturer, container size, quantity usage, contract number, contract quality assessment evaluator's name or government point of contact, and contract performance period. Any contract that is less than one month in duration will be reported at the end of the contract period, and any contract over a month in duration will be reported by the 5th day of each month.

3.11.5 Hazardous Material Storage

Hazardous material brought on base by contractors shall be stored IAW manufacturer recommendation per SDS and references listed in the 29 CFR 199.1200 regulations. All flammable materials shall be stored in approved flammable containers and storage areas comply with references listed in subpart REGULATIONS. Careful consideration shall be taken when storing chemicals that may have an adverse reaction to each other. All necessary precautions shall be taken to ensure the safe storage of these materials and to protect from contaminating the environment. Site-specific spill plans shall be revised as necessary to reflect current hazardous material storage and usage per paragraph 3.11 Emergency Response, Spill Procedures, Fuel Tanks of this document. All hazardous materials storage areas are subject to inspections by the Installation Hazardous Materials Manager for compliance.

3.12 Sub TOXIC SUBSTANCES (ASBESTOS, PCBS, MERCURY, AND LEAD-BASED PAINT)

3.12.1 National Emission Standards For Asbestos Containing Materials

3.12.1.1 Abatement Activities

All abatement activities must follow 25 TAC 296, and the National Emission Standards for Hazardous Air Pollutants 40 CFR 61, Subpart M (NESHAP). The 25 TAC 296 for Asbestos is enforced at each JBSA specific location, since these rules are the most restrictive. In addition to the NESHAP, 40 CFR 61.145 Standards for Demolition and Renovation, the JBSA Asbestos Management Plan, and the JBSA Asbestos Operations Plan shall also be adhered to.

3.12.1.2 Renovation/Demolition Notifications

An asbestos inspection report is required prior to any disturbance of Asbestos Containing Materials regardless of construction date. All notifications shall be coordinated with the JBSA area specific Environmental Office through the area specific Contracting Officer and Project Manager. The Environmental Office will submit all Notifications and amendments through the DSHS electronic notification system and provide a copy to the contracting officer for distribution to all interested parties. All asbestos activities meeting the below requirements are required to have a Renovation/Demolition notification submitted to the Texas Department of State Health Services (TDSHS), Notification Section at the minimum of 14 working days prior to any abatement related activities. This authority will not be delegated to the contractor at any time. If the location specific environmental office is not available, the project manager for the contract may contact the Asbestos Program Officers. See paragraph 1.1 Requirements for a list of contacts.

Any concerns for any JBSA location may be addressed to the Toxic's Team Lead at JBSA-RND, government cell 210-540-0226.

It is the contractor's responsibility and requirement to coordinate all communications and submittals with 802 CES/CEIE Environmental Offices through the 802 CES/CEPM Project Managers and Contracting Representative.

a. If a facility is scheduled for demolition, TDSHS must be notified through the TDSHS electronic notification system even if a facility doesn't contain asbestos.

b. If a facility is required to have 160 SF, or 260 LF of Asbestos Containing Materials removed from any component, then a State Renovation/Demolition Notification is required.

c. An amendment to a Notification is required when the amount of asbestos affected changes by 20%.

d. An amendment to the electronic notification is required for any changes in Start and Stop Dates. This amendment must be posted 24 hours prior to the change. This includes demolition activities without any asbestos.

e. In no circumstance shall an asbestos related activity for a renovation or demolition take place prior to the Start Date as stated in the notification. This rule also includes any demolition activity that doesn't contain Asbestos Containing Materials.

3.12.1.3 Electronic Notifications

The contractor or sub-contractor responsible for abatement shall pay all TDSHS invoice costs associated with asbestos abatement, renovation, demolition activities, and/or disposal activities.

The following information is required for all notifications:

a. An indication of whether the notification is the original or an amendment.

b. Name, address, and telephone number of both the facility owner and operator and the asbestos removal contractor owner or operator. The facility owner for asbestos activities shall always be the area specific Environmental Office.

c. Type of activity; demolition/renovation, demolition without ACM; or renovation.

d. Description of the facility or affected part of the facility including the size in square feet and number of floors and age.

e. Procedures, including analytical methods, employed to detect the presence of all Asbestos Containing Material (ACM) and Category I and Category II non-friable ACM.

f. Estimate of the approximate amount of ACM to be removed from the facility in terms of length of pipe in linear feet, surface area in square feet on other facility components, or volume in cubic feet if off the facility components.

g. Physical location and street address, including building number or name and floor or room number as appropriate. city, county, and state where the facility is being demolished or renovated.

h. The scheduled starting and completion dates of asbestos removal work or any other activity, such as site preparation that would break up,
dislodge, or similarly disturb asbestos material in a demolition or renovation project.

i. The scheduled starting and completion dates of demolition.

j. Description of planned demolition or renovation work to be performed and methods to be employed, including demolition or renovation techniques to be used and description of affected facility components.

k. Description of work practices and engineering controls to be used to comply with the requirements of National Emission Standard for Hazardous Air Pollutant, Renovation and Demolition rules including asbestos removal and waste-handling emission control procedures.

l. Name and location of the waste disposal site where the asbestos-containing waste material will be deposited.

m. For Emergency Renovations and Demolition Notifications, the following information shall be provided; the date and hour that the emergency occurred, a description of the sudden unexpected event, and an explanation of how the event caused an unsafe condition or would cause equipment damage or an unreasonable financial burden. The location specific Environmental Office will initiate an electronic notification. to TDSHS prior to the submission of an Emergency Notification. The Contractor shall submit a request for emergency action to the Contracting Officer; if a financial burden results, then proof containing cost burden shall be included in the request. All requests submitted due to non-emergency action may be subject to penaltyfrom TDSHS. At no time will abatement activities proceed without the Emergency Notification number. Not meeting the 10-day Notification requirement loss or increase in funding are not valid justifications for an Emergency. The final determination for granting an Emergency Notification is at the discretion of the area specific Environmental Manager after discussion with TDSHS representatives.

It is the contractor's responsibility and requirement to coordinate all communications and submittals with 802 CES/CEIE Environmental Offices through the 802 CES/CEPM Project Managers and Contracting Representative and to build in additional time as needed to comply with deadlines and timelines provided with environmental requirements.

n. Description of procedures to be followed if unexpected ACM is found or Category II non-friable ACM becomes crumbled, pulverized, or reduced to powder.

o. Name, address, and telephone number of the waste transporter.

p. The abatement contractor will be responsible for entering as much of the known information into the written notification prior to submitting the notification through the JBSA area specific Contracting Office. The Environmental Asbestos Program Office will fill in the missing information. JBSA Environmental Office will submit the notification through the TDSHS Electronic Notification System and provide a copy of the completed electronic notification to the area specific Contracting Officer for distribution to all interested parties.

Any notifications submitted with phased abatement activities must include the TDSHS phased schedule form. Any phased activity must not have a break in any abatement activity which exceeds 30 days. The Renovation/Demolition Notification forms and the Scheduled Activity forms are available at the TDSHS web site:

http://www.dshs.texas.gov/asbestos/forms.aspx

q. Emergency Notification Procedures for Unforeseen Site Conditions. These procedures are only to be used when a situation arises where asbestos materials are disturbed in an inaccessible area that could not be accessed to conduct a thorough assessment. In the event that asbestos materials are disturbed, an Emergency Notification would be required dependent on the total amount of Asbestos Containing Materials. To initiate an Emergency Notification, stop all work and contact the appropriate Contracting representative (CO or PM) and explain the circumstance. The contracting representative (CO or PM) will then contact the appropriate 802d Environmental. An amendment to the existing notification shall be submitted to the State by the 802d Environmental. If a notification does not exist, an emergency notification shall be submitted with the appropriate justification.

3.12.1.4 ACM Emission Control Procedures

Each owner or operator of a demolition or renovation activity to whom this paragraph applies, shall comply with the following procedures:

a. Remove all ACM from a facility being demolished or renovated before any activity begins that would break up, dislodge, or similarly disturb the material or preclude access to the material for subsequent removal. All ACM shall be removed during demolition. A potential for non-friable ACM to become friable during processing of the construction debris is likely to occur.

b. If it is on a facility component that is encased in concrete or other similarly hard material and is adequately wet whenever exposed during demolition.

c. If it was not accessible for testing and was therefore, not discovered until after demolition began and, as a result of the demolition, the material cannot be safely removed. If not removed for safety reasons, the exposed ACM and any asbestos-contaminated debris must be treated as asbestos-containing waste material and adequately wet at all times until disposed of. This statement applies to facilities that are structurally damaged/unsound where an asbestos inspection is not possible due to safety concerns.

d. When a facility component that contains or is covered with, or coated with ACM which is being taken out of the facility as a unit or in sections:

1. Adequately wet all ACM exposed during cutting or disjoining operations.

2. Carefully lower each unit or section to the floor and to ground level, not dropping, throwing, sliding, or otherwise damaging or disturbing the ACM.

3. When ACM is stripped from a facility component while it remains in place in the facility, adequately wet the ACM during the stripping operation.

3.12.1.5 Wet Methods

In renovation or demolition operations, wet methods are not required if:

a. The owner or operator has obtained prior written approval from DSHS based on a written application that wetting materials to comply with this paragraph would unavoidably damage equipment or present a safety hazard; and;

b. The owner or operator will use an appropriate emission control method:

1. A local exhaust ventilation and collection system is designed and operated to capture the particulate asbestos material produced by the stripping and removal of the asbestos materials. The system must exhibit no visible emissions to the outside air or be designed and operated in accordance with the requirements in 40 CFR 61.152.

2. A glove-bag system is designed and operated to contain the particulate asbestos material produced by the stripping of the asbestos materials.

3. Leak-tight wrapping shall be used to contain all ACM prior to dismantlement.

c. In renovation operations, where wet methods would result in equipment damage or a safety hazard, and the methods allowed in paragraph 3.10.1.4(d) of this section cannot be used, another method may be used after obtaining written approval from the Administrator based upon a determination that it is equivalent to wetting in controlling emissions or to the methods allowed in paragraph 3.10.1.5(b) of this section.

1. A copy of the DSHS written approval shall be kept at the worksite and made available for inspection and a copy provided to the Contracting Officer for Environmental review. Any changes to wet methods shall be written by a DSHS-licensed asbestos consultant.

2. After a facility component is covered with, coated with, or contains ACM has been taken out of the facility as a unit or in sections pursuant to paragraph 3.10.1.4(d) of this section, it shall be stripped or contained in leak-tight wrapping.

3.12.1.6 Adequately wet the ACM during stripping or:

Use a local exhaust ventilation and collection system designed and operated to capture the particulate asbestos material produced by the stripping. The system must exhibit no visible emissions to the outside air or be designed and operated in accordance with the requirements in 40 CFR 61.152(b). For large facility components such as reactor vessels, large tanks, and steam generators, but not beams (which must be handled in accordance with paragraphs 3.10.1.4(b) and (d) of this section), the ACM is not required to be stripped if the following requirements are met:

1. The component is removed, transported, stored, disposed of, or reused without disturbing or damaging the ACM.

2. The component is encased in a leak-tight wrapping.

3. The leak-tight wrapping is labeled according to 40 CFR 61.149(d)(1)(i), (ii), and (iii) during all loading and unloading operations and during storage.

3.12.1.7 For all RACM, including material that has been removed or stripped:

a. Adequately wet the material and ensure that it remains wet until collected and contained or treated in preparation for disposal in accordance with 40 CFR 61.150; and:

b. Carefully lower the material to the ground and floor, not dropping, throwing, sliding, or otherwise damaging or disturbing the material.

c. Transport the material to the ground via leak-tight chutes or containers if it has been removed or stripped more than 50 feet above ground level and was not removed as units or in sections.

d. ACM contained in leak-tight wrapping that has been removed in accordance with paragraphs 3.10.1.5 (c) Wet Methods,(2)and 3.10.1.5 (b)(3) Wet Methods of this section need not be wetted.

3.12.1.8 When the temperature at the point of wetting is below 0 °C (32 °F):

a. The owner or operator need not comply with paragraph 3.10.1.4(d)1 and the wetting provisions of paragraph (3.10.1.5(c)2 of this section.

b. The owner or operator shall remove facility components containing, coated with, or covered with ACM as units or in sections to the maximum extent possible.

c. During periods when wetting operations are suspended due to freezing temperatures, the owner or operator must record the temperature in the area containing the facility components at the beginning, middle, and end of each workday and keep daily temperature records available for inspection by the Administrator during normal business hours at the demolition or renovation site. The owner or operator shall retain the temperature records for at least 2 years.

3.12.1.9 Handling of ACM

No ACM shall be stripped, removed, or otherwise handled or disturbed at a facility regulated by this section unless at least one on-site representative, such as a foreman or management-level person or other authorized representative, trained in the provisions of this regulation and the means of complying with them, is present. Every year, the trained on-site individual shall receive refresher training in the provisions of this regulation. The required training shall include as a minimum: applicability; notifications; material identification; control procedures for removals including, at least, wetting, local exhaust ventilation, negative pressure enclosures, glove-bag procedures, and High Efficiency Particulate Air (HEPA) filters; waste disposal work practices; reporting and record keeping; and asbestos hazards and worker protection. Evidence that the required training has been completed shall be posted and made available for inspection by the Administrator or the location specific

Asbestos Program Manager at the demolition or renovation site.

3.12.1.10 Resilient Floor Covering Institute (RFCI) Procedures

The RFCI procedures are not authorized at any JBSA area locations.

3.12.2 Roofing Materials

Asbestos abatement for roofing materials is regulated as an Occupational Safety Health Administration (OSHA) Class II, asbestos activity. The abatement of asbestos containing roofing materials requires at a minimum, an 8-hour OSHA training course. A copy of all abatement workers training must be provided electronically to 802 CES/CEIE through 502 CONS prior to any asbestos removal of roofing materials. All asbestos roofing materials will be manifested as asbestos waste. During the removal of roofing materials containing asbestos, a competent supervisor trained in the EPA Model Accreditation course must be on-site at all times and an OSHA Negative Exposure Assessment shall be accomplished.

3.12.2.1 Roof Area/NESHAP

If the asbestos containing roof area undergoing renovation is less than 160 SF, National Emission Standards for Hazardous Air Pollutants (NESHAP) does not apply, regardless of the removal method to be used, the type of material (Category I or II), or its condition (friable versus non-friable). 40 CFR 61.145(a)(4). Category I non-friable asbestos-containing roofing material, any project that is 5580 sqft or greater is subject to the NESHAP; conversely, it is EPA's interpretation that when an RB roof cutter or equipment that similarly damages the roofing material is used to remove Category I non-friable asbestos-containing roofing material in a roof removal project that is less than 5580 sqft, the project is not subject to the NESHAP, except that notification is always required for demolitions.

3.12.2.2 Asbestos Cement (Transite) Roof Shingles

For asbestos cement (A/C - Transite) shingles (or other Category II roofing material), if the area of the roofing material to be removed is at least 160 sqft and the removal methods will crumble, pulverize, reduce to powder, or contaminate with ACM (from other ACM that has been crumbled, pulverized or reduced to powder) 160 sqft or more of such roofing material, the removal is subject to the NESHAP. Notification is required if the material exceeds 160 sqft and must be abated by a certified asbestos abatement team.

3.12.2.3 Roofing Material

To determine if a removal operation that meets or exceeds the coverage threshold is subject to the NESHAP, any suspect roofing material (i.e. roofing material that may be ACM) should be tested for asbestos. If any such roofing material is equal to or greater than one percent asbestos and the removal operation is covered by the NESHAP, then DSHS must be notified and the work practices in Sec. 61.145(c) must be followed. In EPA's view, if a removal operation involves at least the threshold level of suspect material, a roofing contractor may choose not to test for asbestos if the contractor follows the notification and work practice requirements of the NESHAP.

3.12.3 Shingle Removal (Category II ACM Removal)

A/C shingles, which are Category II non-friable ACM, become regulated ACM if the material has a high probability of becoming or has become crumbled, pulverized or reduced to powder by the forces expected to act on the material in the course of demolition or renovation operations per 40 CFR 61.141. However, merely breaking an A/C shingle (or any other category II ACM) that is not friable may not necessarily cause the material to become ACM. A/C shingles are typically nailed to buildings on which they are attached. EPA believes that the extent of breakage that will normally result from carefully removing A/C shingles and lowering the shingles to the ground will not result in crumbling, pulverizing or reducing the shingles to powder. Conversely, the extent of breakage that will normally occur if the A/C shingles are dropped from a building or scraped off of a building with heavy machinery would cause the shingles to become ACM. EPA therefore construes the NESHAP to mean that the removal of A/C shingles that are not friable, using methods that do not crumble, pulverize, or reduce the A/C shingles to powder (such as pry bars, spud bars and shovels to carefully pry the material), is not subject to the NESHAP provided that the A/C shingles are properly handled during and after removal, as discussed in this paragraph and the asbestos NESHAP. This interpretation also applies to other Category II non-friable asbestos-containing roofing materials.

3.12.4 Lead-Based Paint

All Lead-Based Paint work must be accomplished in accordance with federal, state, and local laws and the JBSA Lead-Based Paint Management Plan. No paint containing lead shall be used during the course of this contract. The Occupational Health and Safety Act (OSHA) Lead in Construction Standard,
29 CFR 1926.62 is in effect whenever materials are disturbed that contain any amount of lead. This will require contractors disturbing lead-based paint to institute medical surveillance, training, engineering controls, worker protection measures, and employee monitoring until monitoring results per the lead paint standard demonstrate that employee exposure is below the action level and permissible exposure limit. The contractor on site must maintain all documentation regarding lead exposure by either historical data or project data.

3.12.4.1 Disposal Activities

The contractor shall be responsible for the collection, sampling, and disposal of all lead paint chips and lead paint-contaminated materials IAW the JBSA Hazardous Waste Management Plan. All necessary accumulation, disposal activities, and documentation shall be coordinated with the location specific Environmental Office. All analysis and disposal costs associated with Lead Based Paints is the responsibility of the contractor.

3.12.4.2 Waste Manifests

All Waste Manifests for Lead-containing materials shall be signed (approved) by JBSA area specific Environmental office without exception. All Lead manifests will require a Waste Profile Sheet which is the responsibility of the abatement contractor. This profile sheet will establish and generate the waste manifest and the Land Disposal Restriction as required. The Waste Profile Sheet will be coordinated with the area specific Environmental Office through the Contracting Officer and the Project Manager. All waste profile sheets will be signed by JBSA

Environmental Staff. The waste manifest will be signed by a JBSA Environmental Staff member prior to removal of material or components from each JBSA specific location. All Hazardous Waste, Lead disposals must include a Land Disposal Restriction prior to leaving JBSA.

It is the contractor's responsibility and requirement to coordinate all communications and submittals with 802 CES/CEIE Environmental Offices through the 802 CES/CEPM Project Managers and Contracting Representative.

3.12.4.3 Toxic Characteristic Leaching Procedure (TCLP)

Any lead waste in an industrial or administrative facility will require a Toxic Characteristic Leaching Procedure (TCLP) analysis to determine proper disposal procedures. All copies of lab results will be provided to JBSA Environmental prior to disposal of such material. All analysis will be accomplished by an approved TCEQ National Environmental Laboratory Accreditation Conference (NELAC), synonymous with the National Environmental Laboratory Accreditation Program (NELAP) laboratory.

3.12.4.4 Residential Facilities

Lead-contaminated waste in residential housing may be disposed of as Household Waste.

3.12.4.5 Child Occupied Facility

Lead abatement in a target or child-occupied facility requires notification to the Texas Department of State Health Services seven working days prior to abatement activities by the Lead Certified firm. All notification costs and penalties are the responsibility of the Lead firm. A copy of the notification and any amendments shall be provided to the JBSA Contracting Office, Project Manager and JBSA Environmental.

3.12.4.6 Pre-Submittals Required

Submittals required for review prior to Lead Based Paint Activities. The following documents will be reviewed prior to any renovation in a target or child occupied facilities:

a. Lead Work Plans

b. Lead Occupant Protection Plan.

c. Texas Department of State Health Services Lead Licenses

d. Lead Notifications

e. Lead Training Certificates

f. Lead Inspection reports that have not been provided by the area specific Environmental Office. Any inspection reports done by a licensed Lead Inspector or Lead Risk Assessor.

g. Lead Based Paint Reports that were not included in the original assessment or results to a change in the scope of work.

3.12.4.7 TCLP Analysis

Submittal required after OSHA Lead Based Paint removal or preparation

activities. TCLP analysis is required for all lead dust, paint chips, equipment and supplies to determine proper disposal requirements. Analysis must be done by an approved TCEQ Laboratory for the specific media. RCRA 10 metals are the minimum requirement for all regulated facilities excluding target and child-occupied facilities. These facilities are exempt from Hazardous Waste rules: any lead from target and child-occupied facilities is handled as household waste.

3.12.4.8 Clearance Certification

A clearance certification will be required prior to occupants reoccupying the area where lead abatement activities are accomplished. Visual and Wet Wipe samples will be conducted in all Temporary Lodging Facilities (TLF) or Child Care Facilities built before 1978 and has the potential residency of a child under the age of 6 or an expectant female. The facility must pass the minimum lead criteria in 40 CFR, part 745.227. The use of clearance verification cards will not be used in JBSA facilities. All clearances will be conducted by a Texas Licensed Lead Risk Assessor.

3.12.5 Exit Lamp

Any demolition of a facility will require the inspection of exit lamps to ensure that they do not contain tritium. Lamps found to contain tritium will be disposed of IAW the appropriate federal regulations. Tritium Exit signs must still comply with Nuclear Regulatory Commission Radio-Active Regulations. If Tritium is found contact 802 CES/CEIEC prior to any removal activities to determine disposal and manifesting requirements.

3.12.6 Abrasive Media

Any paint removal operations that require the use of abrasive media, whether it's water, sand, or any other blast media to include water, will require a containment to hold all abrasive media within the blasting area. Note that any properties/projects falling within the jurisdiction of the NPS, SHPO, or under Cultural Resources consultation, abrasive media or water pressure shall not be used. Appropriate methods must follow the NPS Preservation briefs related to the abrasive media being used. See NPS Preservation briefs 1, 6, 7, 10, 22, 27,37,38, 42 available at NPS.gov. All drains, vents or any other openings will be masked or covered with a suitable material to prevent any breaches of media from the containment area. All media must be kept dry from the start of the contract until the material has been disposed of. The contractor will be responsible for disposing of the spent media in accordance with all Department of Transportation, Texas Commission on Environmental Quality, and Resource Conservation and Recovery Act requirements. Any breaches will be repaired immediately before continuing the blast operation process. All abrasive blasting procedures must be in accordance with 29 CFR 1910.94 and all other local, state and federal regulations applicable to Abrasive Blasting Operations. All material leaving JBSA locations for disposal must be manifested and signed by the specific Environmental Office staff.

Dry Abrasive Cleaning is permitted by rule PBR 30 TAC 106.452. See PBR for enclosed and abrasive cleaning and outside blast cleaning rules. Logs must be turned in to the 802 CES/CEIE Air Quality Media Team annotating number of hours actual blasting took place and pounds of waste media removed.

3.12.6.1 Blasting/Lead in Construction Rules

If the blasting is in an area where LBP has been identified, all OSHA 29 CFR 1926.62, Lead in Construction Rules, will apply. The media will have a TCLP analysis accomplished by a Texas Certified NELAC/ NELAP laboratory to determine characteristics of the waste stream for proper landfill disposal. All non-approved laboratory results will be disapproved, and the test will be re-accomplished at no cost to the government Approved laboratories may be found on the Texas Commission on Environmental Quality website at:

https://www.tceq.texas.gov/assets/public/compliance/compliance_support/qa/txnelap_lab_

3.12.7 Residential Property Renovation

Residential property renovation includes Child Care Centers, Temporary Lodging Facilities, etc. and applies to all renovations performed for compensation. Child-occupied facility means a building, or portion of a building, constructed prior to 1978, visited regularly by the same child, under 6 years of age, on at least two different days within any week (Sunday through Saturday period), provided that each day's visit lasts at least 3 hours and the combined weekly visits last at least 6 hours, and the combined annual visits last at least 60 hours. Child-occupied facilities may include, but are not limited to, day care centers, preschools and kindergarten classrooms. Child-occupied facilities may be located in target housing or in public or commercial buildings. With respect to common areas in public or commercial buildings that contain child-occupied facilities, the child-occupied facility encompasses only those common areas that are routinely used by children under age 6, such as restrooms and cafeterias. Common areas that children under age 6 only pass through, such as hallways, stairways, and garages are not included. In addition, with respect to exteriors of public or commercial buildings that contain child-occupied facilities, the child-occupied facility encompasses only the exterior sides of the building that are immediately adjacent to the child-occupied facility or the common areas routinely used by children under age six.

3.12.7.1 Certified Renovators

The Repair, Renovate, and Painting rules only apply to Target and Child Occupied facilities. This training and certification does not meet the Occupational Safety and Health Administration training requirements to conduct Lead work in other facilities, therefore, this type of certification will not be accepted for Commercial or Industrial Facility LBP projects. Renovations shall be directed by renovators certified by an authorized EPA training provider and performed by certified renovators or individuals trained by a certified renovator (training records must be available on site) in target housing or child-occupied facilities.

3.12.7.2 General Contractors

All general contractors and hired lead firms that conduct any lead-based paint renovation or repair procedures, not to include lead abatement activities, shall both be certified as an EPA Renovation, Repair, and Painting firm and have received the Renovation, Repair and Painting 8-hour training course from an EPA-certified provider. A copy of the EPA application and a copy of the renovator training certification shall be provided to the 802 CES/CEIE for review through the contracting office prior to the Notice to Proceed. The general contractor and the lead firm

shall provide a copy of both the EPA training certification and the EPA firm certification.

Pressure Washing is not authorized on any facility containing Lead painted surfaces. This process could cause cross contamination of the soils and surrounding areas instituting additional clean-up procedures and additional costs that will be the sole responsibility of the contractor to comply. No detergents are authorized to be used on any facility as this could result in contamination of our local waterways both on and off the installation.

3.12.7.3 Distribution of the EPA Pamphlets

The Lead Safe Certified Guide to Renovate Right will be provided to the facility manager IAW 40 CFR 745 Subpart E any time a Child Occupied or Target facility is being renovated that contains Lead-Based Paint. Proof of distribution will be provided to 802 CES/CEIE through the base Contracting Office. If renovation is to be done in an occupied TLF, then the pamphlet will be provided to the occupant and to any additional facility occupant that has a child under the age of 6 or an expectant female in or adjacent to the target or Child Occupied facility. If the facility is not occupied, then the pamphlet will be provided to the facility manager to validate proof of pamphlet acceptance in accordance with the EPA rules.

3.12.7.4 Occupant Protection

To ensure occupant protection, firms must post signs clearly defining the work area and warning occupants and other persons not involved in renovation activities to remain outside of the work area. To the extent practicable, these signs must be in the primary language of the occupants. These signs must be posted in English and Spanish before beginning the renovation and must remain in place and readable until the renovation and the third-party clearances have been completed. If warning signs have been posted in accordance with 24 CFR 35.1345(b)(2) or 29 CFR 1926.62(m), additional signs are not required.

3.12.7.5 Work Area Isolation

Contractor shall contain the work area. Before beginning the renovation, the firm must isolate the work area so that no dust or debris leaves the work area while the renovation is being performed. In addition, the firm must maintain the integrity of the containment by ensuring that any plastic or other impermeable materials are not torn or displaced and taking any other steps necessary to ensure that no dust or debris leaves the work area while the renovation is being performed. The firm must also ensure that containment is installed in such a manner that it does not interfere with occupant and worker egress in an emergency.

3.12.7.6 Work Area Preparation-Interior

For interior renovations, the firm must:

a. Remove all objects from the work area, including furniture, rugs, and window coverings, or cover them with plastic sheeting or other impermeable material with all seams and edges taped or otherwise sealed.

b. Close and cover all ducts opening in the work area with

taped-down plastic sheeting or other impermeable material.

c. Close windows and doors in the work area. Doors must be covered with plastic sheeting or other impermeable material. Doors used as an entrance to the work area must be covered with plastic sheeting or other impermeable material in a manner that allows workers to pass through while confining dust and debris to the work area.

d. Cover the floor surface, including installed carpet, with taped-down plastic sheeting or other impermeable material in the work area 6 feet beyond the perimeter of surfaces undergoing renovation or a sufficient distance to contain the dust, whichever is greater.

e. Use precautions to ensure that all personnel, tools, and other items, including the exteriors of containers of waste, are free of dust and debris before leaving the work area.

3.12.7.7 Work Area Preparation-Exterior

For exterior renovations, the firm must:

a. Close all doors and windows within 20 feet of the renovation. On multi-story buildings, close all doors and windows within 20 feet of the renovation on the same floor as the renovation, and close all doors and windows on all floors below that are the same horizontal distance from the renovation.

b. Ensure that doors within the work area that will be used while the job is being performed are covered with plastic sheeting or other impermeable material in a manner that allows workers to pass through while confining dust and debris to the work area.

c. Cover the ground with plastic sheeting or other disposable impermeable material extending 10 feet beyond the perimeter of surfaces undergoing renovation or a sufficient distance to collect falling paint debris, whichever is greater, unless the property line prevents 10 feet of such ground covering.

d. In certain situations, the renovation firm must take extra precautions in containing the work area to ensure that dust and debris from the renovation does not contaminate other buildings or other areas of the property or migrate to adjacent properties.

3.12.7.8 Prohibited or Restricted Work

The work listed below shall be prohibited or restricted during a renovation as follows:

a. Open-flame burning or torching of lead-based paint is prohibited.

b. The use of machines that remove lead-based paint through high-speed operation such as sanding, grinding, power planning, needle gun, pressure washing, abrasive blasting, or sandblasting, is prohibited unless such machines are used with HEPA exhaust control.

c. Operating a heat gun on lead-based paint is permitted only at temperatures below 1000 degrees Fahrenheit.

3.12.7.9 Renovation Waste

Waste from renovation activities must be properly managed.

a. Waste must be contained to prevent releases of dust and debris before the waste is removed from the work area for storage or disposal. If a chute is used to remove waste from the work area, it must be covered.

b. At the conclusion of each workday and at the conclusion of the renovation, waste that has been collected from renovation activities must be stored under containment, in an enclosure, or behind a barrier that prevents release of dust and debris out of the work area and prevents access to dust and debris.

c. When the firm transports waste from renovation activities, the firm must contain the waste to prevent release of dust and debris.

3.12.7.10 Cleaning the work area

After the renovation has been completed, the firm must clean the work area until no dust, debris or residue remains.

3.12.7.11 Interior and Exterior Renovations

The firm must:

a. Collect all paint chips and debris and without dispersing any of it, seal this material in a heavy-duty bag.

b. Remove the protective sheeting. Mist the sheeting before folding it, fold the dirty side inward, and either tape shut to seal or seal in heavy-duty bags. Sheeting used to isolate contaminated rooms from non-contaminated rooms must remain in place until after the cleaning and removal of other sheeting. Dispose of the sheeting as waste.

3.12.7.12 Additional Cleaning

Additional cleaning for interior renovations. The firm must clean all objects and surfaces in the work area and within 2 feet of the work area in the following manner, cleaning from higher to lower:

a. Walls; clean walls starting at the ceiling and working down to the floor by either vacuuming with a HEPA vacuum or wiping with a damp cloth.

b. Remaining surfaces. Thoroughly vacuum all remaining surfaces and objects in the work area, including furniture and fixtures, with a HEPA vacuum. The HEPA vacuum must be equipped with a beater bar when vacuuming carpets and rugs.

c. Wipe all remaining surfaces and objects in the work area, except for carpeted or upholstered surfaces, with a damp cloth. Mop uncarpeted floors thoroughly, using a mopping method that keeps the wash water separate from the rinse water, such as the 2-bucket mopping method, or using a wet mopping system.

3.12.7.13 Post Cleaning Verification

Standards for post-renovation cleaning verification:

a. Interiors: A certified renovator must perform a visual inspection to determine whether dust, debris or residue is still present. If dust, debris or residue is present, these conditions must be removed by re-cleaning and another visual inspection must be performed.

b. All Target or Child Occupied facilities clearances will be done by a certified Inspector, Risk Assessor or a dust sampling technician. Verification procedure will not be authorized.

c. The renovation firm is required to re-clean the work area until the dust clearance sample results are below the clearance standards in 745.227(e)(8).
https://www.govregs.com/regulations/40/745.227

3.13 EMERGENCY RESPONSE, SPILL PROCEDURES, FUEL TANKS

3.13.1 Spills

All fuel, oil, and chemical spills/releases that pose a threat to Occupational Health & Safety or the environment must be immediately reported to the installation Fire Emergency Services utilizing 911. If contacting 911 via cell phone, request that the city dispatcher transfer you to the specific JBSA installation's Fire Emergency Services

The contractor is required to train his/her personnel on spill procedures, fire-suppression systems, and Safety Data Sheets for all materials used and/or stored on the project site. Immediately after notifying the location specific Fire Emergency Services of a release, the contractor shall notify the Contracting Officer and 802 CES/CEIE Environmental at JBSA-LAK (210) 671-4844, JBSA-RND (210)652-4668 and JBSA-SAM/BUL (210) 221-1142. A verbal report must be made to 802 CES/CEIE within one hour of discovery followed by a detailed written notification within 11-15 hours. Cleanup and all associated costs due to spills are the responsibility of the contractor, and the contractor shall reimburse any government cost upon receipt of invoice. The 802 CES/CEIE shall make all required spill notifications to federal, state and local regulatory agencies.

It is the contractor's responsibility and requirement to coordinate all communications and submittals with 802 CES/CEIE Environmental Offices through the 802 CES/CEPM Project Managers and Contracting Representative.

3.13.2 Spill Kits and Clean Up Equipment

The contractor shall provide and maintain spill clean-up equipment, sufficient in both type and quantity, at all sites involving the storage, and handling of fuel, POL, hazardous materials and/or hazardous wastes. The type of equipment and quantity required will be identified in the contractor's site-specific contingency plans. Contractor shall train employees in the use of the spill kits and clean up equipment and document the training. If a spill occurs, the contractor shall initiate containment, control, and clean-up actions. Notify the 802 CES/CEIE Environmental office immediately if release extends off-site or enters the natural environment. The contractor shall take sufficient measures to prevent spillage of hazardous and toxic materials during dispensing and shall collect waste in suitable containers observing chemical

compatibility requirements.

3.13.3 Emergency Response Plan

The Emergency Response Plan as required per Section 1.3 Submittals, shall include, but not be limited to the following:

3.13.3.1 Training

Contractor shall provide for review by the Contracting Officer documentation to demonstrate that the contractor has sufficient knowledge and training to address potential spills at the work site. The contractor should have appropriate DOT and HAZWOPER trained personnel to manage all spill response.

3.13.3.2 Site Specific Spill Prevention/Response Plan

A "Site Specific Spill Prevention/Response Plan" shall be prepared that addresses all locations where the contractor handles chemicals, hazardous materials or petroleum products. Site-specific spill plans shall be revised as necessary to reflect current hazardous material storage and usage. The plan shall detail the contractor representative and alternate who will be contacted in the event of an emergency. The plan will identify equipment such as Spill Kits, that will be used to contain and clean up spills. Revisions to the plan shall be coordinated with 802 CES/CEIE through the Contracting Officer.

It is the contractor's responsibility and requirement to coordinate all communications and submittals with 802 CES/CEIE Environmental Offices through the 802 CES/CEPM Project Managers and Contracting Representative.

3.13.4 Storage Tanks

802 CES/CEIE does not allow the use of storage tanks (fixed or portable) and must approve the use of drums (55-gallons or greater) on JBSA properties, and the contractor must ensure that adequate spill containment and spill materials (spill kits) are readily available. The contractor must have written spill procedures for all hazardous materials, tanks, and heavy equipment they use on the installation detailed in the site-specific Spill Prevention/Response Plan.

3.14 POST-CONSTRUCTION CLEANUP

3.14.1 Area Restoration

The Contractor shall clean up all areas affected by construction and restore them back to their original condition to include landscaping, silt fences, planting of trees, grass, and shrubs damaged by construction; plus raking and disposal of debris such as roof shingles, paper, nails, glass, sheet metal, bricks, and waste concrete. All temporary best management practices (i.e., silt fences, geotextile), inert material, and erosion and sediment controls shall be removed by the contractor after site has reached final stabilization.

3.14.2 Backfilled Areas

Backfilled areas shall be compacted and landscaped as required by the 502 CES general construction requirements/Contract Specification.

3.15 JBSA ENVIRONMENTAL MANAGEMENT SYSTEM (EMS)

JBSA is committed to conducting its mission in a safe and environmentally responsible manner. Each contractor shall be aware that JBSA has an environmental policy to Stop pollution, Obey laws, Always improve, and Reduce waste (SOAR).

The environmental policy is found in eDASH at the following link and is available from 802 CES/CEIE by request:

https://usaf.dps.mil/teams/10625/JBSA/Shared%20Documents/EMS/01.%20Scope%20and%20Commi

Each contractor shall be aware that JBSA has an EMS and that there is a commitment for everyone on these installations to protect human health, natural resources, and the environment. All contractors and contractor employees who work on JBSA, must complete General EMS training and maintain certificates of completion, to be provided upon request.

General EMS Awareness training is located on the Air Force Learning Portal TEACH at https://usaf.learningbuilder.com/

Conformance with the Environmental Management System

Perform work under this contract consistent with the policy and objectives identified in the JBSA Environmental Management System (EMS). Perform work in a manner that conforms to objectives and targets of the environmental programs and operational controls identified by the EMS. Support Government personnel when environmental compliance and EMS audits are conducted by escorting auditors at the Project site, answering questions, and providing proof of records being maintained. Provide monitoring and measurement information as necessary to address environmental performance relative to environmental, energy, and transportation management goals. In the event an EMS nonconformance or environmental noncompliance associated with the contracted services, tasks, or actions occurs, take corrective and preventative actions. In addition, employees must be aware of their roles and responsibilities under the installation EMS and of how these EMS roles and responsibilities affect work performed under the contract. Coordinate with the installation's EMS coordinator to identify training needs associated with environmental aspects and the EMS and arrange training or take other action to meet these needs. Provide training documentation to the Contracting Officer. The JBSA Environmental Office will retain associated environmental compliance records. Make EMS Awareness training completion certificates available to Government auditors during EMS audits and include the certificates in the Employee Training Records.

3.16 INSTALLATION RESTORATION MANAGEMENT

3.16.1 Installation Restoration Program (IRP)

The Contractor acknowledges the JBSA Installation Restoration Program (IRP) and the IRP Management Action Plan. The Contractor shall comply with all
aspects of the plan and will utilize the AF Form 103 (Base Civil Engineering Work Clearance Request) Digging Permit process before performing any earthmoving or subsurface work.

3.16.2 Soil and Groundwater Contamination

Contractors awarded construction projects on JBSA should be aware of the potential to encounter soil and/or groundwater contamination throughout many areas of the base properties and that the regulatory agency can halt projects for long periods of time due to the discovery of contamination. Cooperation between the contractor and 802 CES/CEIE will result in expediting the progress of construction with IRP compliance issues.

3.16.3 Environmental Restoration Program (ERP) Sites

The following guidance has been developed to assist in the construction of projects in possibly contaminated areas (ERP sites).

3.16.3.1 Guideline Sets

Guideline Set 1 is the most stringent and involves projects in an area that has known contamination and regulatory land use controls. Guideline Set 2 is general and applies to any area of the installation where contamination has not been confirmed. It is imperative that contractors involve 802 CES/CEIE early and often in the construction process to minimize the impact that contaminated soils and/or groundwater may have on their project.

It is the contractor's responsibility and requirement to coordinate all communications and submittals with 802 CES/CEIE Environmental Offices through the 802 CES/CEPM Project Managers and Contracting Representative.

3.16.3.2 Guideline Set 1

Projects located on a site with known soil and/or groundwater contamination with land use controls. All restrictions will be coordinated with the
802 CES/CEIE and the Environmental Restoration Program Manager.

a. Contractor shall educate workers on potential to encounter contamination and to assure workers are adequately protected with personal protective equipment.

b. If unusual soil or groundwater color or odor is encountered, contact 802 CES/CEIE immediately, non-duty hours, contact EMCS at Joint Base Randolph 652-3143 and Lackland at 210-671-2288.

It is the contractor's responsibility and requirement to coordinate all communications and submittals with 802 CES/CEIE Environmental Offices through the 802 CES/CEPM Project Managers and Contracting Representative.

3.16.3.3 Guideline Set 2

Sites without land use control and not in close proximity to known contamination or an ERP site:

a. If unusual soil or groundwater color or odor is encountered during subsurface construction work, contact 802 CES/CEIE during regular duty hours and EMCS after hours.

b. Contractor shall educate workers on potential to encounter contamination and to assure workers are adequately protected with personal protective equipment.

3.17 EXPLOSIVE ORDNANCE

The Contractor is hereby notified that the site may have Un-exploded Ordinance (UXO) and shall perform a UXO survey/clearance for the site, to include access & utility routes, a minimum of a 15' wide clear zone beyond grading operations. Should UXO be encountered during progress of the Work, the Contractor shall cease work immediately and contact 802 CES Environmental for immediate direction and assistance. Do not, under any circumstances, attempt excavation and handling of hazardous material UXO. Coordinate with the Contracting Officer for procedures and approvals required by JBSA.

It is the contractor's responsibility and requirement to coordinate all communications and submittals with 802 CES/CEIE Environmental Offices through the 802 CES/CEPM Project Managers and Contracting Representative.

Include in the ENVIRONMENTAL PROTECTION PLAN measures to:

a. Immediately stop operations in the affected area.

b. Notify onsite personnel of the UXO hazard and evacuate the immediate area of the UXO.

c. Restrict access to the area.

d. Notify the 802 CES Environmental Office and the Contracting Officer immediately.

-- End of Section --

SECTION 01 58 00

PROJECT IDENTIFICATION
02/25

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. For references without a year, use the current published version.

U.S. ARMY CORPS OF ENGINEERS (USACE)

EP 310-1-6a	(2006; 2019 Change 2) Project Operation -- Sign Standards Manual, VOL 1
EP 310-1-6b	(2006) Sign Standards Manual, VOL 2, Appendices

1.2 SUBMITTALS

Government approval is required for submittals with a "G" or "S" classification. Refer to Section 01 33 00 SUBMITTAL PROCEDURES for requirements when a classification other than "G" or "S" are used. Submittals not having a classification are for information only. Submit the following in accordance with Section 01 33 00 SUBMITTAL PROCEDURES:

SD-01 Preconstruction Submittals

Project Identification Sign

SD-02 Shop Drawings

Preliminary One Line Drawings Of Project Rendering; G

Project Identification Sign; G

SD-04 Samples

[Final Rendering Sample; G

][Final Framed Rendering and Copies; G

]1.3 QUALITY CONTROL

1.3.1 Rendering

Provide the project rendering in accordance with the following drawing stages as required in the SUBMITTALS paragraph. The following submittal data is required to properly identify the appropriate view and approve the final rendering of the facility. The final painted rendering will be used to produce the image for the signboard and framed photographic copies provided to the Contracting Officer.

1.3.1.1 Preliminary One Line Drawings

Provide three different views of the facility in a preliminary single line drawing (black and white) format. These three views will represent the best angles at which to view the proposed facility showing the [_____] [best design features] and the three dimensional character of the facility.

1.3.1.2 Final Rendering Sample

Provide a photographic copy (8 by 10 inches minimum size) of final rendering for approval of color, landscaping, and foreground/background development prior to final submittal.

1.3.1.3 Final Framed Rendering and Copies

Provide final full color rendering of the proposed facility as specified.

1.3.2 Project Identification Sign

Provide a project sign rendering before the full size project sign is produced.

1.4 PROJECT IDENTIFICATION SIGN

Prior to initiating any work on site, provide [one][two] project identification sign[s] at the location[s] designated. Construct the sign in accordance with paragraph PROJECT SIGNBOARD. Maintain sign throughout the life of the project. Upon completion of the project, remove the sign from the site. Provide color rendering of the project. Reproduce the rendering on the signboard or enclose a copy of the rendering under a water-proof, transparent cover, and caulk for weather protection.

1.4.1 Project Rendering

Provide a full color rendering of the proposed facility as follows:

a. Provide rendering by a company that regularly does this work as a major component of their normal business.

b. Colors used on the rendering to match the exterior color scheme indicated in the contract document.

c. The rendering is a full vignette/fully developed, on heavy illustration board. Approximate finished size is 24 by 30 inches with minimum inside mat dimension of 16 by 20 inches. Draw the rendering at [human eye] [roof] [bird's eye] [_____] level view, painted with Case-in Tempera.

d. Provide three preliminary single line black and white perspectives prior to proceeding with the color rendering. Provide these preliminary perspectives within 30 days after [preliminary design approval] [contract award] for evaluation by the Contracting Officer. Develop the view selected by the Contracting Officer into the final rendering.

e. Provide the final rendering sample photograph within 30 days after approval of preliminary single line drawings. Provide this sample photograph for evaluation by the Contracting Officer.

f. Provide final original color rendering, two full size photographic reproductions of the original rendering, and the photographic negative. Mount the original and reproductions on acid free board, double-matted (acid free matting) with appropriate colored board and framed in contemporary metal frames, using non-glare glass. Print on the matting the project name, location, and the Architect/Engineer firm's name. On the back of the renderings and reproductions, indicated the project name, the location, the contract number, and the date of reproduction.

g. Ship the rendering, the photographic copies, and the negative in resilient packaging to ensure damage-free delivery.

Deliver to:	ATTN: [_____] 802D CIVIL ENGINEER SQUADRON 2250 ENGINEER ST, B4196 STE 7 JBSA SAM HOUSTON, TX 78234
Deliver to:	ATTN: [_____] 802D CIVIL ENGINEER SQUADRON 1555 GOTT ST, B5595 JBSA LACKLAND, TX 78236
Deliver to:	ATTN: [_____] 802D CIVIL ENGINEER SQUADRON 2020 5TH ST E, B62 JBSA RANDOLPH, TX 78150

h. Provide copy of rendering to be used for the signboard that has been protected from UV damage as per specifications.

1.4.2 Project Signboard

Furnish the sign, maintain the sign during construction, and remove the sign from the job site upon completion of the project. Details of sign graphics and construction are indicated in ATT-1, and are based off of details from Plates 6 and 7. Replace the NAVFAC logo seen in Plate 7 with the 802 CES emblem. Remove all references to Naval Facilities Engineering Command and NAVFAC.

1.4.3 Project Signboard

Furnish the sign, maintain the sign during construction, and remove the sign from the job site upon completion of the project. Details of sign graphics and construction are indicated in ATT-1, and are based off of details from Plates 6 and 7. Replace the NAVFAC logo seen in Plate 7 with the 802 CES emblem. Remove all references to Naval Facilities Engineering Command and NAVFAC.

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Furnish the sign, maintain the sign during construction, and remove the sign from the job site upon completion of the project. Details of sign graphics and construction are indicated in ATT-1, and are based off of details from Plates 6 and 7. Replace the NAVFAC logo seen in Plate 7 with the 802 CES emblem. Remove all references to Naval Facilities Engineering Command and NAVFAC.

1.4.5 Construction Project Signs

Furnish the construction project sign package, maintain the signs during construction, and remove the signs from the job site upon completion of the project. The construction project sign package consists of two signs: one for project identification and the other to show the on-the-job safety performance of the contractor. Ensure that the package conforms to the requirements of paragraph PROJECT SIGNBOARD for the project identification sign; and EP 310-1-6a and EP 310-1-6b, specifically Section 16, for the safety performance sign.

PART 2 PRODUCTS

Not Used

PART 3 EXECUTION

Not Used

ATT-1 - JBSA [FSH][BUL] Project Sign

ATTACHED IN APPENDIX A

ATT-1 - JBSA [LAK][CTA][KEL] Project Sign

ATTACHED IN APPENDIX A

ATT-1 - JBSA [RND][SEG][CL] Project Sign

ATTACHED IN APPENDIX A

-- End of Section --

SECTION 01 74 19

CONSTRUCTION WASTE MANAGEMENT AND DISPOSAL
06/25

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. For references without a year, use the current published version.

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

40 CFR 260	Hazardous Waste Management System: General
40 CFR 261	Identification and Listing of Hazardous Waste
40 CFR 273	Standards for Universal Waste Management
40 CFR 279	Standards for the Management of Used Oil
49 CFR SUBCHAPTER C	Hazardous Materials Regulations
49 CFR 173	Shippers - General Requirements for Shipments and Packagings
49 CFR 178	Specifications for Packagings

1.2 DEFINITIONS

1.2.1 Co-mingle

The practice of placing unrelated materials together in a single container, usually for benefits of convenience and speed.

1.2.2 Construction Waste

Waste generated by construction activities, such as scrap materials, damaged or spoiled materials, temporary and expendable construction materials, and other waste generated by the workforce during construction activities.

1.2.3 Demolition Debris/Waste

Waste generated from demolition activities, including minor incidental demolition waste materials generated as a result of Intentional dismantling of all or portions of a building, to include clearing of building contents that have been destroyed or damaged.

1.2.4 Disposal

Depositing waste in a solid waste disposal facility, usually a managed landfill or incinerator, regulated in the US under the Resource Conservation and Recovery Act (RCRA).

1.2.5 Diversion

The practice of diverting waste from disposal in a landfill or incinerator, by means of eliminating or minimizing waste, or reuse of materials.

1.2.6 Green Waste

Materials that can be composted or used as mulch, including plant materials (trees, shrubs, limbs, brush, leaves), sawdust, raw lumber (not treated, painted, pressed, or particleboard), and certain food scraps.

1.2.7 Final Construction Waste Diversion Report

A written assertion by a material recovery facility operator identifying constituent materials diverted from disposal, usually including summary tabulations of materials, weight in short-ton.

1.2.8 Recycling

The series of activities, including collection, separation, and processing, by which products or other materials are diverted from the solid waste stream for use in the form of raw materials in the manufacture of new products sold or distributed in commerce, or the reuse of such materials as substitutes for goods made of virgin materials, other than fuel.

1.2.9 Reuse

The use of a product or materials again for the same purpose, in its original form or with little enhancement or change.

1.2.10 Salvage

Usable, salable items derived from buildings undergoing demolition or deconstruction, parts from vehicles, machinery, other equipment, or other components.

1.2.11 Source Separation

The practice of administering and implementing a management strategy to identify and segregate unrelated waste at the first opportunity.

1.3 CONSTRUCTION WASTE (INCLUDES DEMOLITION DEBRIS/WASTE)

Divert a minimum of 60 percent by weight of the project construction waste and demolition debris/waste from the landfill or incinerator. Follow applicable industry standards in the management of waste. Apply sound environmental principles in the management of waste. (1) Practice efficient waste management when sizing, cutting, and installing products and materials and (2) use all reasonable means to divert construction waste and demolition debris/waste from landfills and incinerators and to facilitate the recycling or reuse of excess construction materials.

1.4 CONSTRUCTION WASTE MANAGEMENT

Implement a Construction Waste Management Program for the project. Take a pro-active, responsible role in the management of construction

construction waste, recycling process, disposal of demolition debris/waste, and require all subcontractors, vendors, and suppliers to participate in the Construction Waste Management Program. Establish a process for clear tracking, and documentation of construction waste and demolition debris/waste.

1.4.1 Implementation of Construction Waste Management Program

Develop and document how the Construction Waste Management Program will be implemented in a Construction Waste Management Plan. Submit a Construction Waste Management Plan to the Contracting Officer for approval. Construction waste and demolition debris/waste materials include un-used construction materials not incorporated in the final work, as well as demolition debris/waste materials from demolition activities or deconstruction activities. In the management of waste, consider the availability of viable markets, the condition of materials, the ability to provide material in suitable condition and in a quantity acceptable to available markets, and time constraints imposed by internal project completion mandates.

1.4.2 Oversight

The Quality Control Manager, as specified in Section 01 45 00 QUALITY CONTROL, is responsible for overseeing and documenting results from executing the Construction Waste Management Plan for the project.[The Environmental Manager, when utilized and as specified in Section 01 57 19 TEMPORARY ENVIRONMENTAL CONTROLS, can fullfill this duty of the Quality Control Manager.]

1.4.2.1 Government Oversight

The following table lists Government POCs to coordinate with for questions relating to waste management and proper removal from JBSA. Record of conversations shall be supplied to the Contracting Officer and Contracting Officer's Technical Representative.

PROGRAM	CONTACT
Qualified Recycling Program (QRP) Manager	(210) 671-5371 (210) 671-4844
Concrete, Asphalt, Asphalt Milling Material Recycling	(210) 671-0331 (210) 671-4844
Pollution Prevention (P2) Program Manager	(210) 671-8015 (210) 671-4844

1.4.3 Special Programs

Implement special programs involving rebates or similar incentives related to recycling of construction waste and demolition debris/waste materials. Retain revenue or savings from salvaged or recycling, unless otherwise directed. Ensure firms and facilities used for recycling, reuse, and disposal are permitted for the intended use to the extent required by federal, state, and local regulations.

1.4.4 Special Instructions

Provide on-site instruction of appropriate separation, handling, recycling, salvage, reuse, and return methods to be used by all parties at the appropriate stages of the projects. Designation of single source separating will be clearly marked on the containers.

Designate an on-site authority who shall be responsible for instructing workers and overseeing and documenting results of the Construction Waste Management Plan. Ensure that approved copies of the Construction Waste Management Plan are distributed to key personnel.

Reduce the amount of solid waste generated through procurement of products with less or reusable packaging, buying only the amounts needed, investigating new recycling/re-use opportunities, and altering operations to reduce wastes.

Coordinate with the JBSA Environmental Office on all matters involving solid waste management and recycling. This includes sampling, lab analysis, and characterization of waste streams. Verify that facilities designated to receive waste, recyclable, and re-used materials are permitted for the intended use to the extent required by federal, state, and local regulations.

1.4.5 Waste Streams

Delineate waste streams and characterization, including estimated material types and quantities of waste, in the Construction Waste Management Plan. Manage all waste streams associated with the project. Typical waste streams are listed below. Include additional waste steams not listed:

a. Land Clearing Debris

b. *Asphalt and asphalt milling material

c. Masonry and CMU

d. *Concrete; with and without reinforcement

e. *Metals (Includes, but is not limited to, banding, stud trim, ductwork, piping, rebar, roofing, other trim, steel, iron, galvanized, stainless steel, aluminum, copper, zinc, bronze.)

f. Wood (nails and staples allowed); inlcuding pallets

g. Glass

h. Paper; including newspapers, magazines, books, phone books, envelopes

i. Plastics (PET, HDPE,PVC,LDPE,PP,PS, Other)

j. Gypsum

k. *Non-hazardous paint and paint cans

l. Carpet

m. Ceiling Tiles

n. Insulation

o. *Tanks and vessels; only if triple-rinsed, as necessary, and cut open

p. *Clean air conditioning units, refrigerators, and freezers (after refrigerant removal)

q. *Corrugated cardboard

r. *Ink and toner (printer) cartridges

s. *Used oil

t. Beverage Containers

u. Trash (lunch waste, miscellaneous municipal solid waste items)

Items denoted with an asterisk (*) shall be recycled to the maximum extent practicable.

1.5 SUBMITTALS

Government approval is required for submittals with a "G" or "S" classification. Refer to Section 01 33 00 SUBMITTAL PROCEDURES for requirements when a classification other than "G" or "S" are used. Submittals not having a classification are for information only. Submit the following in accordance with Section 01 33 00 SUBMITTAL PROCEDURES:

SD-01 Preconstruction Submittals

Construction Waste Management Plan; G

Profile Sheet; G

SD-06 Test Reports

Monthly Reports; G

Quarterly Reports; G

Annual Report; G

Analytical Report; G

SD-07 Certificates

Documentation

SD-11 Closeout Submittals

Final Construction Waste Diversion Report; S

1.6 MEETINGS

Conduct Construction Waste Management meetings. After award of the Contract and prior to commencement of work, schedule and conduct a meeting with the Contracting Officer to discuss the proposed Construction Waste Management Plan and to develop a mutual understanding relative to the management of the Construction Waste Management Program and how waste

diversion requirements will be met. Government team will provide input, as capable, to help identify possible pollution prevention and solid waste diversion opportunities.

The requirements of this meeting may be fulfilled during the Coordination and Mutual Understanding meeting outlined in Section 01 45 00 QUALITY CONTROL. At a minimum, discuss and document waste management goals at following meetings:

a. [Preconstruction][Pre-demolition] meeting.

b. Regular [site][Quality Control] meetings.

c. Work safety meeting (if applicable).

1.7 CONSTRUCTION WASTE MANAGEMENT PLAN

Submit Construction Waste Management Plan within 15 days after notice to proceed. Revise and resubmit Construction Waste Management Plan as necessary, in order for construction to begin. Submit Construction Waste Management Plan not less than 45 calendar days before scheduled final site or building design approval. Revise and resubmit Construction Waste Management Plan until it receives final approval from the Contracting Officer, in order for construction to begin. Execute demolition or deconstruction activities in accordance with Section 02 41 00 [DEMOLITION] [AND] [DECONSTRUCTION]. Manage demolition debris/waste or deconstruction materials in accordance with the approved construction waste management plan.

An approved Construction Waste Management Plan will not relieve the Contractor of responsibility for compliance with applicable environmental regulations or meeting project cumulative waste diversion requirement. Ensure all subcontractors receive a copy of the approved Construction Waste Management Plan. The plan demonstrates how to meet the project waste diversion requirement. Also, include the following in the plan:

a. Identify the names of individuals responsible for waste management and waste management tracking, along with roles and responsibilities on the project.

b. Actions that will be taken to reduce solid waste generation, including coordination with subcontractors to ensure awareness and participation.

c. Description of the regular meetings to be held to address waste management.

d. Description and estimated quantities of the proposed waste, including recyclable materials, salvable materials, and construction and demolition debris to be generated. This includes waste that is separated for re-use, salvage, recycling, or disposal. Indicate whether materials will be salvaged for resale, salvaged and reused on the current project, salvaged and stored for reuse on a future project, recycled, or disposed.

e. Description of the specific approaches to be used in recycling/reuse of the various materials generated, including the areas on site and equipment to be used for processing, sorting, and temporary storage of materials.

f. Name of landfill to be used. Identify the landfill by name, address, and phone number. Transfer stations are not acceptable disposal facilities.

g. Name of recycling facility to be used. Identify the recycling facilities by name, address, and phone number. Transfer stations are not acceptable recycling facilities.

h. Identification of local and regional re-use programs, including non-profit organizations such as schools, local housing agencies, and organization that accept used materials such as material exchange networks and resale stores. Include the name, location, phone number for each re-use facility identified, and provide a copy of the permit or license for each facility.

i. List of specific materials, by type and quantity, that will be salvaged for resale, salvaged and reused on the current project, salvaged and stored for reuse on a future project, or recycled. Identify the recycling facilities by name, address, and phone number.

j. Identification of materials that cannot be recycled or reused with an explanation or justification, to be approved by the Contracting Officer.

k. Description of the means by which materials identified in item (i) above will be protected from contamination.

l. Description of the means of transportation of the recyclable materials (whether materials will be site-separated and self-hauled to designated centers, or whether mixed materials will be collected by a waste hauler and removed from the site).

m. Copy of training plan for subcontractors and other services to prevent contamination by co-mingling materials identified for diversion and waste materials.

[n. Identification of at least 5 construction or demolition material streams for diversion.

][o. Detailed plan and distribution of waste diversion between buildings, when project is a part of a campus.

] p. Facilities or subcontractors offering construction waste transport on-site or off-site must ensure that proper shipping orders, bill of lading, manifests, or other shipping documents containing waste diversion information meet requirements of 40 CFR 273 Universal Waste Management, 49 CFR 173 Shippers - General Requirements for Shipments and Packagings, and 49 CFR 178 Specifications for Packaging. Only designated indiviuals from the JBSA Environmental Office will be signing manifests or other shipping documents.

q. List each supplier who deliver construction materials, in bulk, or package products in returnable containers or returnable packaging, or have take-back programs. List each program and the applicable material to actively monitor and track to assist in meeting waste diversion requirements on the project.

Distribute copies of the waste management plan to each subcontractor, Quality Control Manager[, Environmental Manager], and the Contracting

Officer.

1.8 RECORDS (DOCUMENTATION)

1.8.1 General

Maintain records to document the types and quantities of waste generated and diverted though re-use, recycling and sale to third parties; through disposal to a landfill or incinerator facility. Provide explanations for materials not recycled, reused or sold. Collect and retain manifests, weight tickets, sales receipts, and invoices specifically identifying diverted project waste materials or disposed materials.

1.8.2 Accumulated

Maintain a running record of materials generated and diverted from landfill disposal, including accumulated diversion rates for the project. Make records available to the Contracting Officer during construction or incidental demolition activities. Provide a copy of the diversion records to the Contracting Officer upon completion of the construction, incidental demolitions or minor deconstruction activities.

1.9 REPORTS

1.9.1 General

Maintain current construction waste diversion information on site for periodic inspection by the Contracting Officer. Include in the monthly reports, quarterly reports, annual reports and final reports: the project name, contract information, information for waste generated, diverted and disposed of for the current reporting period and show cumulative totals for the project. Reports must identify quantifies of waste by type and disposal method. Also include in each report, supporting documentation to include manifests, weigh tickets, receipts, and invoices specifically identifying the project and waste material type and weighted sum. Also include proof of reclamation of oil from compressors and other equipment prior to recycling or disposal and documentation of proper disposal of the used oil. All material donated, recycled, or disposed of from across JBSA shall be documented and tracked to meet Environmental Reporting requirements.

1.9.2 Monthly Reporting

Provide cumulative reports at the end of each month. Submit monthly reports no later than 7 calendar days after the month has ended.

1.9.3 Quarterly Reporting

Provide cumulative reports at the end of each quarter (December, March, June, and September, corresponding with the federal fiscal year for reporting purposes). Submit quarterly reports no later than 15 calendar days after the preceding quarter has ended. Submit Quarterly Reports to the Contracting Officer. Reports will be distributed to the appropriate office after receipt by the Government.

1.9.4 Annual Reporting

Provide a cumulative construction waste diversion report annually. Submit annual report not later than 30 calendar days after the preceding fourth

quarter has ended. Provide copy of annual construction waste diversion report to the Contracting Officer. Reports will be distributed to the appropriate office after receipt by the Government.

1.10 FINAL CONSTRUCTION WASTE DIVERSION REPORT

A Final Construction Waste Diversion Report is required at the end of the project. Provide Final Construction Waste Diversion Report no later than [30][_____] calendar days after the Beneficial Occupancy Date (BOD). The final Construction Waste Diversion Report must be included in the Sustainability eNotebook in accordance with Section 01 33 29 SUSTAINABILITY REQUIREMENTS AND REPORTING.

1.11 COLLECTION

Collect, store, protect, and handle reusable and recyclable materials at the site in a manner which prevents contamination, and provides protection from the elements to preserve their usefulness and monetary value. Provide receptacles and storage areas designated specifically for recyclable and reusable materials and label them clearly and appropriately to prevent contamination from other waste materials. Keep receptacles or storage areas neat and clean.

Train subcontractors and other service providers to separate waste streams as described in the Construction Waste Management Plan. Handle hazardous waste and hazardous materials in accordance with applicable regulations and coordinate with Section [01 57 19 TEMPORARY ENVIRONMENTAL CONTROLS][01 57 20 ENVIRONMENTAL PROTECTION] and Section 02 81 00 TRANSPORTATION AND DISPOSAL OF HAZARDOUS MATERIALS. Separate materials by one of the following methods described herein:

1.11.1 Source Separation Method

Separate waste products and materials that are recyclable from trash and sort as described below into appropriately marked separate containers and then transport to the respective recycling facility for further processing. Deliver materials in accordance with recycling or reuse facility requirements (e.g., free of dirt, adhesives, solvents, petroleum contamination, and other substances deleterious to the recycling process). Separate materials into the category types as defined in the Construction Waste Management Plan.

1.11.2 Co-Mingled Method

Place waste products and recyclable materials into a single container and then transport to an authorized recycling facility, which meets all applicable requirements to accept and dispose of recyclable materials in accordance with all applicable local, state and federal regulations. The Co-mingled materials must be sorted and processed in accordance with the approved Construction Waste Management Plan. This method is only allowed if waste is directly transported to [Covel Gardens landfill][or][Tessman Road landfill] and the landfill has agreed to sort and separate the waste materials.

1.11.3 Other Methods

Other methods proposed by the Contractor may be used when approved by the Contracting Officer and the JBSA Environmental Office.

1.12 DISPOSAL

Control accumulation of waste materials and trash. Recycle or dispose of collected materials off-site at intervals approved by the Contracting Officer and in compliance with waste management procedures as described in the waste management plan. Except as otherwise specified in other sections of the specifications, dispose of in accordance with the following:

1.12.1 Reuse

Give first consideration to reusing construction and demolition materials as a disposition strategy. Recover for reuse materials, products, and components as described in the approved Construction Waste Management Plan. Coordinate with the Contracting Officer to identify onsite reuse opportunities or material sales or donation available through Government resale or donation programs. Sale of recovered materials is not allowed on the Installation. Consider the use of surplus industrial supply broker services, who match entities with reusable or repurpose industrial materials with entities with need of such materials.

1.12.2 Recycle

Recycle non-hazardous construction and demolition/debris materials that are not suitable for reuse. Track rejection of contaminated recyclable materials by the recycling facility. Rejected recyclables materials will not be counted as a percentage of diversion calculation. Recycle all fluorescent lamps, HID lamps, mercury (Hg) -containing thermostats and ampoules, and PCBs-containing ballasts and electrical components as directed by the Contracting Officer and the JBSA Hazardous Waste Program Manager. Do not crush lamps on site as this creates a hazardous waste stream with additional handling requirements.

1.12.2.1 Authorized Recyclers

All recyclable materials shall be directly transported to an EPA approved recycler. Transportation to a transfer station is not allowed.

1.12.3 Green Waste

Consider separating items that can be composted or mulched (trees, limbs, brush, raw lumber, sawdust, etc.) and deliver these materials to off-base compost or mulch facilities. Ensure materials meet or exceed the compost or mulch facility requirements for material type, size, and contamination level. Track rejection of materials by the compost or mulch facility and document reason(s) for rejection. Rejected materials must not be counted as a percentage of diversion calculation.

1.12.4 Waste

Dispose by landfill only those waste materials with no practical use, economic benefit, or recycling opportunity in accordance with the approved Construction Waste Management Plan.

1.12.4.1 Authorized Landfills

All waste materials shall be directly transported to a TCEQ authorized landfill that has been vetted through the JBSA Environmental Office. Transportation to a transfer station is not allowed. The current

authorized and vetted local landfills are:

a. Covel Gardens Landfill, operated by Waste Management Services

b. Tessman Road Landfill, operated by Republic Services

A separate request shall be submitted to the Contracting Officer if the Contractor wants to use a landfill that is not listed above. Do not list any alternate landfill in the Construction Waste Management Plan until a request has been approved. Refer to the following link for the current TCEQ authorized active landfills: https://www.tceq.texas.gov/permitting/waste_permits/msw_permits/msw-data

PART 2 PRODUCTS

Not Used

PART 3 EXECUTION

3.1 COLLECTION

Layout and label a specific area to facilitate separation of materials for waste and potential recycling, salvage, re-use, and return. Recycling and waste container areas shall be kept neat, clean, and clearly marked to avoid contamination of materials.

Prevent waste disposal in containers located across JBSA that are outside the limits of the project site.

3.2 DISPOSAL

Refer to Section [01 57 19 TEMPORARY ENVIRONMENTAL CONTROLS][01 57 20 ENVIRONMENTAL PROTECTION], Section 02 41 00 [DEMOLITION][AND][DECONSTRUCTION], Section 02 81 00 TRANSPORTATION AND DISPOSAL OF HAZARDOUS MATERIALS, Section 02 82 00 ASBESTOS REMEDIATION, Section 02 83 00 LEAD REMEDIATION, Section 02 84 16 HANDLING OF LIGHTING BALLASTS AND LAMPS CONTAINING PCBs AND MERCURY, and Section 02 84 33 REMOVAL AND DISPOSAL OF POLYCHLORINATED BIPHENYLS (PCBs) for additional requirements for identifying, handling, transporting, and disposing of hazardous material.

For both hazardous and non-hazardous waste, all debris, reusable mterial, recyclable material, and soils shall be characterized by lab analysis, profiled, and manifested to an approved landfill or recycling facility. All costs associated with disposal of reusable, recyclable, soils, and waste material shall be the responsibility of the Contractor.

Ensure that preparation, packaging, marking, and labeling of wastes is performed in accordance with 49 CFR SUBCHAPTER C.

3.2.1 Characterization

All soil, reusable, recyclable, and waste material shall have a determination of either hazardous or non-hazardous material. Known hazardous waste material will have been identified and characterized by the Hazardous Material Survey report(s) provided in Appendix D. Contractor shall ensure representative samples of materials that have not been characterized are collected by qualified personnel and submitted to a certified laboratory. Resulting report shall be provided to the

Contracting Officer and the JBSA Environmental Office to confirm the hazardous or non-hazardous determination.

Any material encountered that is suspected of being hazardous material, and that has not been previously identified, shall be characterized by lab analysis using applicable methods in accordance with 40 CFR 261. Contractor is responsible for the collection of representative samples, transportation, and testing of samples to be characterized. Analytical Report for each characterization shall be submitted to the Contracting Officer for review by the JBSA Environmental Office to confirm the hazardous or non-hazardous determination. The JBSA Environmental Office will assist in the identification of state permitted landfills that are eligible to receive the waste.

If waste is designated to be transported to a landfill, they may require additional testing be performed. Any additional testing requested by the landfill shall be performed at no additional cost to the Government.

3.2.2 Profiling

All soil, reusable, recyclable, and waste material shall be profiled. Waste material shall be profiled using the Profile Sheet from an approved landfill listed in the Construction Waste Management Plan[or the Hazardous Waste Management Plan]. Reusable and recyclable material shall be profiled using the applicable Profile Sheet attached to this section specification.

Draft profile sheets shall be submitted for review to determine if all necessary information has been included. Contractor shall use the following information as the Generator's Information in the applicable sections of the profile sheets:

a. Name: Building [_____]

b. Site Address: [_____], JBSA Sam Houston, TX 78234Medical Center Annex, TX 78234Grayson Street Annex, TX 78208Bullis, TX [78257][78260][78163][78015]Lackland, TX 78236Chapman Training Annex, TX [78236][78227]Kelly Field Annex, TX [78226][78236][78227]Port Annex, TX 78226Randolph, TX 78150Seguin Auxiliary Field, TX 78155 Canyon Lake, TX 78133

c. Mailing Address Line:

   (1) ATTN: 802 CES/CEIE

   (2) 2250 Engineer St, B4196 Ste 7; JBSA Sam Houston, TX 782341555 Gott St, B5595; JBSA Lackland, TX 782362020 5th St W, H62; JBSA Randolph, TX 78150

d. County: [Bexar][Comal]Guadalupe

Profile sheets for waste material, both hazardous and non-hazardous, shall be entered electronically into the applicable landfill's system. Corrections required based on the Government's review of the draft profile sheet shall be represented in the electronic system. Once fully entered, Contractor shall utilize the elctronic system's notification tool to alert the JBSA Environmental Office that a profile is ready for digital signature. Contractor shall not sign any profile as the Generator. Signature shall only be made by an authorized JBSA Environmental Office

representative.

Profile sheets for recyclable material do not require signature by a Generator. Submission shall be in accordance with the requirements of Section 01 33 00 SUBMITTAL PROCEDURES.

With each profile generated, inlcude the following additional information:

a. Container size to be used

b. Number of manifests requested

c. Estimated total quantity (a x b)

3.2.3 Manifesting

All soil ,reusable, recyclable, and waste material shall be manifested directly to the landill or recycling location. Transportation to transfer stations is not allowed.

Manifests shall not be signed by the Prime Contractor or its subcontractors as the Generator, even for manifests dealing with hazardous wastes. Only an authorized representative of the JBSA Environmental Office shall sign as the Generator. The applicable landfill will generate manifests for the corresponding profile sheet and send to the JBSA Environmental Office to be signed. Manifests for recyclable material will be generated by the JBSA Environmental Office. Once the manifests have been signed by the JBSA Environmental Office as the Generator, the Contracting Officer's Technical Representative will deliver them to the Contractor's designated representative at the project site.

General instruction for use a manifest are as follows:

a. Only one (1) manifest may be used per transport. Do not overfill the transport container.

b. Manifest shall state the quantity and unit measure of material being transported.

c. Contractor must ensure that the licensed transporter legibly prints all required information and signs in the appropriate section.

d. Contractor shall retain the "Generator's Copy" sheet from the manifest before the transporter leaves the project site.

e. Contractor shall retreive the associated weight ticket from the transporter after the load has been delivered to and accepted by the approved destination.

f. Contractor shall submit the "Generator's Copy" sheet and associated weight ticket to the Contracting Officer's Technical Representative.

g. In the event that the destination facility returns the completed manifest to anyone but the Generator, Contractor shall retrieve that manifest and submit it to the Contracting Officer's Technical Representative.

3.2.3.1 Profile Revisions

When additional manifests are required for an existing profile, a request shall be submitted to the Contracting Officer at least [30][14] calendar days in advance of the needed date. The request shall detail the number of additional manifests needed, container size to be used, and if there is an increase in material. An incomplete request will not meet the advance notice requirement.

Profiles for active manifests are only valid for one year. Contractor shall provide notice to the Contracting Officer's Technical Representative at least 30 calendar days before expiration, to extend the time the profile is valid.

3.2.4 Transporting

All material shall be transported directly to its approved destination, with no intermidiate stops at transfer stations, by a licensed transporter.[Refer to Section 02 81 00 TRANSPORTATION AND DISPOSAL OF HAZARDOUS MATERIALS for additional requirements for transportation of hazardous waste.]

3.3 SPECIFIC MATERIALS

a. Universal wastes (lamps, ballasts, mercury-containing equipment, batteries, paint and paint-related waste, aerosol cans) will be properly manifested and managed[in accordance with the JBSA Hazardous Waste Management Plan. Refer to paragraph HAZARDOUS WASTE of Section 01 57 20 ENVIRONMENTAL PROTECTION].

   (1) Lamps shall not be disposed of in municipal dumpsters or managed as municipal solid waste. All lights shall be checked for mercury containing lamps. If the lamp is a sodium vapor, fluorescent, or metal halide bulb the bulbs shall be shipped as Universal Waste or recycled at an approved EPA recycling center.

   (2) When fluorescent and mercury vapor fixtures are removed, the ballast must be examined for PCB labeling. Ballast is presumed to contain PCBs unless clearly labeled "NO PCBs". Suspected ballast must be removed and recycled through a licensed recycling center for PCBs.

b. Recyclable metal that has tested positive for lead-based or lead-containing paint will require a waste manifest, weight ticket, and certificate of disposal from the selected recycling facility[and managed in accordance with the JBSA Lead-Based Paint Management Plan. Refer to paragraph TOXIC SUBSTANCES of Section 01 57 20 ENVIRONMENTAL PROTECTION].

c. Asbestos containing materials will be properly profiled, manifested, and managed[in accordance with the JBSA Asbestos Management and Operations Plan. Refer to paragraph TOXIC SUBSTANCES of Section 01 57 20 ENVIRONMENTAL PROTECTION].

d. Compressed gas and liquid fuel cylinders MUST NEVER be placed into any containers, recycling bins in buildings, scrap metal dumpsters, or Installation refuse and trash dumpsters. Contact the JBSA Hazardous Waste Manager at 210-652-6204 or 210-671-4844 for specific guidance on disposal of these items.

e. Scrap metal recycling may be coordinated through the JBSA Qualified Recycling Program. Proceeds from these scrap metal sales will be retained by the QRP. Contact the QRP POC for information and coordination. Trip tickets and weight tickets for all recycled metal shall be submitted to the Contracting Officer.

f. Other recyclable items accepted by the JBSA QRP may be given to the QRP for recycling; including paper, cardboard, certain plastics, aluminum cans, ink & toner cartridges, and wood pallets. Contact the QRP or P2 POC for a current list of accepted items. Items must be separated by type before transport to a JBSA Recycle Center. Proceeds from sales of these items will be retained by the QRP.

g. Used oil must be managed in accordance with 40 CFR 260 and 40 CFR 279.

3.4 DOCUMENTATION

All original sheets titled "Generator Copies", or similar, from used manifests shall be returned to the Contracting Officer's Technical Representative as they are generated. Each sheet shall also include the associated weight ticket.

If the original sheet titled "Generator", or similar, from used manifests is returned to the Contractor or any of its subcontractors, it shall be delivered to the Contracting Officer's Technical Representative. Otherwise, this sheet will typically be sent directly to the Generator's address by the landfill or recycler.

All unused manifests shall be turned over to the Contracting Officer's Technical Representative.

ATT-1 - Profile Sheet for Non-Haz Asphalt/Concrete

ATTACHED IN APPENDIX A

ATT-2 - Profile Sheet for Non-Haz Misc Recyclable

ATTACHED IN APPENDIX A

-- End of Section --

SECTION 01 78 00

CLOSEOUT SUBMITTALS
11/25

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. For references without a year, use the current published version.

U.S. ARMY CORPS OF ENGINEERS (USACE)

EM 1110-1-2909	(2012) Engineering and Design -- Geospatial Data and Systems
ERDC/ITL SR-23-1	(2023) A/E/C Graphics Standard, Release 2.2
ERDC/ITL SR-24-3	(2024) A/E/C CAD Standard - Release 6.2

U.S. DEPARTMENT OF DEFENSE (DOD)

UFC 1-300-08	(2026) Criteria for Transfer and Acceptance of DoD Real Property

1.2 DEFINITIONS

1.2.1 As-Built Drawings

As-built drawings are the marked-up drawings, maintained by the Contractor on-site, that depict actual conditions and deviations from the Contract Documents. These deviations and additions may result from coordination required by, but not limited to: contract modifications; official responses to submitted Requests for Information (RFI's); direction from the Contracting Officer; design that is the responsibility of the Contractor, and differing site conditions. Maintain the as-builts throughout construction as red-lined hard copies on site. Maintain an electronic version as well. These files serve as the basis for the creation of the record drawings.

1.2.2 Record Drawings

The record drawings are the final compilation of actual conditions reflected in the as-built drawings.

Produce the record drawings from the Record Model(s) and do not include annotations indicating revisions.

1.2.3 Record Model

A model reflecting approved changes during construction including red-lines, requests for information (RFI's), and contract modifications. Include updated construction phase facility/site data for components.

1.2.4 Advanced Modeling

A subset of geospatial technologies as defined in EM 1110-1-2909 to include Building Information Modeling (BIM), Civil Information Modeling (CIM), Geographic Information Systems (GIS), and Computer-Aided Design (CAD). Advanced modeling is comprised of models and drawings that form a digital representation of the project, or part thereof, that are comprised of model elements with facility data.

1.2.5 USACE CAD/BIM Technology Center

The USACE CAD/BIM Technology Center hosts all standard content for USACE. This content can be accessed through the CAD/BIM Technology Center website, https://cadbimcenter.erdc.dren.mil/.

1.3 SOURCE DRAWING FILES

Request the full set of electronic drawings, in the source format, for Record Drawing preparation, after award and at least 30 days prior to required use.

1.3.1 Terms and Conditions

Data contained on these electronic files must not be used for any purpose other than as a convenience in the preparation of construction drawings and data for the referenced project. Any other use or reuse is at the sole risk of the Contractor and without liability or legal exposure to the Government. The Contractor must make no claim and waives to the fullest extent permitted by law, any claim or cause of action of any nature against the Government, its agents or sub consultants that may arise out of or in connection with the use of these electronic files. The Contractor must, to the fullest extent permitted by law, indemnify and hold the Government harmless against all damages, liabilities or costs, including reasonable attorney's fees and defense costs, arising out of or resulting from the use of these electronic files.

These electronic CAD drawing files are not construction documents. Differences may exist between the CAD files and the corresponding construction documents. The Government makes no representation regarding the accuracy or completeness of the electronic CAD files, nor does it make representation to the compatibility of these files with the Contractor hardware or software. In the event that a conflict arises between the signed and sealed construction documents prepared by the Government and the furnished Source drawing files, the signed and sealed construction documents govern. The Contractor is responsible for determining if any conflict exists. Use of these Source Drawing files does not relieve the Contractor of duty to fully comply with the contract documents, including and without limitation, the need to check, confirm and coordinate the work of all contractors for the project. If the Contractor uses, duplicates or modifies these electronic source drawing files for use in producing construction drawings and data related to this contract, remove all previous indicia of ownership (seals, logos, signatures, initials and dates).

1.4 RECORD DRAWINGS

The Government will provide pdf and or program files at the preconstruction conference that contains one set of "as-designed""as-built" electronic CAD files in the specified software and format revised to

reflect all amendments and the final contract PDF drawings. The CAD files are provided to enable preparation of as-built or as-constructed drawings. If discrepancies exist between the CAD files and the contract PDF drawings, correct the CAD files to show the contract PDF drawings.

1.4.1 Variation with Contract Drawings

The electronic files provided are not part of the contract documents. If there is any discrepancy between the electronic files and the contract drawings, the contract drawings govern. The Government has no responsibility to modify any GFM due to changes in the design that occur after award.

Evaluate the content and quality of the GFM upon receipt. If major discrepancies or omissions occur in the GFM, notify the Contracting Officer and indicate the nature of such variations.

1.4.2 Data Loss, Corruption, and Error

Transfer of GFM files may result in corrupted files resulting in data loss and errors. Use of GFM files at own risk. Verify data integrity upon receipt and request a replacement if necessary. Make any adjustment in file structure, format, or software version as needed to make GFM compatible with computer systems and/or software to meet the requirements of the contract.

1.4.3 Modeling Completeness and Quality

The Government makes no guarantee that the GFM provide the level of completeness or quality as required by the contract. Further, the Government makes no guarantee that identified variations will be corrected upon notification.

1.5 SUBMITTALS

Government approval is required for submittals with a "G" or "S" classification. Refer to Section 01 33 00 SUBMITTAL PROCEDURES for requirements when a classification other than "G" or "S" are used. Submittals not having a classification are for information only. Submit the following in accordance with Section 01 33 00 SUBMITTAL PROCEDURES:

SD-03 Product Data

Warranty Management Plan; G

Warranty Tags

Spare Parts Data

SD-08 Manufacturer's Instructions

Posted Instructions

SD-10 Operation and Maintenance Data

Operation and Maintenance Manuals; G

SD-11 Closeout Submittals

As-Built Drawings; G

Record Drawings; G

Record Model; G

As-Built Record of Equipment and Materials

Warranted Equipment and Materials

Final Approved Shop Drawings; G

Construction Contract Specifications; G

Certification of EPA Designated Items; G

Certification Of USDA Designated Items; G

Interim DD FORM 1354; G

High Performance and Sustainable Building (HPSB) Checklist; G

List Of Installed Building Equipment Items For DD Form 1354

Final DD FORM 1354; G

1.6 SPARE PARTS DATA

Submit [two][_____] copies of the Spare Parts Data list.

a. Indicate manufacturer's name, part number, and stock level required for test and balance, pre-commissioning, maintenance and repair activities. List those items that may be standard to the normal maintenance of the system.

b. At acceptance of commissioning, ensure the required stock level is supplied as indicated in subparagraph a for maintenance and repair activities through the facilities warranty period. Provision of spare parts does not relieve the Contractor of responsibilities listed under the contract guarantee provisions.

1.7 QUALITY CONTROL

Additions and corrections to the contract drawings must be equal in quality and detail to that of the originals. Line colors, line weights, lettering, layering conventions, and symbols must conform to ERDC/ITL SR-24-3.

1.8 WARRANTY MANAGEMENT

1.8.1 Warranty Management Plan

Develop a warranty management plan which contains information relevant to FAR 52.246-21 Warranty of Construction. At least 30 days before the planned pre-warranty conference, submit [one set] [[_____]] of the warranty management plan. Include within the warranty management plan all required actions and documents to assure that the Government receives all warranties to which it is entitled. The plan narrative must contain sufficient detail to render it suitable for use by future maintenance and

repair personnel, whether tradesmen, or of engineering background, not necessarily familiar with this contract. The term "status" as indicated below must include due date and whether item has been submitted or was accomplished. Submit warranty information, made available during the construction phase, to the Contracting Officer for approval prior to each monthly pay estimate. Assemble approved information in a binder and turn over to the Government upon acceptance of the work. The construction warranty period must begin on the date of project acceptance and continue for the full product warranty period. Conduct a joint 4 month and 9 month warranty inspection, measured from time of acceptance; with the Contractor, Contracting Officer and the Customer Representative. The warranty management plan must include, but is not limited to, the following:

a. Roles and responsibilities of personnel associated with the warranty process, including points of contact and telephone numbers within the organizations of the Contractors, subcontractors, manufacturers or suppliers involved.

b. For each warranty, the name, address, telephone number, and e-mail of each of the guarantor's representatives nearest to the project location.

c. A list and status of delivery of Certificates of Warranty for extended warranty items, including roofs, HVAC balancing, pumps, motors, transformers, and for commissioned systems, such as fire protection and alarm systems, sprinkler systems, and lightning protection systems.

d. Warranted Equipment and Materials list for each warranted equipment, item, feature of construction or system indicating:

(1) Name of item.
(2) Model and serial numbers.
(3) Location where installed.
(4) Name and phone numbers of manufacturers or suppliers.
(5) Names, addresses and telephone numbers of sources of spare parts.
(6) Warranties and terms of warranty. Include one-year overall warranty of construction, including the starting date of warranty of construction. Items which have warranties longer than one year must be indicated with separate warranty expiration dates.
(7) Cross-reference to warranty certificates as applicable.
(8) Starting point and duration of warranty period.
(9) Summary of maintenance procedures required to continue the warranty in force.
(10) Cross-reference to specific pertinent Operation and Maintenance manuals.
(11) Organization, names and phone numbers of persons to call for warranty service.
(12) Typical response time and repair time expected for various warranted equipment.

e. The plans for attendance at the 4 and 9 month post-construction warranty inspections conducted by the Government.

f. Procedure and status of tagging of equipment covered by warranties longer than one year.

g. Copies of instructions to be posted near selected pieces of equipment where operation is critical for warranty or safety reasons.

1.8.2 Performance Bond

The Performance Bond must remain effective throughout the construction[and warranty] period.

a. In the event the Contractor fails to commence and diligently pursue any construction warranty work required, the Contracting Officer will have the work performed by others, and after completion of the work, will charge the remaining construction warranty funds of expenses incurred by the Government while performing the work, including, but not limited to administrative expenses.

b. In the event sufficient funds are not available to cover the construction warranty work performed by the Government at the Contractor's expense, the Contracting Officer will have the right to recoup expenses from the bonding company.

c. Following oral or written notification of required construction warranty repair work, respond in a timely manner. Written verification will follow oral instructions. Failure to respond will be cause for the Contracting Officer to proceed against the Contractor.

1.8.3 Pre-Warranty Conference

Prior to contract completion, and at a time designated by the Contracting Officer, meet with the Contracting Officer to develop a mutual understanding with respect to the requirements of this section. At this meeting, establish and review communication procedures for Contractor notification of construction warranty defects, priorities with respect to the type of defect, reasonable time required for Contractor response, and other details deemed necessary by the Contracting Officer for the execution of the construction warranty In connection with these requirements and at the time of the Contractor's quality control completion inspection, furnish the name, telephone number and address of a licensed and bonded company which is authorized to initiate and pursue construction warranty work action on behalf of the Contractor. This point of contact must be located within the local service area of the warranted construction, be continuously available, and be responsive to Government inquiry on warranty work action and status. This requirement does not relieve the Contractor of any of its responsibilities in connection with other portions of this provision.

1.8.4 Contractor's Response to Construction Warranty Service Requirements

Following oral or written notification by the Contracting Officer, respond to construction warranty service requirements in accordance with the "Construction Warranty Service Priority List" and the three categories of priorities listed below. Submit a report on any warranty item that has been repaired during the warranty period. Include within the report the cause of the problem, date reported, corrective action taken, and when the repair was completed. If the Contractor does not perform the construction warranty within the timeframe specified, the Government will perform the work and back charge the construction warranty payment item established.

a. First Priority Code 1. Perform onsite inspection to evaluate situation, and determine course of action within 4 hours, initiate work within 6 hours and work continuously to completion or relief.

b. Second Priority Code 2. Perform onsite inspection to evaluate situation, and determine course of action within 8 hours, initiate work within 24 hours and work continuously to completion or relief.

c. Third Priority Code 3. All other work to be initiated within 3 work days and work continuously to completion or relief.

d. The "Construction Warranty Service Priority List" is as follows:

Code 1-Life Safety Systems
(1) Fire suppression systems.
(2) Fire alarm system(s) in place in the building.

Code 1-Air Conditioning Systems
(1) Recreational support.
(2) Air conditioning leak in part of building, if causing damage.
(3) Air conditioning system not cooling properly.

Code 1-Doors
(1) Overhead doors not operational, causing a security, fire, or safety problem.
(2) Interior, exterior personnel doors or hardware, not functioning properly, causing a security, fire, or safety problem.

Code 3-Doors
(1) Overhead doors not operational.
(2) Interior/exterior personnel doors or hardware not functioning properly.

Code 1-Electrical
(1) Power failure (entire area or any building operational after 1600 hours).
(2) Security lights
(3) Smoke detectors

Code 2-Electrical
(1) Power failure (no power to a room or part of building).
(2) Receptacle and lights (in a room or part of building).

Code 3-Electrical
Street lights.

Code 1-Gas
(1) Leaks and breaks.
(2) No gas to family housing unit or cantonment area.

Code 1-Heat
(1) Area power failure affecting heat.
(2) Heater in unit not working.

Code 2-Kitchen Equipment
(1) Dishwasher not operating properly.
(2) All other equipment hampering preparation of a meal.

Code 1-Plumbing
(1) Hot water heater failure.
(2) Leaking water supply pipes.

Code 2-Plumbing

(1) Flush valves not operating properly.
(2) Fixture drain, supply line to commode, or any water pipe leaking.
(3) Commode leaking at base.

Code 3 -Plumbing
Leaky faucets.

Code 3-Interior
(1) Floors damaged.
(2) Paint chipping or peeling.
(3) Casework.

Code 1-Roof Leaks
Temporary repairs will be made where major damage to property is occurring.

Code 2-Roof Leaks
Where major damage to property is not occurring, check for location of leak during rain and complete repairs on a Code 2 basis.

Code 2-Water (Exterior)
No water to facility.

Code 2-Water (Hot)
No hot water in portion of building listed.

Code 3-All other work not listed above.

1.8.5 Warranty Tags

At the time of installation, tag each warranted item with a durable, oil and water resistant tag approved by the Contracting Officer. Attach each tag with a copper wire and spray with a silicone waterproof coating. Also, submit [two][_____] record copies of the warranty tags showing the layout and design. The date of acceptance and the QC signature must remain blank until the project is accepted for beneficial occupancy. Show the following information on the tag.

Type of product/material	
Model number	
Serial number	
Contract number	
Warranty period from/to	
Inspector's signature	
Construction Contractor	
Address	

Telephone number	
Warranty contact	
Address	
Telephone number	
Warranty response time priority code	
WARNING - PROJECT PERSONNEL TO PERFORM ONLY OPERATIONAL MAINTENANCE DURING THE WARRANTY PERIOD.	

PART 2 PRODUCTS

2.1 RECORD DRAWINGS

Prepare the CAD drawing files in AutoCAD Release 2020 format compatible with a Windows 11 operating system.

2.1.1 Additional Drawings

If additional drawings are required, prepare them using the specified electronic file format applying ERDC/ITL SR-24-3 and ERDC/ITL SR-23-1. The title block and drawing border to be used for any new final record drawings must be identical to that used on the contract drawings.

2.1.1.1 Sheet Numbers and File Names

If a sheet needs to be added between two sequential sheets, append a Supplemental Drawing Designator in accordance with ERDC/ITL SR-24-3 Adding a drawing sheet, and ERDC/ITL SR-23-1 Adding or deleting drawing sheets and index sheet procedures.

[2.2 ADVANCED MODELING PACKAGE

For each Advanced Modeling Package submittal for both the Interim Record Model Package and the Final Record Model Package, submit in accordance with ERDC/ITL SR-24-3 [and in accordance with Section 01 33 16.00 30 DESIGN DATA (DESIGN AFTER AWARD)] and also provide the following items:

a. Advanced Modeling PxP: Provide an electronic copy of the most current approved version of the project Advanced Modeling PxP.

b. Electronic Files: Provide an electronic list (.txt file or similar), of all submitted electronic files including a description, directory, and file name for each file submitted. Identify which files have been produced from the Model and Facility Data. For all sheet files, include a list of the sheet titles and sheet numbers.

c. Advanced Modeling Submittal Checklist: Complete the USACE BIM/CIM Advanced Modeling Submittal Checklist and include with each submittal. Download the Checklist from the USACE CAD/BIM Technology Center website.

d. Advanced Modeling Files: Provide all native Advanced Modeling files associated with the production of the contract drawings and associated as-modeled drawings. Update and maintain in compliance with the Advanced Modeling formatting, content requirement, and standards in Section 01 33 16.00 30 DESIGN DATA (DESIGN AFTER AWARD), in order to yield a complete and coordinated document package.

e. Quality Control (QC) Reports: Provide electronic PDFs of all QC reports and checklist utilized to ensure full compliance with the contract requirements and standards.

[f. CAD Exports of BIM-Generated Sheets and Drawings: Provide supplemental 2D CAD exports from the project BIM model as needed to demonstrate compliance with contract requirements. Export all contract drawings sheets to the CAD format(s) defined in Section 01 33 16.00 30 DESIGN DATA(DESIGN AFTER AWARD).]

][2.3 CERTIFICATION OF EPA DESIGNATED ITEMS

Submit the Certification of EPA Designated Items as required by FAR 52.223-9 Estimate of Percentage of Recovered Material Content for EPA Designated Items and FAR 52-223-17 Affirmative Procurement of EPA designated items in Service and Construction Contracts. Include on the certification form the following information: project name, project number, Contractor name, license number, Contractor address, and certification. The certification will read as follows and be signed and dated by the Contractor. ["I hereby certify the information provided herein is accurate and that the requisition/procurement of all materials listed on this form comply with current EPA standards for recycled/recovered materials content. The following exemptions may apply to the non-procurement of recycled/recovered content materials:

a. The product does not meet appropriate performance standards;

b. The product is not available within a reasonable time frame;

c. The product is not available competitively (from two or more sources);

d. The product is only available at an unreasonable price (compared with a comparable non-recycled content product)."][_____]

Record each product used in the project that has a requirement or option of containing recycled content in accordance with SECTION 01 33 29 SUSTAINABILITY REQUIREMENTS AND REPORTING, noting total price, total value of post-industrial recycled content, total value of post-consumer recycled content, exemptions (a, b, c, or d, as indicated), and comments. Recycled content values may be determined by weight or volume percent, but must be consistent throughout.

]2.4 CERTIFICATION OF USDA DESIGNATED ITEMS

Submit the Certification of USDA Designated Items as required by FAR 52-223-1 Bio-based Product Certifications and FAR 52.223-2 Affirmative Procurement of Biobased Products Under Service and Construction Contracts. Include on the certification form the following information: project name, project number, Contractor name, license number, Contractor address, and certification. The certification will read as follows and be signed and dated by the Contractor. ["I hereby certify the information

provided herein is accurate and that the requisition/procurement of all materials listed on this form comply with current USDA standards for biobased materials content. The following exemptions may apply to the non-procurement of biobased content materials:

a. The product does not meet appropriate performance standards;

b. The product is not available within a reasonable time frame;

c. The product is not available competitively (from two or more sources);

d. The product is only available at an unreasonable price (compared with a comparable bio-based content product)."][_____]

Record each product used in the project that has a requirement or option of containing biobased content in accordance with SECTION 01 33 29 SUSTAINABILITY REQUIREMENTS AND REPORTING, noting total price, total value of post-industrial recycled content, total value of post-consumer recycled content,[total value of biobased content,] exemptions (a, b, c, or d, as indicated), and comments. Biobased content values may be determined by weight or volume percent, but must be consistent throughout.

2.5 PDF AS-BUILT FILES

Provide electronic PDF "plots" of all contract drawings sheets associated with the as-built drawing submittal. Compile and organize the PDF set to match the contract drawings. Bookmark and label the pages of the PDF file in accordance with Section [01 33 16.00 30 DESIGN DATA (DESIGN AFTER AWARD)][01 33 00 SUBMITTAL PROCEDURES].

2.6 REDLINES AND MARKUPS

Provide PDFs of the current working redlines and/or markups complying with the as-builts drawing and markup requirements contained in this specification.

[2.7 GEO-DATA-BASE FILES

Provide a SDSFIE/FGDC GeoReferenced personal GeoDataBase. For all information outside of the building walls, provide a personal GeoDataBase in .mdb format using the latest version of Spatial Data Standard for Facilities, Infrastructure, and Environment (SDSFIE) as the database structure. Provide a shell database to define the projection and database structure.

For all drawings within and including the exterior walls, utilize the advanced modeling formats described and referenced herein. Provide a short GeoDataBase read-me file explaining the deliverable. The read-me file will include a description of the software used to create the data, projection, and include the attribute tables used.

]2.8 AS-BUILT OR ADVANCED MODELING RE-SUBMISSION REQUIREMENTS

If elements of an as-built submittal or advanced modeling package are rejected, provide the following for each re-submission, in addition to any information required in Section 01 33 00 SUBMITTAL PROCEDURES:

a. Re-submit all components required under paragraph As-Builts or Advanced Modeling Package, including a new Advanced Modeling Submittal

Checklist and updated content in response to Government comments.

b. Provide a copy of all Government review comments.

c. Provide a disposition/response to each Government review comment for a back-check of the re-submission deliverable.

PART 3 EXECUTION

3.1 AS-BUILT DRAWINGS

Provide and maintain two black line print copies of the PDF contract drawings for As-Built Drawings. Maintain the as-builts throughout construction as red-lined hard copies on site and red-lined PDF files. Submit As-Built Drawings 30 days prior to Beneficial Occupancy Date (BOD).

3.1.1 Markup Guidelines

Make comments and markup the drawings complete without reference to letters, memos, or materials that are not part of the As-Built drawing. Show what was changed, how it was changed, where item(s) were relocated and change related details. These working as-built markup prints must be neat, legible and accurate as follows:

a. Use base colors of red, green, and blue. Color code for changes as follows:

(1) Special (Blue) - Items requiring special information, coordination, or special detailing or detailing notes.

(2) Deletions (Red) - Over-strike deleted graphic items (lines), lettering in notes and leaders.

(3) Additions (Green) - Added items, lettering in notes and leaders.

b. Provide a legend if colors other than the "base" colors of red, green, and blue are used.

c. Add and denote any additional equipment or material facilities, service lines, incorporated under As-Built Revisions if not already shown in legend.

d. Use frequent written explanations on markup drawings to describe changes. Do not totally rely on graphic means to convey the revision.

e. Use legible lettering and precise and clear digital values when marking prints. Clarify ambiguities concerning the nature and application of change involved.

f. Wherever a revision is made, also make changes to related section views, details, legend, profiles, plans and elevation views, schedules, notes and call out designations, and mark accordingly to avoid conflicting data on all other sheets.

g. For deletions, cross out all features, data and captions that relate to that revision.

h. For changes on small-scale drawings and in restricted areas, provide large-scale inserts, with leaders to the applicable location.

i. Indicate one of the following when attaching a print or sketch to a markup print:

   1) Add an entire drawing to contract drawings

   2) Change the contract drawing to show changes on the drawing.

   3) Provided for reference only to further detail the initial design.

j. Incorporate all shop and fabrication drawings into the markup drawings.

3.1.2 As-Built Drawings Content

Revise As-Built Drawings in accordance with ERDC/ITL SR-23-1 and ERDC/ITL SR-24-3. Keep these working as-built markup drawings current on a weekly basis and at least one set available on the jobsite at all times. Changes from the contract drawings which are made during construction or additional information which might be uncovered in the course of construction must be accurately and neatly recorded as they occur by means of details and notes. Submit the working as-built markup drawings for approval prior to submission of each monthly pay estimate. For failure to maintain the working and final record drawings as specified herein, the Contracting Officer will withhold 10 percent of the monthly progress payment until approval of updated drawings. Show on the as-built drawings, but not limited to, the following information:

a. The actual location, kinds and sizes of all sub-surface utility lines. In order that the location of these lines and appurtenances may be determined in the event the surface openings or indicators become covered over or obscured, show by offset dimensions to two permanently fixed surface features the end of each run including each change in direction on the record drawings. Locate valves, splice boxes and similar appurtenances by dimensioning along the utility run from a reference point. Also record the average depth below the surface of each run.

b. The location and dimensions of any changes within the building structure.

c. Layout and schematic drawings of electrical circuits and piping.

d. Correct grade, elevations, cross section, or alignment of roads, earthwork, structures or utilities if any changes were made from contract plans.

e. Changes in details of design or additional information obtained from working drawings specified to be prepared or furnished by the Contractor; including but not limited to shop drawings, fabrication, erection, installation plans and placing details, pipe sizes, insulation material, dimensions of equipment, and foundations.

f. The topography, invert elevations and grades of drainage installed or affected as part of the project construction.

g. Changes or Revisions which result from the final inspection.

h. Where contract drawings or specifications present options, show only the option selected for construction on the working as-built markup

drawings.

i. If borrow material for this project is from sources on Government property, or if Government property is used as a spoil area, furnish a contour map of the final borrow pit/spoil area elevations.

j. Systems designed or enhanced by the Contractor, such as HVAC controls, fire alarm, fire sprinkler, and irrigation systems.

k. Changes in location of equipment and architectural features.

l. Modifications.

m. Actual location of anchors, construction and control joints, etc., in concrete.

n. Unusual or uncharted obstructions that are encountered in the contract work area during construction.

o. Location, extent, thickness, and size of stone protection particularly where it will be normally submerged by water.

3.2 RECORD DRAWING FILES

If additional drawings are required, prepare them using the specified electronic file format applying ERDC/ITL SR-24-3 and ERDC/ITL SR-23-1. The title block and drawing border to be used for any new final record drawings must be identical to that used on the contract drawings. Accomplish additions and corrections to the contract drawings using[BIM, CIM, GIS, and] CAD files. Provide all program files and hardware necessary to prepare final PDF record drawings. The Contracting Officer will review final PDF record drawings for accuracy and return them to the Contractor for required corrections, changes, additions, and deletions.

3.2.1 Rename the CAD Drawing files

Rename the CAD Drawing files using the contract number as the Project Code field,(e.g., FA301624C10A-102.DWG) as instructed in the Pre-Construction conference. Use only those renamed files for the Marked-up changes. Make all changes on the layer/level as the original item.

a. For AutoCAD files (DWG), enter all as-built delta changes and notations on the AS-BUILT layer.

b. When final revisions have been completed, show the wording "RECORD DRAWING AS-BUILTS" followed by the name of the Contractor in letters at least 3/16 inch high on the cover sheet drawing. Date "RECORD DRAWING AS-BUILTS" drawing revisions in the revision block.

c. Within 1020 days after Government approval of all of the working record drawings for a phase of work, prepare the final CAD record drawings for that phase of work and submit PDF drawing files and two sets of prints for review and approval. The Government will promptly return one set of prints annotated with any necessary corrections. Within 710 days revise the CAD files accordingly at no additional cost and submit one set of final prints for the completed phase of work to the Government. Within 1020 days of substantial completion of all phases of work, submit the final record drawing package for the entire project. Submit one set of electronic CAD files, and one set of the

approved working record PDF and or programfiles with two sets of prints. The CAD files must be complete in all details and identical in form and function to the CAD drawing files supplied by the Government. Prepare AutoCAD files for transmittal using e-Transmit. Make any transactions or adjustments necessary to accomplish this. The Government reserves the right to reject any drawing files it deems incompatible with the customer's CAD system. Paper prints, drawing files and storage media submitted will become the property of the Government upon final approval. Failure to submit final record PDF drawing files, CAD files and marked prints as specified will be cause for withholding any payment due under this contract. Approval and acceptance of final record drawings must be accomplished before final payment is made.

3.3 RECORD DRAWINGS

Prepare final record drawings after the completion of each definable feature of work as listed in the Contractor Quality Control Plan (such as Foundations, Utilities, or Structural Steel as appropriate for the project). Transfer the changes from the approved working as-built markup drawings to the original electronic[BIM, CIM, GIS, and] CAD drawing files. Modify the as-built[BIM, CIM, GIS, and] CAD drawing files to correctly show the features of the project as-built by bringing the working CAD drawing set into agreement with approved working as-built markup drawings, and adding such additional drawings as may be necessary. Refer to ERDC/ITL SR-23-1. Jointly review the working as-built markup drawings with printouts from working as-built[BIM, CIM, GIS, and] CAD drawing PDF files for accuracy and completeness. Monthly review of working as-built[BIM, CIM, GIS, and] CAD drawing PDF file printouts must cover all sheets revised since the previous review. These PDF drawing files are part of the permanent records of this project. Any drawings damaged or lost must be satisfactorily replaced at no expense to the Government.

Drawing revisions (include within change order price the cost to change working and final record drawings to reflect revisions) and compliance with the following procedures.

a. Follow directions in the revision for posting descriptive changes.

b. The revision delta size must be 5/16 inch unless the area where the delta is to be placed is crowded. Use a smaller size delta for crowded areas.

c. Place a revision delta at the location of each deletion.

d. For new details or sections which are added to a drawing, place a revision delta by the detail or section title.

e. For minor changes, place a revision delta by the area changed on the drawing (each location).

f. For major changes to a drawing, place a revision delta by the title of the affected plan, section, or detail at each location.

g. For changes to schedules or drawings, place a revision delta either by the schedule heading or by the change in the schedule.

3.3.1 Final Record Drawing Package

Submit the final record PDF[, BIM, CIM, GIS,] and CAD drawings package for the entire project within 20 days of substantial completion of all phases of work, to include all shop drawings. Submit [one] set of ANSI D size PDF [, BIM files, CIM files, GIS files] and CAD files, [two] sets of ANSI D size prints and [one] set of the approved working record drawings. The package must be complete in all details and identical in form and function to the contract drawing files supplied by the Government.

[3.4 FINAL APPROVED SHOP DRAWINGS

Submit final approved project shop drawings [30][_____] days after transfer of the completed facility. Submit [one] set of ANSI D size PDF[, BIM files, CIM files, GIS files] and CAD files.

]3.5 CONSTRUCTION CONTRACT SPECIFICATIONS

Submit final PDF file record construction contract specifications, including revisions thereto, [30][_____] days after transfer of the completed facility. PDF file shall be generated in accordance with the requirements for specifications outlined in Section 01 33 16.00 30 DESIGN DATA (DESIGN AFTER AWARD)ATT-2. Submission shall also include all SpecsIntact (SEC) files.

3.6 AS-BUILT RECORD OF EQUIPMENT AND MATERIALS

Furnish [one copy][[_____]copies] of preliminary record of equipment and materials used on the project [15][_____] days prior to final inspection. This preliminary submittal will be reviewed and returned [2][_____] days after final inspection with Government comments. Submit [Two][_____] sets of final record of equipment and materials [10][_____] days after final inspection. Key the designations to the related area depicted on the contract drawings. List the following data:

RECORD OF DESIGNATED EQUIPMENT AND MATERIALS DATA				
Description	Specification Section	Manufacturer and Catalog, Model, and Serial Number	Composition and Size	Where Used

3.7 OPERATION AND MAINTENANCE MANUALS

Provide project operation and maintenance manuals as specified in Section 01 78 23 OPERATION AND MAINTENANCE DATA. Submit to the Contracting Officer for approval within [30][_____] calendar days of the Beneficial Occupancy Date (BOD). Update and resubmit files for final approval at BOD.

3.8 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. Replace 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..

[3.8.1 Extraordinary Cleanup Requirements

The following cleanup requirements apply: [_____].

]3.9 REAL PROPERTY RECORD

Refer to UFC 1-300-08 for instruction on completing the DD FORM 1354. Contact the Contracting Officer for any project specific information necessary to complete the DD FORM 1354.

3.9.1 Interim DD FORM 1354

At approximately 65% completion of the Project, but a minimum of 60 calendar days prior to final acceptance of the work, complete, update draft DD FORM 1354, and submit an accounting of all installed property with Interim DD FORM 1354. Include any additional assets, improvements, and alterations from the Draft DD FORM 1354.

3.9.2 Final DD FORM 1354

No later than [14] calendar days after final acceptance of all work, update the Interim DD FORM 1354 and submit an accounting of all installed property with Final DD FORM 1354. Include any additional assets, improvements, and alterations from the Interim DD FORM 1354

3.9.3 Completed DD FORM 1354

[Attach the Real Property receiving Component's completed High Performance and Sustainable Building (HPSB) Checklist for each applicable building to the completed DD 1354, in accordance with Section 01 33 29 SUSTAINABILITY REQUIREMENTS AND REPORTING.]For convenience, a blank fillable PDF DD FORM 1354 is attached as ATT-1.

Submit the completed List of Installed Building Equipment items for DD FORM 1354. Attach this list to the updated DD FORM 1354.

ATT-1 - Draft DD Form 1354

ATTACHED IN APPENDIX A

[**ATT-2 - SpecsIntact Guidance for Contractors**

ATTACHED IN APPENDIX A

] -- End of Section --

SECTION 02 41 00

[DEMOLITION][AND][DECONSTRUCTION]
01/26

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. For references without a year, use the current published version.

AIR-CONDITIONING, HEATING AND REFRIGERATION INSTITUTE (AHRI)

AHRI Guideline K	(2009) Guideline for Containers for Recovered Non-Flammable Fluorocarbon Refrigerants

AMERICAN ASSOCIATION OF STATE HIGHWAY AND TRANSPORTATION OFFICIALS (AASHTO)

AASHTO M 145	(1991; R 2025) Standard Specification for Classification of Soils and Soil-Aggregate Mixtures for Highway Construction Purposes
AASHTO T 180	(2025) Standard Method of Test for Moisture-Density Relations of Soils Using a 4.54-kg (10-lb) Rammer and a 457-mm (18-in.) Drop

AMERICAN SOCIETY OF SAFETY PROFESSIONALS (ASSP)

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

ASTM INTERNATIONAL (ASTM)

ASTM D2487	(2017; R 2025) Standard Practice for Classification of Soils for Engineering Purposes (Unified Soil Classification System)

CARPET AND RUG INSTITUTE (CRI)

CRI 104	(2015) Carpet Installation Standard for Commercial Carpet
CRI 105	(2015) Carpet Installation Standard for Residential Carpet

STATE OF TEXAS ADMINISTRATIVE CODE (TAC)

25 TAC 296	Texas Asbestos Health Protection

25 TAC 296.251	Texas Asbestos Health Protection - Notifications

U.S. ENVIRONMENTAL PROTECTION AGENCY (EPA)

EPA SW-846	(Third Edition; Update VII) Test Methods for Evaluating Solid Waste: Physical/Chemical Methods

U.S. ARMY CORPS OF ENGINEERS (USACE)

EM 385-1-1	(2024) Safety -- Safety and Occupational Health (SOH) Requirements

U.S. DEFENSE LOGISTICS AGENCY (DLA)

DLA 4145.25	(Jun 2000; Reaffirmed Oct 2010) Storage and Handling of Liquefied and Gaseous Compressed Gases and Their Full and Empty Cylinders; https://www.dla.mil/Portals/104/Documents/Dispositions/ddsr/docs/cylinderjointpub.pdf

U.S. DEPARTMENT OF DEFENSE (DOD)

DOD 4000.25-1-M	(2006) MILSTRIP - Military Standard Requisitioning and Issue Procedures
MIL-STD-129	(2014; Rev R; Change 1 2018; Change 2 2019; Change 3 2023) Military Marking for Shipment and Storage

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-SUBPART M	National Emission Standard for Asbestos
40 CFR 61.145	Standard for Demolition and Renovation
40 CFR 82	Protection of Stratospheric Ozone
49 CFR 173.301	Shipment of Compressed Gases in Cylinders and Spherical Pressure Vessels

1.2 PROJECT DESCRIPTION

1.2.1 Definitions

1.2.1.1 Demolition

Demolition is the process of tearing apart and removing any feature of a facility together with any related handling and disposal operations.

In the context of regulatory notification requirements, demolition is the wrecking or taking out of any load-supporting structural member of a

facility together with any related handling operations or the intentional burning of any facility.

1.2.1.2 Deconstruction

Deconstruction is the process of taking apart a facility with the primary goal of preserving the value of all useful building materials.

1.2.1.3 Demolition Plan

Demolition Plan is the planned steps and processes for managing demolition activities and identifying the required sequencing activities and disposal mechanisms.

1.2.1.4 Deconstruction Plan

Deconstruction Plan is the planned steps and processes for dismantling all or portions of a structure or assembly, to include managing sequencing activities, storage, re-installation activities, salvage and disposal mechanisms.

1.2.2 Demolition/Deconstruction Plan

Prepare a [Demolition Plan][Deconstruction Plan] and submit proposed [salvage,] [demolition,] [deconstruction,] and removal procedures for approval before work is started. Include in the plan procedures for careful removal and disposition of materials specified to be salvaged, coordination with other work in progress[, a disconnection schedule of [utility services,] [and] [airfield lighting,] a detailed description of methods and equipment to be used for each operation and of the sequence of operations]. Coordinate with Waste Management Plan in accordance with Section 01 74 19 CONSTRUCTION WASTE MANAGEMENT AND DISPOSAL.[Include statements affirming Contractor inspection of the existing roof deck and its suitability to perform as a safe working platform or if inspection reveals a safety hazard to workers, state provisions for securing the safety of the workers throughout the performance of the work.] Provide procedures for safe conduct of the work in accordance with EM 385-1-1. Plan must be approved by [Structural PE][and][Contracting Officer] prior to work beginning.

1.2.3 General Requirements

Do not begin demolition or deconstruction until authorization is received from the Contracting Officer. Remove rubbish and debris from the project site; do not allow accumulations [inside or outside the building[s]][on airfield pavements]. The work includes [demolition,] [deconstruction], 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

Comply with FAR 52.236-9 to protect existing vegetation, structures, equipment, utilities, and improvements. Coordinate the work of this section with all other work indicated. Construct and maintain shoring, bracing, and supports as required. Ensure that structural elements are

not overloaded. Increase structural supports or add new supports as may be required as a result of any cutting, removal, deconstruction, or demolition work performed under this contract. Do not overload [structural elements][or][pavements to remain]. Provide new supports and reinforcement for existing construction weakened by demolition, deconstruction, or removal work. Repairs, reinforcement, or structural replacement require approval by the Contracting Officer prior to performing such work.

1.3.1 Existing Construction Limits and Protection

Do not disturb existing construction beyond the extent indicated or necessary for installation of new construction. Provide temporary shoring and bracing for support of building components to prevent settlement or other movement. Provide protective measures to control accumulation and migration of dust and dirt in all work areas. Remove [snow,]dust, dirt, and debris from work areas daily.

1.3.2 Weather Protection

For portions of the building to remain, protect building interior and materials and equipment from the weather at all times. Where removal of existing roofing is necessary to accomplish work, have materials and workmen ready to provide adequate and temporary covering of exposed areas.

1.3.3 Trees

Protect trees within the project site which might be damaged during demolition or deconstruction, and which are indicated to be left in place, by a 6 foot high fence. Erect and secure fence a minimum of 5 feet from the trunk of individual trees or follow the outer perimeter of branches or clumps of trees. Replace any tree designated to remain that is damaged during the work under this contract with like-kind or as approved by the Contracting Officer.

1.3.4 Utility Service

Maintain existing utilities indicated to stay in service and protect against damage during demolition and deconstruction operations. Prior to start of work, [utilities serving each area of alteration or removal will be shut off by the [Government] [utility provider] and disconnected and sealed by the Contractor] [the [Government] [utility provider] will disconnect and seal utilities serving each area of alteration or removal upon written request from the Contractor].

1.3.5 Facilities

Protect electrical and mechanical services and utilities. Where removal of existing utilities and pavement is specified or indicated, provide approved barricades, temporary covering of exposed areas, and temporary services or connections for electrical and mechanical utilities. Floors, roofs, walls, columns, pilasters, and other structural components that are designed and constructed to stand without lateral support or shoring, and are determined to be in stable condition, must remain standing without additional bracing, shoring, or lateral support until demolished or deconstructed, unless directed otherwise by the Contracting Officer. Ensure that no elements determined to be unstable are left unsupported and place and secure bracing, shoring, or lateral supports as may be required as a result of any cutting, removal, deconstruction, or demolition work

performed under this contract.

1.4 BURNING

The use of burning at the project site for the disposal of refuse and debris will not be permitted.

1.5 AVAILABILITY OF WORK AREAS

Areas in which the work is to be accomplished will be available [at contract award.] [in accordance with the following schedule:

Schedule	
Area	Date
[_____]	[_____]

]

1.6 SUBMITTALS

Government approval is required for submittals with a "G" or "S" classification. Refer to Section 01 33 00 SUBMITTAL PROCEDURES for requirements when a classification other than "G" or "S" are used. Submittals not having a classification are for information only. Submit the following in accordance with Section 01 33 00 SUBMITTAL PROCEDURES:

SD-01 Preconstruction Submittals

Demolition Plan; G

Deconstruction Plan; G

Existing Conditions

[TxDSHS Asbestos/Demolition Notification; G

] SD-07 Certificates

Notification; G

SD-11 Closeout Submittals

Receipts

1.7 QUALITY ASSURANCE

Submit timely notification of [demolition] [deconstruction] [and] [renovation] projects to Federal, State, regional, and local authorities in accordance with 40 CFR 61-SUBPART M, 40 CFR 61.145, and 25 TAC 296. Notify the State's environmental protection agency and the Contracting Officer in writing 10 working days prior to the commencement of work in accordance with 40 CFR 61-SUBPART M and 25 TAC 296.251. Comply with federal, state, and local hauling and disposal regulations. Refer to Section [01 57 19 TEMPORARY ENVIRONMENTAL CONTROLS][01 57 20 ENVIRONMENTAL PROTECTION] and 01 74 19 CONSTRUCTION WASTE MANAGEMENT AND DISPOSAL for additional requirements realted to reuse, recycling, and disposal of material generated from contract activities. 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] [will not] be permitted.

[1.7.1 TxDSHS Asbestos/Demolition Notification

Prior to the start of work, in accordance with 25 TAC 296.251, notification to the Texas Department of State Heath Services is required if one or more of the following criteria are met:

a. Any demolition of a public building whether or not asbestos has been identified.

b. Any demolition of a facility, to include commercial buildings, whether or not asbestos has been identified.

c. Any renovation operation if the combined amount of RACM to be stripped, removed, dislodged, cut, drilled, or similarly disturbed meets or exceeds the NESHAP threshold, in accordance with 40 CFR 61.145, of 160 square feet of surface area, 260 linear feet of pipe length, or 35 cubic feet off facility components where the length or area could not be measured.

In accordance with 25 TAC 296.251, an amendment to the notification is required if one or more of the following criteria are met:

a. The amount of RACM to be stripped, removed, dislodged, cut, drilled, or similarly disturbed changes from the notified amount by 20% or more.

b. A start date, stop date, phased project schedule, scheduled work day, or time changes from the current notified date, schedule, scheduled work day, or time.

The JBSA Environmental Office will submit all notifications and amendments to the Texas Department of State Health Services on behalf of the Contractor. All associated fees are the responsobility of the Contractor. A copy of the notification form is provided as ATT-1.

1.7.1.1 Notification Details

In addition to the information required by ATT-1, the following information shall be supplied:

a. For Emergency Renovation and Demolition notifications:

(1) date and hour that the emergency occurred

(2) description of the sudden unexpected event

(3) explanation of how the event caused an unsafe condition, would cause equipment damage, or an unreasonable financial burden

(a) proof of cost burden shall be included in the request

* Work shall not proceed until an Emergency Notification number issued by the Texas Department of State Health Services. The final determination for granting an Emergency Notification is at the discretion of the JBSA Environmental Office and the Texas Department of State Health Services.

b. Emergency notification procedures for unforeseen site conditions. These procedures are only to be used when a situation arises where asbestos containing materials are disturbed in an inaccessible area that could not be accessed to conduct a thorough assessment.

c. Description of procedures to be followed if unexpected ACM is found or Category II non-friable ACM becomes crumbled, pulverized, or reduced to powder.

d. Phased abatement activities shall include a phased project schedule form. Any phased activity must not have a break in any abatement activity which exceeds 30 calendar days.

]1.7.2 Dust[and Debris] Control

Prevent the spread of dust and debris [to occupied portions of the building] [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. Vacuum and dust the work area [daily][_____]. Sweep pavements as often as necessary to control the spread of debris that may result in foreign object damage potential to aircraft.

1.8 PROTECTION

1.8.1 Traffic Control Signs

a. Where [pedestrian and driver][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. Refer to Section 01 14 00 JBSA WORK RESTRICTIONS for notification requirements.

b. 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. Perform light construction and installation in compliance with FAA AC 70/7460-1. Lights must 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.

1.8.2 Protection of Personnel

Before, during and after the [demolition][and][deconstruction] work continuously evaluate the condition of the [site specific features] [structure] [_____] being [demolished] [and] [deconstructed] 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.

1.9 FOREIGN OBJECT DAMAGE (FOD)

Aircraft and aircraft engines are subject to FOD from debris and waste material lying on airfield pavements. Remove all such materials that may appear on operational aircraft pavements due to the Contractor's operations. If necessary, the Contracting Officer may require the Contractor to install a temporary barricade at the Contractor's expense to control the spread of FOD potential debris. Provide a barricade consisting of a fence covered with a fabric designed to stop the spread of debris. Anchor the fence and fabric to prevent displacement by winds or jet/prop blasts. Remove barricade when no longer required.

1.10 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.

1.11 EXISTING CONDITIONS

Before beginning any demolition or deconstruction work, survey the site and examine the drawings and specifications to determine the extent of the work. Record existing conditions in the presence of the Contracting Officer or the Contracting Officer's Representative showing the condition of structures and other facilities adjacent to areas of alteration or removal. Photographs or electronic images with a minimum resolution of 4032 x 2268 pixels, capable of a print resolution of 300 dpi, 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 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 to the Contracting Officer.

PART 2 PRODUCTS

2.1 FILL MATERIAL

a. Comply with excavating, backfilling, and compacting procedures for soils used as backfill material to fill basements, voids, depressions or excavations resulting from demolition or deconstruction of structures.

b. Provide fill material conforming to the definition of satisfactory soil material as defined in [ASTM D2487] [AASHTO M 145, Soil Classification Groups A-1, A-2-4, A-2-5 and A-3]. In addition, fill material must be free from roots and other organic matter, trash, debris, frozen materials, and stones larger than 2 inches in any dimension.

c. Proposed fill material must be sampled and tested by a TCEQ approved soil testing laboratory, as follows:

Soil classification	AASHTO M 145
Moisture-density relations	AASHTO T 180, Method B or D
RCRA 11 Metals	EPA SW-846, Method 7000 series, TCLP extraction
Organochlorine Pesticides/Polychlorinated Biphenyl (PCBs)	EPA SW-846, Method 8081B/8080, TCLP extraction
Semi-Volatile Organic Compounds (SVOCs)	EPA SW-846, Method 8270E, TCLP extraction
Volatile Organic Compounds (VOCs)	EPA SW-846, Method 8260D, TCLP extraction
Total Petroleum Hydrocarbons (TPH)	TCEQ, Method 1005
Non-halogenated Organics	EPA SW-846, Method 8015C, TCLP extraction
Reactivity, Corrosivity, Ignitibility (RCI)	

PART 3 EXECUTION

3.1 EXISTING FACILITIES TO BE REMOVED

Inspect and evaluate existing structures onsite for reuse. Disassemble existing construction scheduled to be removed for reuse. Dismantled and removed materials are to be separated, set aside, and prepared as specified, and stored or delivered to a collection point for reuse, remanufacture, recycling, or other disposal, as specified. Designate materials for reuse onsite whenever possible.

3.1.1 Structures

a. Remove existing structures indicated to be removed to [grade] [top of foundation walls] [[_____] feet below grade]. Remove interior walls, other than retaining walls and partitions, to [_____] feet below grade or to top of concrete slab on ground. Break up basement slabs to permit drainage. Remove sidewalks, curbs, gutters and street light bases as indicated.

b. [Demolish] [Deconstruct] structures in a systematic manner from the top of the structure to the ground. Complete demolition work above each tier or floor before the supporting members on the lower level are disturbed. [Demolish] [Deconstruct] concrete and masonry walls in small sections. Remove structural framing members and lower to ground by means of derricks, platforms hoists, or other suitable methods as approved by the Contracting Officer.

c. Locate demolition and deconstruction equipment throughout the structure and remove materials so as to not impose excessive loads to supporting walls, floors, or framing.

d. [Building, or the remaining portions thereof, not exceeding 80 feet in height may be demolished by the mechanical method of demolition.]

3.1.2 Utilities and Related Equipment

3.1.2.1 General Requirements

Do not interrupt existing utilities serving occupied or used facilities, except when authorized in writing by the Contracting Officer. Do not interrupt existing utilities serving facilities occupied and used by the Government except when approved in writing and then only after temporary utility services have been approved and provided. Do not begin demolition or deconstruction work until all utility disconnections have been made. Shut off and cap utilities for future use, as indicated.

3.1.2.2 Disconnecting Existing Utilities

Remove existing utilities [, as indicated] [uncovered by work] and terminate in a manner conforming to the nationally recognized code covering the specific utility and approved by the Contracting Officer. When utility lines are encountered but are not indicated on the drawings, notify the Contracting Officer prior to further work in that area. Remove meters and related equipment and deliver to a location in accordance with instructions of the Contracting Officer.

3.1.3 Chain Link Fencing

Remove chain link fencing, gates and other related salvaged items scheduled for removal and transport to designated areas. Remove gates as whole units. Cut chain link fabric to [_____] 25 foot lengths and store in rolls off the ground.

3.1.4 Paving and Slabs

[Remove [ground] [scarified] [sawcut] concrete and asphaltic concrete paving and slabs [including aggregate base] [as indicated] to a depth of [_____] inches below [existing adjacent] [new finish] grade. [Demolition of concrete pavement on airfields and other heavy duty pavements will follow methods in Section 32 13 14.13 CONCRETE PAVING FOR AIRFIELDS AND OTHER HEAVY DUTY PAVEMENTS.][Provide neat sawcuts at limits of pavement removal as indicated.]] Move, grind and store pavement and slabs designated to be recycled and utilized in this project as directed by the Contracting Officer. Remove pavement and slabs not to be used in this project from the [installation] [project site] at Contractor's expense.

3.1.5 Roofing

[Remove existing roof system and associated components in their entirety down to existing roof deck.] [Remove [built-up] [single-ply] roofing to effect the connections with new flashing or roofing.] [Remove gravel surfacing from existing roofing felts for a minimum distance of 18 inches back from the cut. Remove gravel without damaging felts.] [Salvage asphalt roofing materials.] [Cut existing [felts] [membrane] [and insulation] along straight lines.] [Remove roofing system [and insulation] without damaging the roof deck.] Sequence work to minimize building exposure between demolition or deconstruction and new roof materials installation.

3.1.5.1 Temporary Roofing

Install temporary roofing and flashing as necessary to maintain a watertight condition throughout the course of the work. Remove temporary

work prior to installation of permanent roof system materials unless approved otherwise by the Contracting Officer. [The existing [deck] [and support structure] is deteriorated where indicated, such that ability to support foot traffic and construction loads is unknown. Make provisions for worker safety during demolition, deconstruction, and installation of new materials as described in paragraphs entitled "Statements" and "Regulatory and Safety Requirements."]

3.1.5.2 Reroofing

When removing the existing roofing system from the roof deck, remove only as much roofing as can be recovered by the end of the work day, unless approved otherwise by the Contracting Officer. Do not attempt to open the roof covering system in threatening weather. Reseal all openings prior to suspension of work the same day.

3.1.6 Masonry

Sawcut and remove masonry so as to prevent damage to surfaces to remain[, to removed materials being salvaged] [and to facilitate the installation of new work]. Where new masonry adjoins existing, abut or tie the new work into the existing construction as [indicated] [specified for the new work]. Provide square, straight edges and corners where existing masonry adjoins new work and other locations.[Salvage masonry removed in whole blocks and store for reuse.] [Masonry removed in pieces must be crushed[for use as aggregate]].

3.1.7 Concrete

Saw concrete along straight lines to a depth of a minimum 2 inch. Make each cut in walls perpendicular to the face and in alignment with the cut in the opposite face. Break out the remainder of the concrete provided that the broken area is concealed in the finished work, and the remaining concrete is sound. At locations where the broken face cannot be concealed, grind smooth or saw cut entirely through the concrete. [Salvage removed concrete.] [Sawcuts in existing [concrete sidewalk] [roads] [concrete pads] [parking areas] must be at the nearest existing expansion joint or weakened plane joint and at full depth.]

3.1.8 Structural Steel

Dismantle structural steel at field connections and in a manner that will prevent bending or damage. Salvage for [reuse] [recycle] structural steel, steel joists, girders, angles, plates, columns and shapes. [Do not use flame-cutting torches] [Flame-cutting torches are permitted when other methods of dismantling are not practical]. Transport steel joists and girders as whole units and not dismantled. Transport structural steel shapes to a designated [storage area] [recycling facility] [area as directed by the Contracting Officer], stacked according to size, type of member and length, and stored off the ground, protected from the weather.

3.1.9 Miscellaneous Metal

Salvage shop-fabricated items such as access doors and frames, steel gratings, metal ladders, wire mesh partitions, metal railings, metal windows and similar items as whole units. Salvage light-gage and cold-formed metal framing, such as steel studs, steel trusses, metal gutters, roofing and siding, metal toilet partitions, toilet accessories and similar items. [Scrap metal is the Contractor's property.] Recycle

scrap metal as part of demolition and deconstruction operations. Provide separate containers to collect scrap metal and transport to a scrap metal collection or recycling facility, in accordance with the Waste Management Plan.

3.1.10 Carpentry

Salvage for [reuse] [recycle] lumber, millwork items, and finished boards, and sort by type and size. [[Chip or shred and]recycle salvaged wood unfit for reuse, except stained, painted, or treated wood.] [Salvage] [Remove] windows, doors, frames, and cabinets, and similar items as whole units, complete with trim and accessories. [Do not remove hardware attached to units, except for door closers.] [Salvage hardware attached to units for reuse.] Brace the open end of door frames to prevent damage.

3.1.11 Carpet

Remove existing carpet for reclamation in accordance with manufacturer recommendations and as follows. Remove used carpet in large pieces, roll tightly, and pack neatly in a container. Remove adhesive according to recommendations of the Carpet and Rug Institute (CRI). Provide adhesive removal solvents in compliance with CRI 104/CRI 105. Recycle removed carpet cushion.

3.1.12 Acoustic Ceiling Tile

Remove, neatly stack, and recycle acoustic ceiling tiles. Recycling may be available with manufacturer. Otherwise, give priority to a local recycling organization. Recycling is not required if the tiles contain or may have been exposed to asbestos material.

3.1.13 Airfield Lighting

Remove existing airfield lighting as indicated and terminate in a manner satisfactory to the Contracting Officer. Remove [edge lights], [associated transformers] [and] [_____] as indicated and [deliver to a location on the station in accordance with instructions of the Contracting Officer] [dispose of off station] [_____].

3.1.14 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. Make finished surfaces of patched area flush with the adjacent existing surface and match the existing adjacent surface as closely as possible to texture and finish. Provide patching as specified and indicated, and include the following:

a. Concrete and Masonry: Completely fill holes and depressions, [caused by previous physical damage or] left as a result of removals in existing masonry walls to remain, with an approved masonry patching material, applied in accordance with the manufacturer's printed instructions.

b. Where existing partitions have been removed leaving damaged or missing resilient tile flooring, patch to match the existing floor tile.

c. Patch acoustic lay-in ceiling where partitions have been removed. Make the transition between the different ceiling heights by continuing the higher ceiling level over to the first runner on the lower ceiling and closing the vertical opening with a painted sheet metal strip.

3.1.15 Air Conditioning Equipment

Remove air conditioning, refrigeration, and other equipment containing refrigerants without releasing chlorofluorocarbon refrigerants to the atmosphere in accordance with the Clean Air Act Amendment of 1990. Recover all refrigerants prior to removing air conditioning, refrigeration, and other equipment containing refrigerants in accordance with the paragraph entitled "Disposal of Ozone Depleting Substance (ODS)." Turn in salvaged refrigerants as specified in paragraph, "Salvaged Materials and Equipment."

3.1.16 Cylinders and Canisters

Remove all fire suppression system cylinders and canisters and dispose of in accordance with the paragraph entitled "Disposal of Ozone Depleting Substance (ODS)."

3.1.17 Locksets on Swinging Doors

Remove all locksets from all swinging doors indicated to be removed and disposed of. Deliver the locksets and related items to a designated location for receipt by the Contracting Officer after removal.

3.1.18 Mechanical Equipment and Fixtures

Disconnect mechanical hardware at the nearest connection to existing services to remain, unless otherwise noted. Disconnect mechanical equipment and fixtures at fittings. Remove service valves attached to the unit. Salvage each item of equipment and fixtures as a whole unit; listed, indexed, tagged, and stored. Salvage each unit with its normal operating auxiliary equipment. Transport salvaged equipment and fixtures, including motors and machines, to a designated storage area as directed by the Contracting Officer. Do not remove equipment until approved. Do not offer low-efficiency equipment for reuse[; provide to recycling service for disassembly and recycling of parts].

3.1.18.1 Preparation for Storage

Remove water, dirt, dust, and foreign matter from units; drain tanks, piping and fixtures; if previously used to store flammable, explosive, or other dangerous liquids, steam clean interiors. Seal openings with caps, plates, or plugs. Secure motors attached by flexible connections to the unit. Change lubricating systems with the proper oil or grease.

3.1.18.2 Piping

Disconnect piping at unions, flanges and valves, and fittings as required to reduce the pipe into straight lengths for practical storage. Store salvaged piping according to size and type. If the piping that remains can become pressurized due to upstream valve failure, attach end caps, blind flanges, or other types of plugs or fittings with a pressure gage and bleed valve to the open end of the pipe to ensure positive leak control. Carefully dismantle piping that previously contained gas, gasoline, oil, or other dangerous fluids, with precautions taken to

prevent injury to persons and property. Store piping outdoors until all fumes and residues are removed. Box prefabricated supports, hangers, plates, valves, and specialty items according to size and type. Wrap sprinkler heads individually in plastic bags before boxing. Classify piping not designated for salvage, or not reusable, as scrap metal.

3.1.18.3 Ducts

Classify removed duct work as scrap metal.

3.1.18.4 Fixtures, Motors and Machines

Remove and salvage fixtures, motors and machines associated with plumbing, heating, air conditioning, refrigeration, and other mechanical system installations. Salvage, box and store auxiliary units and accessories with the main motor and machines. Tag salvaged items for identification, storage, and protection from damage. Classify [non-porcelain]broken, damaged, or otherwise unserviceable units and not caused to be broken, damaged, or otherwise unserviceable as debris to be disposed of by the Contractor. [Salvage and crush porcelain plumbing fixtures unsuitable for reuse.]

3.1.19 Electrical Equipment and Fixtures

Salvage motors, motor controllers, and operating and control equipment that are attached to the driven equipment. Salvage wiring systems and components. Box loose items and tag for identification. Disconnect primary, secondary, control, communication, and signal circuits at the point of attachment to their distribution system.

3.1.19.1 Fixtures

Remove and salvage electrical fixtures. Salvage unprotected glassware from the fixture and salvage separately. Salvage incandescent, mercury-vapor, and fluorescent lamps and fluorescent ballasts manufactured prior to 1978, boxed and tagged for identification, and protected from breakage.

3.1.19.2 Electrical Devices

Remove and salvage switches, switchgear, transformers, conductors including wire and nonmetallic sheathed and flexible armored cable, regulators, meters, instruments, plates, circuit breakers, panelboards, outlet boxes, and similar items. Box and tag these items for identification according to type and size.

3.1.19.3 Wiring Ducts or Troughs

Remove and salvage wiring ducts or troughs. Dismantle plug-in ducts and wiring troughs into unit lengths. Remove plug-in or disconnecting devices from the busway and store separately.

3.1.19.4 Conduit and Miscellaneous Items

Salvage conduit except where embedded in concrete or masonry. Consider corroded, bent, or damaged conduit as scrap metal. Sort straight and undamaged lengths of conduit according to size and type. Classify supports, knobs, tubes, cleats, and straps as debris to be removed and disposed.

3.1.20 Elevators and Hoists

Remove elevators, hoists, and similar conveying equipment and salvage as whole units, to the most practical extent. Remove and prepare items for salvage without damage to any of the various parts. Salvage and store rails for structural steel with the equipment as an integral part of the unit.

3.2 CONCURRENT EARTH-MOVING OPERATIONS

Do not begin excavation, filling, and other earth-moving operations that are sequential to demolition or deconstruction work in areas occupied by structures to be demolished or deconstructed until all demolition and deconstruction in the area has been completed and debris removed. Fill holes, open basements and other hazardous openings.

3.3 DISPOSITION OF MATERIAL

3.3.1 Title to Materials

Except for salvaged items specified in related Sections, and for materials or equipment scheduled for salvage, all materials and equipment removed and not reused or salvaged, become the property of the Contractor and must be removed from Government property. Materials approved for storage by the Contracting Officer must be removed before completion of the contract. 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. 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 JBSA is prohibited.

3.3.2 Reuse of Materials and Equipment

Remove and store materials and equipment listed in the [Demolition] [Deconstruction] Plan and as specified by other contract requirements to be reused or relocated to prevent damage, and reinstall as the work progresses. Coordinate the re-use of materials and equipment with the re-use requirements in accordance with Section 01 74 19 CONSTRUCTION WASTE MANAGEMENT AND DISPOSAL. Capture re-use of materials in the diversion calculations for the project.

3.3.3 Salvaged Materials and Equipment

Remove materials and equipment that are listed in the [Demolition] [Deconstruction] Plan and specified by other contract requirements to be removed by the Contractor and that are to remain the property of the Government, and deliver to a storage site [, as directed within [_____] miles of the work site].

a. Salvage items and material to the maximum extent possible.

b. Store all materials salvaged for the Contractor as approved by the Contracting Officer and remove from Government property before completion of the contract. Coordinate the salvaged materials with tracking requirements in accordance with Section 01 74 19 CONSTRUCTION WASTE MANAGEMENT AND DISPOSAL. Capture salvaged materials in the diversion calculations for the project.

c. Remove salvaged items to remain the property of the Government in a manner to prevent damage, and packed or crated to protect the items from damage while in storage or during shipment. Items damaged during removal or storage must be repaired or replaced to match existing items. Properly identify the contents of containers. Deliver the following items reserved as property of the Government to the areas designated: [_____].

d. Remove the following items reserved as property of the using service prior to commencement of work under this contract: [_____].

e. Remove historical items in a manner to prevent damage. Deliver the following historical items to the Government for disposition: Corner stones, contents of corner stones, and document boxes wherever located on the site.

f. Remove and capture all refrigerants in accordance with the Clean Air Act Amendment of 1990, and turn in to the Installation's HVAC Shop. Provide cylinders as needed to capture all refrigerants. Cylinders will not be returned to the contractor.

3.3.4 Disposal of Ozone Depleting Substance (ODS)

Class I and Class II ODS are defined in Section, 602(a) and (b), of The Clean Air Act. Prevent discharge of Class I and Class II ODS to the atmosphere. Place recovered ODS in cylinders meeting AHRI Guideline K suitable for the type ODS (filled to no more than 80 percent capacity) and provide appropriate labeling. Recovered ODS must be turned over to the designated location identified by the Contracting Officer. Dispose products, equipment and appliances containing ODS in a sealed, self-contained system (e.g. residential refrigerators and window air conditioners) in accordance with 40 CFR 82. Submit Receipts or bills of lading, as specified.

3.3.4.1 Special Instructions

No more than one type of ODS is permitted in each container. Apply a warning/hazardous label to the containers in accordance with Department of Transportation regulations. Provide a tag with the following information on all cylinders including but not limited to fire extinguishers, spheres, or canisters containing an ODS:

a. Activity name and unit identification code

b. Activity point of contact and phone number

c. Type of ODS and pounds of ODS contained

d. Date of shipment

e. National stock number (for information, call (804) 279-4525).

3.3.4.2 Fire Suppression Containers

Deactivate fire suppression system cylinders and canisters with electrical charges or initiators prior to shipment. Also, safety caps must be used to cover exposed actuation mechanisms and discharge ports on these special cylinders.

3.3.5 Transportation Guidance

Transport all ODS containers to the Government's storage location in accordance with MIL-STD-129, DLA 4145.25 (also referenced one of the following: Army Regulation 700-68, Naval Supply Instruction 4440.128C, Marine Corps Order 10330.2C, and Air Force Regulation 67-12), 49 CFR 173.301, and DOD 4000.25-1-M.

3.3.6 Unsalvageable and Non-Recyclable Material

Dispose of unsalvageable and non-recyclable material in accordqnce with Section 01 74 19 CONSTRUCTION WASTE MANAGEMENT AND DISPOSAL.

3.4 CLEANUP

Remove debris and rubbish from project site 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 as contractually specified in Section 01 74 19 CONSTRUCTION WASTE MANAGEMENT AND DISPOSAL and Section [01 57 19 TEMPORARY ENVIRONMENTAL CONTROLS][01 57 20 ENVIRONMENTAL PROTECTION]. [Storage of removed materials on the project site is prohibited.]

3.5.2 Burning on Government Property

Burning of materials removed from demolished and deconstructed structures will not be permitted on Government property.

3.5.3 Removal to Spoil Areas on Government Property

Transport noncombustible materials removed from demolition and deconstruction structures to designated spoil areas with the project site boundary. Government does not have any spoil areas for use by contractors. All materials shall be temporarily stored in an appropriate container within the project site boundary or approved contractor laydown area until it can be removed from the Installation.

3.5.4 Removal from Government Property

Transport waste materials removed from demolished and deconstructed structures from Government property for legal disposal. Dispose of waste soil per Section [01 57 19 TEMPORARY ENVIRONMENTAL CONTROLS][01 57 20 ENVIRONMENTAL PROTECTION] and Section 01 74 19 CONSTRUCTION WASTE MANAGEMENT AND DISPOSAL.

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.

[

ATT-1 - TxDSHS Asbestos/Demolition Notification

[ATTACHED IN APPENDIX A][REFER TO SECTION 02 82 00 ASBESTOS REMEDIATION]

] -- End of Section --

SECTION 02 82 00

ASBESTOS REMEDIATION
01/26

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. For references without a year, use the current published version.

AMERICAN SOCIETY OF SAFETY PROFESSIONALS (ASSP)

ASSP Z9.2	(2018) Fundamentals Governing the Design and Operation of Local Exhaust Ventilation Systems

ASTM INTERNATIONAL (ASTM)

ASTM D4397	(2016; R 2023) Standard Specification for Polyethylene Sheeting for Construction, Industrial, and Agricultural Applications
ASTM E1368	(2023) Standard Practice for Visual Inspection of Asbestos Abatement Projects

COMPRESSED GAS ASSOCIATION (CGA)

CGA G-7	(2019) Standard for Compressed Air for Human Respiration; 6th Edition

INTERNATIONAL SAFETY EQUIPMENT ASSOCIATION (ISEA)

ANSI/ISEA Z87.1	(2020) Occupational and Educational Personal Eye and Face Protection Devices

NATIONAL FIRE PROTECTION ASSOCIATION (NFPA)

NFPA 701	(2023; ERTA 1 2023) Standard Methods of Fire Tests for Flame Propagation of Textiles and Films

NATIONAL INSTITUTE FOR OCCUPATIONAL SAFETY AND HEALTH (NIOSH)

NIOSH NMAM	(2020; 5th Ed) NIOSH Manual of Analytical Methods

STATE OF TEXAS ADMINISTRATIVE CODE (TAC)

25 TAC 296	Texas Asbestos Health Protection
25 TAC 296.251	Texas Asbestos Health Protection - Notifications

U.S. ARMY CORPS OF ENGINEERS (USACE)

EM 385-1-1	(2024) Safety -- Safety and Occupational Health (SOH) Requirements

U.S. ENVIRONMENTAL PROTECTION AGENCY (EPA)

EPA 340/1-90-018	(1990) Asbestos/NESHAP Regulated Asbestos Containing Materials Guidance
EPA 560/5-85-024	(1985) Guidance for Controlling Asbestos-Containing Materials in Buildings (Purple Book)

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

29 CFR 1910.147	The Control of Hazardous Energy (Lock Out/Tag Out)
29 CFR 1926.51	Sanitation
29 CFR 1926.59	Hazard Communication
29 CFR 1926.103	Respiratory Protection
29 CFR 1926.200	Accident Prevention Signs and Tags
29 CFR 1926.1101	Asbestos
40 CFR 61	National Emission Standards for Hazardous Air Pollutants
40 CFR 61-SUBPART A	General Provisions
40 CFR 61-SUBPART M	National Emission Standard for Asbestos
40 CFR 61.145	Standard for Demolition and Renovation
40 CFR 763	Asbestos
42 CFR 84	Approval of Respiratory Protective Devices
49 CFR 107	Hazardous Materials Program Procedures
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 173	Shippers - General Requirements for Shipments and Packagings
49 CFR 174	Carriage by Rail

UL SOLUTIONS (UL)

UL 586	(2009; Reprint Sep 2022) UL Standard for Safety High-Efficiency Particulate, Air Filter Units

1.2 DEFINITIONS

1.2.1 Amended Water

Water containing a wetting agent or surfactant with a maximum surface tension of 0.00042 psi.

1.2.2 Area Sampling

Sampling of asbestos fiber concentrations which approximates the concentrations of asbestos in the theoretical breathing zone but is not actually collected in the breathing zone of an employee.

1.2.3 Asbestos

The term asbestos includes chrysotile, amosite, crocidolite, tremolite, anthophyllite, and actinolite and any of these minerals that have been chemically treated or altered.

1.2.4 Asbestos Containing Material (ACM)

Any material which contains greater than 1 percent asbestos.

[1.2.5 Asbestos Containing Construction Material (ACCM)

Any manufactured construction material which contains more than 1/10th of 1 percent asbestos by weight.

]1.2.6 Asbestos Control Area

That area where asbestos removal operations are performed which is isolated by physical boundaries which assist in the prevention of the uncontrolled release of asbestos dust, fibers, or debris.

1.2.7 Asbestos Fibers

Those fibers having an aspect ratio of at least 3:1 and longer than 5 micrometers as determined by National Institute for Occupational Safety and Health (NIOSH) Method 7400.

1.2.8 Asbestos Permissible Exposure Limit

0.1 fibers per cubic centimeter of air as an 8-hour time weighted average measured in the breathing zone as defined by 29 CFR 1926.1101 or other Federal legislation having legal jurisdiction for the protection of workers health.

1.2.9 Authorized Person

Any person authorized by the Contractor and required by work duties to be present in the regulated areas.

1.2.10 Background

The ambient airborne asbestos concentration in an uncontaminated area as measured prior to any asbestos hazard abatement efforts. Background concentrations for other (contaminated) areas are measured in similar but asbestos free locations.

1.2.11 Competent Person (CP)

A person meeting the requirements for competent person as specified in 29 CFR 1926.1101 including a person capable of identifying existing asbestos hazards in the workplace and selecting the appropriate control strategy for asbestos exposure, who has the authority to take prompt corrective measures to eliminate them, and is specifically trained in a training course which meet the criteria of EPA's Model Accreditation Plan (40 CFR 763) for project designer or supervisor, or its equivalent. The competent person must have a current State of Texas asbestos contractors or supervisors license.

1.2.12 Contractor

The Contractor is that individual, or entity under contract to perform the herein listed work.

1.2.13 Disposal Bag

A 6 mil thick, leak-tight plastic bag, pre-labeled in accordance with 29 CFR 1926.1101 and applicable state regulations, used for transporting asbestos waste from containment to disposal site.

1.2.14 Disturbance

Activities that disrupt the matrix of ACM or ACCM, crumble or pulverize ACM or ACCM, or generate visible debris from ACM or ACCM. Disturbance includes cutting away small amounts of ACM or ACCM, no greater than the amount which can be contained in one standard sized glovebag or waste bag, not larger than 60 inches in length and width or as required by state or local regulations in order to access a building component.

1.2.15 Encapsulation

The abatement of an asbestos hazard through the appropriate use of a physical barrier or chemical encapsulants.

1.2.16 Encapsulants

Specific materials in various forms used to chemically or physically entrap asbestos fibers in various configurations to prevent these fibers from becoming airborne. There are four types of encapsulants as follows which must comply with performance requirements as specified herein.

a. Removal Encapsulant (can be used as a wetting agent)

b. Bridging Encapsulant (used to provide a tough, durable surface coating to asbestos containing material)

c. Penetrating Encapsulant (used to penetrate the asbestos containing material encapsulating all asbestos fibers and preventing fiber release due to routine mechanical damage)

d. Lock-Down Encapsulant (used to seal off or "lock-down" minute asbestos fibers left on surfaces from which asbestos containing material has been removed).

1.2.17 Friable Asbestos Material

A term defined in 40 CFR 61-SUBPART M and EPA 340/1-90-018 meaning any material which contains more than 1 percent asbestos, as determined using the method specified in 40 CFR 763, Polarized Light Microscopy (PLM), that when dry, can be crumbled, pulverized, or reduced to powder by hand pressure.

1.2.18 Glovebag Technique

Those asbestos removal and control techniques put forth in 29 CFR 1926.1101.

1.2.19 Government Consultant (GC)

That qualified person employed directly by the Government to monitor, sample, inspect the work or in some other way advise the Contracting Officer. The GC is normally a private consultant, but can be an employee of the Government.

1.2.20 HEPA Filter Equipment

High efficiency particulate air (HEPA) filtered vacuum and exhaust ventilation equipment with a filter system capable of collecting and retaining asbestos fibers. Filters must retain 99.97 percent of particles 0.3 microns or larger as indicated in UL 586.

1.2.21 Model Accreditation Plan (MAP)

USEPA training accreditation requirements for persons who work with asbestos as specified in 40 CFR 763.

1.2.22 Negative Pressure Enclosure (NPE)

That engineering control technique described as a negative pressure enclosure in 29 CFR 1926.1101 or applicable state regulations.

1.2.23 NESHAP

National Emission Standards for Hazardous Air Pollutants. The USEPA NESHAP regulation for asbestos is at 40 CFR 61-SUBPART M. Additional state regulation is at 25 TAC 296. Requirements associated with demolition and renovation activities are found in Section 61.145 of the NESHAP while requirements associated with waste disposal are found in Section 61.150.

1.2.24 Nonfriable Asbestos Material

Material that contains asbestos in which the fibers have been immobilized by a bonding agent, coating, binder, or other material so that the asbestos fibers are not normally released during appropriate use, handling, storage or transportation. It is understood that asbestos fibers may be released under other conditions such as demolition, removal, or mishap.

1.2.25 Permissible Exposure Limits (PELs)

1.2.25.1 PEL-Time Weighted Average(TWA)

Concentration of asbestos not in excess of 0.1 fibers per cubic centimeter of air (f/cc) as an 8-hour time weighted average (TWA).

1.2.25.2 PEL-Excursion Limit

An airborne concentration of asbestos not in excess of 1.0 f/cc of air as averaged over a sampling period of 30 minutes.

1.2.26 Personal Sampling

Air sampling which is performed to determine asbestos fiber concentrations within the breathing zone of a specific employee, as performed in accordance with 29 CFR 1926.1101.

1.2.27 Presumed ACM

Any material which cannot be sampled at the time of the initial inspection due to inaccessibility, structural or safety concerns (such as charged electrical components), or could void active warranties (such as roofing materials). Presumed ACM must be managed as ACM unless proven to not be ACM through testing by a qualified and certified asbestos professional.

1.2.28 Private Qualified Person (PQP)

A Registered Architect, Professional Engineer, Certified Industrial Hygienist, consultant or other qualified person who has successfully completed training and is therefore accredited under a legitimate State Model Accreditation Plan as described in 40 CFR 763 as a Building Inspector, Contractor/Supervisor Abatement Worker, and Asbestos Project Designer. The PQP that collects samples and elects to analyze samples on site must successfully complete the National Institute of Occupational Safety and Health (NIOSH) 582 course "Sampling and Evaluating Airborne Asbestos Dust" or equivalent, and must participate in the American Industrial Hygiene Association (AIHA) Asbestos Analysis Registry (AAR). The PQP must be appropriately licensed in the State of Texas.

1.2.29 TEM

Refers to Transmission Electron Microscopy.

1.2.30 Thermal System Insulation

Thermal system insulation (TSIACM applied to pipes, fittings, boilers, breeching, tanks, ducts or other structural components to prevent heat loss or gain.

1.2.31 Time Weighted Average (TWA)

The TWA is an 8-hour time weighted average airborne concentration of asbestos fibers.

1.2.32 Transite

A generic name for asbestos cement wallboard and pipe.

1.2.33 Wetting Agent

A chemical added to water to reduce the water's surface tension thereby increasing the water's ability to soak into the material to which it is applied. An equivalent wetting agent must have a surface tension of at most 0.00042 psi.

1.2.34 Worker

Individual (not designated as the Competent Person or a supervisor) who performs asbestos work and has completed asbestos worker training required by 29 CFR 1926.1101, to include EPA Model Accreditation Plan (MAP) "Worker" training; accreditation, if required by the OSHA Class of work to be performed or by the state where the work is to be performed. The worker must be appropriately licensed in the State of Texas.

1.3 REQUIREMENTS

1.3.1 Description of Work

The work covered by this section includes the handling and control of asbestos containing materials and describes some of the resultant procedures and equipment required to protect workers, the environment and occupants of the building or area, or both, from contact with airborne asbestos fibers. The work also includes the disposal of any asbestos containing materials generated by the work. More specific operational procedures must be outlined in the Asbestos Hazard Abatement Plan called for elsewhere in this specification. The asbestos work includes the demolition and removal of [_____] located [_____] which is governed by 40 CFR 763. Under normal conditions non-friable or chemically bound materials containing asbestos would not be considered hazardous; however, this material may release airborne asbestos fibers during demolition and removal and therefore must be handled in accordance with the removal and disposal procedures as specified herein. Provide negative pressure enclosure and other approved techniques as outlined in this specification. The work area must be evacuated during the asbestos abatement work. A competent person must supervise asbestos removal work as specified herein.

Resilient Floor Covering Institute (RFCI) work procedures are not authorized at any JBSA location.

1.3.1.1 Wallboard/Joint Compound

[Sampling has not been performed of the wallboard, to include discrete sampling of the components (wallboard and joint compound). Contractor is responsible for sampling and testing of these items. The analytical report shall be provided to the Contracting Officer and the JBSA Environmental Office.

][Both composite samples of the wallboard and discrete samples of the components (wallboard and joint compound) have been tested and results are attached.

][Composite samples of the wallboard system were tested and found to contain[less than one percent asbestos] [_____]. Discrete samples of the wallboard were tested and found to contain[less than one percent asbestos] [_____]. Discrete samples of the joint compound were tested and found to contain[greater than one percent asbestos] [_____].

]1.3.2 Unexpected Discovery of Asbestos

Notify the Contracting Officer if any previously untested building components suspected to contain asbestos are impacted by the work.

1.3.3 Medical Requirements

Provide medical requirements including but not limited to medical surveillance and medical record keeping as listed in 29 CFR 1926.1101.

1.3.3.1 Medical Examinations

Contractor must submit documentation of workers who perform activities potentially impacting ACM or ACCM including the name of each employee, type of exam received, and date of the exam. The documentation must also include a signed statement that the medical examination was reviewed by the contractor's Safety Manager and Industrial Hygienist stating that the listed personnel have received the required medical examination in accordance with 29 CFR 1926.1101 and the exam results are saved. This requirement must have been satisfied within the 12 months prior to the start of work on this contract. The same medical examination must be given on an annual basis to employees engaged in an occupation involving asbestos and within 30 calendar days before or after the termination of employment in such occupation. Specifically identify x-ray films of asbestos workers to the consulting radiologist and mark medical record jackets with the word "ASBESTOS."

1.3.3.2 Medical Records

Maintain complete and accurate records of employees' medical examinations, medical records, and exposure data for a period of 30 years after termination of employment and make records of the required medical examinations and exposure data available for inspection and copying to: The Assistant Secretary of Labor for Occupational Safety and Health (OSHA), or authorized representatives of them, and an employee's physician upon the request of the employee or former employee.

1.3.4 Employee Training

Submit certificates, prior to the start of work but after the main abatement submittal, signed by each employee indicating that the employee has received training in the proper handling of materials and wastes that contain asbestos in accordance with 40 CFR 763; understands the health implications and risks involved, including the illnesses possible from exposure to airborne asbestos fibers; understands the use and limits of the respiratory equipment to be used; and understands the results of monitoring of airborne quantities of asbestos as related to health and respiratory equipment as indicated in 29 CFR 1926.1101 on an initial and annual basis. Organize certificates by individual worker, not grouped by type of certification. Make training requirement records readily available in accordance with 40 CFR 763. Train personnel involved in the asbestos control work in accordance with United States Environmental Protection Agency (USEPA) Asbestos Hazard Emergency Response Act (AHERA) training criteria or State training criteria whichever is more stringent. Document the training by providing: dates of training, training entity, course outline, names of instructors, and qualifications of instructors upon request by the Contracting Officer. Furnish each employee with respirator training and fit testing administered by the PQP as required by

29 CFR 1926.1101 and 29 CFR 1926.103. Fully cover engineering and other hazard control techniques and procedures. Asbestos workers must have a current State of Texas asbestos worker's license.

1.3.5 Permits and Notifications

Prior to the start of work, obtain necessary permits in conjunction with asbestos removal, encapsulation, hauling, and disposition, and furnish notification of such actions required by Federal, State, regional, and local authorities. Notify the Texas Department of State Health Services (TxDSHS) and the Contracting Officer in writing a minimum of 15 working days prior to commencement of work in accordance with 40 CFR 61-SUBPART M, 40 CFR 61.145, and 25 TAC 296.251.TxDSHS Asbestos/Demolition Notification and amendments shall be submitted to the Texas Department of State Heath Services through the JBSA Environmental Office. Amendments and Cancellations shall also be submitted through the JBSA Environmental Office. Amendments to notifications must be received by the Texas Department of State Health Services in accordance with the deadlines outlined in 25 TAC 296.251, so at least three working days must be allotted for the JBSA Environmental Office to submit the amendments. All fees shall be paid by the Contractor. A copy of the notification form is provided as ATT-1.[Submit copies of all Notifications to the Contracting Officer.] Notify the local fire department 3 working days prior to removing fire-proofing material from the building including notice that the material contains asbestos.

In accordance with 25 TAC 296.251, any activity that meets one or more of the following criteria requires submission of an Asbestos Demolition/Renovation Notification to the Texas Department of State Health Services:

a. Any demolition of a public building whether or not asbestos has been identified.

b. Any demolition of a facility, to include commercial buildings, whether or not asbestos has been identified.

c. Any renovation operation if the combined amount of RACM to be stripped, removed, dislodged, cut, drilled, or similarly disturbed meets or exceeds the NESHAP threshold, in accordance with 40 CFR 61.145, of 160 square feet of surface area, 260 linear feet of pipe length, or 35 cubic feet off facility components where the length or area could not be measured.

In accordance with 25 TAC 296.251, an amendment to the notification is required if one or more of the following criteria are met:

a. The amount of RACM to be stripped, removed, dislodged, cut, drilled, or similarly disturbed changes from the notified amount by 20% or more.

b. A start date, stop date, phased project schedule, scheduled work day, or time changes from the current notified date, schedule, scheduled work day, or time.

1.3.5.1 Notification Details

In addition to the information required by ATT-1, the following information shall be supplied:

a. For Emergency Renovation and Demolition notifications:

(1) date and hour that the emergency occurred

(2) description of the sudden unexpected event

(3) explanation of how the event caused an unsafe condition, would cause equipment damage, or an unreasonable financial burden

(a) proof of cost burden shall be included in the request

* Work shall not proceed until an Emergency Notification number issued by the Texas Department of State Health Services. The final determination for granting an Emergency Notification is at the discretion of the JBSA Environmental Office and the Texas Department of State Health Services.

b. Emergency notification procedures for unforeseen site conditions. These procedures are only to be used when a situation arises where asbestos containing materials are disturbed in an inaccessible area that could not be accessed to conduct a thorough assessment.

c. Description of procedures to be followed if unexpected ACM is found or Category II non-friable ACM becomes crumbled, pulverized, or reduced to powder.

d. Phased abatement activities shall include a phased project schedule form (ATT-3). Any phased activity must not have a break in any abatement activity which exceeds 30 calendar days.

1.3.6 Environment, Safety and Health Compliance

In addition to detailed requirements of this specification, comply with those applicable laws, ordinances, criteria, rules, and regulations of Federal, State, regional, and local authorities regarding handling, storing, transporting, and disposing of asbestos waste materials. Comply with the applicable requirements of the current issue of EM 385-1-1, 29 CFR 1926.1101, 40 CFR 61-SUBPART A, 40 CFR 61-SUBPART M, 40 CFR 763, and 25 TAC 296. Submit matters of interpretation of standards to the appropriate administrative agency for resolution before starting the work. Where the requirements of this specification, applicable laws, rules, criteria, ordinances, regulations, and referenced documents vary, the most stringent requirement as defined by the Government apply. The following laws, ordinances, criteria, rules and regulations regarding removal, handling, storing, transporting and disposing of asbestos materials apply:

a. Encapsulation of ACM is not allowed at any location within JBSA.

b. [_____]

c. [_____].

1.3.7 Respiratory Protection Program

Establish and implement a respirator program as required by 29 CFR 1926.1101, and 29 CFR 1926.103 and applicable state and local regulations. Submit a written description of the program to the Contracting Officer. Submit a written program manual or operating

procedure including methods of compliance with regulatory statutes.

1.3.7.1 Respirator Program Records

Submit records of the respirator program as required by 29 CFR 1926.103, and 29 CFR 1926.1101.

1.3.7.2 Respirator Fit Testing

The Contractor's PQP must conduct a qualitative or quantitative fit test conforming to 29 CFR 1926.103 for each worker required to wear a respirator, and any authorized visitors who enter a regulated area where respirators are required to be worn. A respirator fit test must be performed prior to initially wearing a respirator and every 12 months thereafter. If physical changes develop that affects the fit, a new fit test must be performed. Functional fit checks must be performed each time a respirator is put on and in accordance with the manufacturer's recommendation.

1.3.7.3 Respirator Selection and Use Requirements

Provide respirators, and ensure that they are used as required by 29 CFR 1926.1101 and in accordance with CGA G-7 and the manufacturer's recommendations. Respirators must be approved by the National Institute for Occupational Safety and Health NIOSH, under the provisions of 42 CFR 84, for use in environments containing airborne asbestos fibers. For air-purifying respirators, the particulate filter must be high-efficiency particulate air (HEPA)/(N-,R-,P-100). The initial respirator selection and the decisions regarding the upgrading or downgrading of respirator type must be made by the Contractor's Designated IH based on the measured or anticipated airborne asbestos fiber concentrations to be encountered.

1.3.8 Asbestos Hazard Control Supervisor

The Contractor must be represented on site by a supervisor, trained using the model Contractor accreditation plan as indicated in the Federal statutes for all portions of the herein listed work.

1.3.9 Hazard Communication

Adhere to all parts of 29 CFR 1926.59 and provide the Contracting Officer with a copy of the Safety Data Sheets (SDS) for all materials brought to the site.

1.3.10 Asbestos Hazard Abatement Plan

Submit a detailed plan of the safety precautions such as lockout, tagout, tryout, fall protection, and confined space entry procedures and equipment and work procedures to be used in the removal and demolition of materials containing asbestos. The plan, not to be combined with other hazard abatement plans, must be prepared, signed, and sealed by the PQP. Provide a Table of Contents for each abatement submittal, which follows the sequence of requirements in the contract. The plan must include but not be limited to the precise personal protective equipment to be used including, but not limited to, respiratory protection, type of whole-body protection and if reusable coveralls are to be employed, an outer disposable layer such as disposable whole body cover must be employed over the top of the coveralls, the location of asbestos control areas including clean and dirty areas, buffer zones, showers, storage areas, change rooms,

removal method, interface of trades involved in the construction, sequencing of asbestos related work, disposal plan, type of wetting agent and asbestos sealer to be used, locations of local exhaust equipment, planned air monitoring strategies, and a detailed description of the method to be employed in order to control environmental pollution. The plan must also include (both fire and medical emergency) response plans and an Activity Hazard Analyses (AHAs) in accordance with EM 385-1-1. The Asbestos Hazard Abatement Plan must be approved in writing prior to starting any asbestos work. The Contractor, Asbestos Hazard Control Supervisor, CP and PQP must meet with the Contracting Officer prior to beginning work, to discuss in detail the Asbestos Hazard Abatement Plan, including work procedures and safety precautions. Once approved by the Contracting Officer, the plan will be enforced as if an addition to the specification. Any changes required in the specification as a result of the plan must be identified specifically in the plan to allow for free discussion and approval by the Contracting Officer prior to starting work.

1.3.11 Testing Laboratory

Submit the name, address, telephone number, and appliable laboratory certification(s) of each testing laboratory selected for the sampling, analysis, and reporting of airborne concentrations of asbestos fibers along with evidence that each laboratory selected holds the appropriate State license and permits and certification that each laboratory is American Industrial Hygiene Association (AIHA) accredited and that persons counting the samples have been judged proficient by current inclusion on the AIHA Asbestos Analysis Registry (AAR) and successful participation of the laboratory in the Proficiency Analytical Testing (PAT) Program. Where analysis to determine asbestos content in bulk materials or transmission electron microscopy is required, submit evidence that the laboratory is accredited by the National Institute of Science and Technology (NIST) under National Voluntary Laboratory Accreditation Program (NVLAP) for asbestos analysis. The testing laboratory firm must be independent of the asbestos contractor and must have no employee or employer relationship which could constitute a conflict of interest.

1.3.12 Landfill Approval

Submit written evidence that the landfill is approved for asbestos disposal by the U.S. Environmental Protection Agency, Region 6, Air Enforcement Section, and the Texas Commission on Environmental Quality (TCEQ). Within three working days after delivery, submit detailed delivery tickets, prepared, signed, and dated by an agent of the landfill, certifying the amount of asbestos materials delivered to the landfill. Submit a copy of the waste shipment records within one day of the shipment leaving the project site.

1.3.13 Transporter Certification

Submit written evidence that the transporter is approved to transport asbestos waste in accordance with the DOT requirements of 49 CFR 171, 49 CFR 172, 49 CFR 173,[and][49 CFR 174 and IMDG DGR for water transportation][, and][IATA DGR for air transportation] as well as registration requirements of 49 CFR 107 and all other State and local regulatory agency requirements.

1.3.14 Medical Certification

Provide a written certification for each worker and supervisor, signed by

a licensed physician indicating that the worker and supervisor has met or exceeded all of the medical prerequisites listed herein and in 29 CFR 1926.1101 and 29 CFR 1926.103 as prescribed by law. Submit certificates prior to the start of work but after the main abatement submittal.

1.4 SUBMITTALS

Government approval is required for submittals with a "G" or "S" classification. Refer to Section 01 33 00 SUBMITTAL PROCEDURES for requirements when a classification other than "G" or "S" are used. Submittals not having a classification are for information only. Submit the following in accordance with Section 01 33 00 SUBMITTAL PROCEDURES:

SD-01 Preconstruction Submittals

Asbestos Hazard Abatement Plan; G

[TxDSHS Asbestos/Demolition Notification; G

] SD-03 Product Data

Amended Water; G

Safety Data Sheets (SDS) for All Materials; G

Respirators; G

Local Exhaust Equipment; G

Pressure Differential Automatic Recording Instrument; G

Vacuums; G

[Glovebags; G

] SD-06 Test Reports

[Analytical Report; G

] Air Sampling Results; G

Pressure Differential Recordings for Local Exhaust System; G

Clearance Sampling; G

Asbestos Disposal Quantity Report; G

SD-07 Certificates

Employee Training; G

[Notifications; G

] Respiratory Protection Program; G

Asbestos Hazard Abatement Plan; G

Testing Laboratory; G

Landfill Approval; G

Delivery Tickets; G

Waste Shipment Records; G

Transporter Certification; G

Medical Certification; G

Private Qualified Person Documentation; G

Designated Competent Person; G

Worker's License; G

Contractor's License; G

Federal, State or Local Citations on Previous Projects; G

Equipment Used to Contain Airborne Asbestos Fibers; G

Water Filtration Equipment; G

Vacuums; G

Ventilation Systems; G

SD-11 Closeout Submittals

Permits; G

[Notifications; G

] Respirator Program Records; G

[Protective Clothing Decontamination Quality Control Records; G

][Protective Clothing Decontamination Facility Notification; G

] Rental Equipment; G

1.5 QUALITY ASSURANCE

1.5.1 Private Qualified Person Documentation

Submit the name, address, and telephone number of the PQP selected to prepare the Asbestos Hazard Abatement Plan, direct monitoring and training, and documented evidence that the PQP has successfully completed training in and is accredited and where required is certified as, a Building Inspector, Contractor/Supervisor Abatement Worker, and Asbestos Project Designer as described by 40 CFR 763 and has successfully completed the National Institute of Occupational Safety and Health (NIOSH) 582 course "Sampling and Evaluating Airborne Asbestos Dust" or equivalent. The PQP must be appropriately licensed in the State of Texas as a Project Monitor. The PQP and the asbestos contractor must not have an employee/employer relationship or financial relationship which could constitute a conflict of interest. The PQP must be a first tier

subcontractor.

1.5.2 Designated Competent Person Documentation

The Designated Competent Person must be experienced in the administration and supervision of asbestos abatement projects including exposure assessment and monitoring, work practices, abatement methods, protective measures for personnel, setting up and inspecting asbestos abatement work areas, evaluating the integrity of containment barriers, placement and operation of local exhaust systems, ACM generated waste containment and disposal procedures, decontamination units installation and maintenance requirements, site safety and health requirements, notification of other employees onsite, [_____]. The Designated Competent Person must be on-site at all times when asbestos abatement activities are underway. Submit training certification and a current State of Texas Asbestos Contractor's and Supervisor's License. Submit evidence that the Designated Competent Person has a minimum of 2 years of on-the-job asbestos abatement experience relevant to OSHA designated competent person requirements. The Designated Competent Person must be a first tier subcontractor.

1.5.3 Worker's License

Submit documentation that workers meet the requirements of 29 CFR 1926.1101, 40 CFR 61-SUBPART M and have a current State of Texas Asbestos Workers License.

1.5.4 Contractor's License

Submit a copy of the asbestos contractor's license issued by the State of Texas. Submit the following certification along with the license: "I certify that the personnel I am responsible for during the course of this project fully understand the contents of 29 CFR 1926.1101, 40 CFR 61-SUBPART M, 25 TAC 296, EM 385-1-1, and the Federal, State and local requirements for those asbestos abatement activities that they will be involved in." This certification statement must be signed by the Company's President or Chief Executive.

1.5.5 Air Sampling Results

Complete fiber counting and provide results to the PQP for review within 16 hours of the "time off" of the sample pump. Notify the Contracting Officer immediately of any airborne levels of asbestos fibers in excess of the acceptable limits. Submit sampling results to the Contracting Officer and the affected Contractor employees where required by law within three working days, signed by the testing laboratory employee performing air sampling, the employee that analyzed the sample, and the PQP. Notify the Contractor and the Contracting Officer immediately of any variance in the pressure differential which could cause adjacent unsealed areas to have asbestos fiber concentrations in excess of 0.01 fibers per cubic centimeter or background whichever is higher. In no circumstance must levels exceed 0.1 fibers per cubic centimeter.

1.5.6 Pressure Differential Recordings for Local Exhaust System

Provide a local exhaust system that creates a negative pressure of at least 0.02 inches of water relative to the pressure external to the enclosure and operate it continuously, 24-hours a day, until the temporary enclosure of the asbestos control area is removed. Submit pressure differential

recordings for each work day to the PQP for review and to the Contracting Officer within 24-hours from the end of each work day.

[1.5.7 Protective Clothing Decontamination Quality Control Records

Provide all records that document quality control for the decontamination of reusable outer protective clothing.

][1.5.8 Protective Clothing Decontamination Facility Notification

Submit written evidence that persons who decontaminate, store, or transport asbestos contaminated clothing used in the performance of this contract were duly notified in accordance with 29 CFR 1926.1101.

]1.5.9 Federal, State or Local Citations on Previous Projects

Submit a statement, signed by an officer of the company, containing a record of any citations issued by Federal, State or local regulatory agencies relating to asbestos activities within the last 5 years (including projects, dates, and resolutions); a list of penalties incurred through non-compliance with asbestos project specifications, including liquidated damages, overruns in scheduled time limitations and resolutions; and situations in which an asbestos-related contract has been terminated (including projects, dates, and reasons for terminations). If there are none, a negative declaration signed by an officer of the company must be provided.

1.5.10 Preconstruction Conference

Conduct a safety preconstruction conference to discuss the details of the Asbestos Hazard Abatement Plan, Accident Prevention Plan (APP) including the AHAs required in specification Section 01 35 26 GOVERNMENTAL SAFETY REQUIREMENTS. The safety preconstruction conference must include the Contractor and their Designated Competent Person, Designated IH and Project Supervisor and the Contracting Officer. Deficiencies in the APP must be discussed. Onsite work must not begin until the APP has been accepted.

1.6 SECURITY

[[_____] must be provided for each regulated area.]A log book must be kept documenting entry into and out of the regulated area. Entry into regulated areas must only be by personnel authorized by the Contractor and the Contracting Officer. Personnel authorized to enter regulated areas must be trained, medically evaluated, and wear the required personal protective equipment.

1.7 EQUIPMENT

1.7.1 Rental Equipment

Provide a copy of the written notification to the rental company concerning the intended use of the equipment and the possibility of asbestos contamination of the equipment.

PART 2 PRODUCTS

[]2.1 DUCT TAPE

Industrial grade duct tape of appropriate widths suitable for bonding sheet plastic and disposal container.

2.2 DISPOSAL CONTAINERS

Leak-tight (defined as solids, liquids, or dust that cannot escape or spill out) disposal containers must be provided for ACM wastes, and presumed ACM wastes, as required by 29 CFR 1926.1101 and state and local regulatory requirements. Disposal containers can be in the form of:

a. Disposal Bags

b. Fiberboard Drums

c. Cardboard Boxes

2.3 SHEET PLASTIC

Sheet plastic must be polyethylene of 6 mil minimum thickness and must be provided in the largest sheet size necessary to minimize seams. Film must conform to ASTM D4397, except as specified below:

2.3.1 Flame Resistant

Where a potential for fire exists, flame-resistant sheets must be provided. Film must conform to the requirements of NFPA 701.

2.3.2 Reinforced

Reinforced sheets must be provided where high skin strength is required, such as where it constitutes the only barrier between the regulated area and the outdoor environment. The sheet stock must consist of translucent, nylon-reinforced or woven-polyethylene thread laminated between two layers of polyethylene film. Film must meet flame resistant standards of NFPA 701.

2.4 MASTIC REMOVING SOLVENT

Mastic removing solvent must be nonflammable and must not contain methylene chloride, glycol ether, or halogenated hydrocarbons. Solvents used onsite must have a flash point greater than 140 degrees F.

Prior to approving the use of mastic removing solvent for renovation projects where a new material is placed on the treated surface, the treated surface with mastic removing solvent must be completely removed. Remaining mastic removing solvent may react with glues and mastic of the new product.

2.5 LEAK-TIGHT WRAPPING

Two layers of 6 mil minimum thick polyethylene sheet stock must be used for the containment of removed asbestos-containing components or materials such as large tanks, boilers, insulated pipe segments and other materials. Upon placement of the ACM component or material, each layer must be individually leak-tight sealed with duct tape.

2.6 VIEWING INSPECTION WINDOW

Where feasible, a minimum of one clear, 1/8 inch thick, acrylic sheet, 18 by 24 inches, must be installed as a viewing inspection window at eye level on a wall in each containment enclosure. The windows must be sealed leak-tight with industrial grade duct tape.

2.7 WETTING AGENTS

Removal encapsulant (a penetrating encapsulant) must be provided when conducting removal abatement activities that require a longer removal time or are subject to rapid evaporation of[amended] water. The removal encapsulant must be capable of wetting the ACM and retarding fiber release during disturbance of the ACM greater than or equal to that provided by amended water. Performance requirements for penetrating encapsulants are specified in paragraph ENCAPSULANTS above.

PART 3 EXECUTION

3.1 EQUIPMENT

Provide the Contracting Officer or the Contracting Officer's Representative, with at least [two][_____] complete sets of personal protective equipment as required for entry to and inspection of the asbestos control area. Provide equivalent training to the Contracting Officer or a designated representative as provided to Contractor employees in the use of the required personal protective equipment. Provide manufacturer's certificate of compliance for all equipment used to contain airborne asbestos fibers.

3.1.1 Air Monitoring Equipment

The Contractor's PQP must approve air monitoring equipment. The equipment must include, but must not be limited to:

a. High-volume sampling pumps that can be calibrated and operated at a constant airflow up to 16 liters per minute.

b. Low-volume, battery powered, body-attachable, portable personal pumps that can be calibrated to a constant airflow up to approximately 3.5 liters per minute, and a self-contained rechargeable power pack capable of sustaining the calibrated flow rate for a minimum of 10 hours. The pumps must also be equipped with an automatic flow control unit which must maintain a constant flow, even as filter resistance increases due to accumulation of fiber and debris on the filter surface.

c. Single use standard 25 mm diameter cassette, open face, 0.8 micron pore size, mixed cellulose ester membrane filters and cassettes with 50 mm electrically conductive extension cowl, and shrink bands for personal air sampling.

[d. Single use standard 25 mm diameter cassette, open face, 0.45 micron pore size, mixed cellulose ester membrane filters and cassettes with 50 mm electrically conductive cowl, and shrink bands when conducting environmental area sampling using NIOSH NMAM Methods 7400 and 7402, (and the transmission electric microscopy method specified at 40 CFR 763 if required).

] e. A flow calibrator capable of calibration to within plus or minus 2 percent of reading over a temperature range of minus 4 to plus 140 degrees F and traceable to a NIST primary standard.

3.1.2 Respirators

Select respirators from those approved by the National Institute for Occupational Safety and Health (NIOSH), Department of Health and Human Services.

3.1.2.1 Respirators for Handling Asbestos

Provide personnel engaged in pre-cleaning, cleanup, handling, removal and demolition of asbestos materials with respiratory protection as indicated in 29 CFR 1926.1101 and 29 CFR 1926.103. Breathing air must comply with CGA G-7.

3.1.3 Exterior Whole Body Protection

3.1.3.1 Outer Protective Clothing

Provide personnel exposed to asbestos with disposable "non-breathable," whole body outer protective clothing, head coverings, gloves, and foot coverings. Provide disposable plastic or rubber gloves to protect hands. Cloth gloves may be worn inside the plastic or rubber gloves for comfort, but must not be used alone. Make sleeves secure at the wrists, make foot coverings secure at the ankles, and make clothing secure at the neck by the use of tape. Reusable whole body outer protective clothing must be either disposed of as asbestos contaminated waste upon exiting from the asbestos regulated work area or be properly decontaminated.

3.1.3.2 Work Clothing

Provide cloth work clothes for wear under the outer protective clothing and foot coverings and either dispose of or properly decontaminate them as recommended by the PQP after each use.

3.1.3.3 Personal Decontamination Unit

Provide a temporary, negative pressure unit with a separate decontamination locker room and clean locker room with a shower that complies with 29 CFR 1926.51(f)(4)(ii) through (V) in between for personnel required to wear whole body protective clothing. Provide two separate lockers for each asbestos worker, one in each locker room. Keep street clothing and street shoes in the clean locker. HEPA vacuum and remove asbestos contaminated disposable protective clothing while still wearing respirators at the boundary of the asbestos work area and seal in impermeable bags or containers for disposal. Do not wear work clothing between home and work. Locate showers between the decontamination locker room and the clean locker room and require that all employees shower before changing into street clothes. Collect used shower water and filter with approved water filtration equipment to remove asbestos contamination. Wastewater filters must be installed in series with the first stage pore size [20][_____] microns and the second stage pore size of [5][_____] microns. Dispose of filters and residue as asbestos waste. Discharge clean water to the sanitary system. Dispose of asbestos contaminated work clothing as asbestos contaminated waste. Keep the floor of the decontamination unit's clean room dry and clean at all times. Proper housekeeping and hygiene requirements must be maintained. Provide

soap and towels for showering, washing and drying. Cloth towels provided must be disposed of as ACM waste. Physically attach the decontamination units to the asbestos control area. Construct both a personnel decontamination unit and an equipment decontamination unit onto and integral with each asbestos control area.

3.1.3.4 Decontamination of Reusable Outer Protective Clothing

When reusable outer protective clothing is used, transport the double bagged clothing to a previously notified commercial/industrial decontamination facility for decontamination. Perform non-destructive testing to determine the effectiveness of asbestos decontamination. If representative sampling is used, ensure the statistical validity of the sampling results. If representative sampling is used, reject any entire batch in which any of the pieces exceed 40 fibers per square millimeter. Inspect reusable protective clothing prior to use to ensure that it will provide adequate protection and is not or is not about to become ripped, torn, deteriorated, or damaged, and that it is not visibly contaminated. Notify, in writing, all personnel involved in the decontamination of reusable outer protective clothing as indicated in 29 CFR 1926.1101.

3.1.3.5 Eye Protection

Provide eye protection that complies with ANSI/ISEA Z87.1 when operations present a potential eye injury hazard. Provide goggles to personnel engaged in asbestos abatement operations when the use of a full face respirator is not required.

3.1.4 Regulated Areas

All Class I, II, and III asbestos work must be conducted within regulated areas. The regulated area must be demarcated to minimize the number of persons within the area and to protect persons outside the area from exposure to airborne asbestos. Control access to regulated areas, ensure that only authorized personnel enter, and verify that Contractor required medical surveillance, training and respiratory protection program requirements are met prior to allowing entrance.

3.1.5 Load-out Unit

Provide a temporary load-out unit that is adjacent and connected to the regulated area[and][access tunnel]. Attach the load-out unit in a leak-tight manner to each regulated area.

3.1.6 Warning Signs and Labels

Provide bilingual warning signs printed in English and Spanish at all approaches to asbestos control areas. Locate signs at such a distance that personnel may read the sign and take the necessary protective steps required before entering the area. Provide labels and affix to all asbestos materials, scrap, waste, debris, and other products contaminated with asbestos. Containers with preprinted warning labels conforming to the requirements are acceptable.

3.1.6.1 Warning Sign

Provide vertical format conforming to[applicable state and local regulations][and][or] 29 CFR 1926.200, and 29 CFR 1926.1101 minimum 20 by 14 inches displaying the following legend in the lower panel:

Legend	Notation
DANGER	one inch Sans Serif Gothic or Block
ASBESTOS	one inch Sans Serif Gothic or Block
MAY CAUSE CANCER	one inch Sans Serif Gothic or Block
CAUSES DAMAGE TO LUNGS	1/4 inch Sans Serif Gothic or Block
AUTHORIZED PERSONNEL ONLY	1/4 inch Sans Serif Gothic or Block
[WEAR RESPIRATORY PROTECTION AND PROTECTIVE CLOTHING IN THIS AREA]	1/4 inch Sans Serif Gothic or Block

Spacing between lines must be at least equal to the height of the upper of any two lines.

3.1.6.2 Warning Labels

Provide labels conforming to 25 TAC 296.212 and 29 CFR 1926.1101 of sufficient size to be clearly legible, displaying the following legend:

DANGER
CONTAINS ASBESTOS FIBERS
MAY CAUSE CANCER
CAUSES DAMAGE TO LUNGS
DO NOT BREATHE DUST AVOID CREATING DUST

3.1.7 Local Exhaust System

Provide a local exhaust system in the asbestos control area in accordance with ASSP Z9.2 and 29 CFR 1926.1101 that provides at least four air changes per hour inside of the negative pressure enclosure. Local exhaust equipment must be operated 24-hours per day, until the asbestos control area is removed and must be leak proof to the filter and equipped with HEPA filters. Maintain a minimum pressure differential in the control area of minus 0.02 inch of water column relative to adjacent, unsealed areas. Provide continuous 24-hour per day monitoring of the pressure differential with a pressure differential automatic recording instrument. The building ventilation system must not be used as the local exhaust system for the asbestos control area. Filters on exhaust equipment must conform to ASSP Z9.2 and UL 586. Terminate the local exhaust system out of doors and remote from any public access or ventilation system intakes.

3.1.8 Tools

Vacuums must be leak proof to the filter and equipped with HEPA filters. Filters on vacuums must conform to ASSP Z9.2 and UL 586. Do not use power tools to remove asbestos containing materials unless the tool is equipped with effective, integral HEPA filtered exhaust ventilation systems. Remove all residual asbestos from reusable tools prior to storage or reuse. Reusable tools must be thoroughly decontaminated prior to being removed from the regulated areas.

3.1.9 Rental Equipment

If rental equipment is to be used, furnish written notification to the rental agency concerning the intended use of the equipment and the possibility of asbestos contamination of the equipment.

[3.1.10 Glovebags

Submit written manufacturers proof that glovebags do not break down under expected temperatures and conditions.

]3.1.11 Single Stage Decontamination Area

A decontamination area (equipment room/area) must be provided for Class I work involving less than 25 feet or 10 square feet of TSI or surfacing ACM, and for Class II and Class III asbestos work operations where exposures exceed the PELs or where there is no negative exposure assessment. The equipment room or area must be adjacent to the regulated area for the decontamination of employees, material, and their equipment which could be contaminated with asbestos. The area must be covered by an impermeable drop cloth on the floor or horizontal working surface. The area must be of sufficient size to accommodate cleaning of equipment and removing personal protective equipment without spreading contamination beyond the area.

3.1.12 Decontamination Area Exit Procedures

Ensure that the following procedures are followed:

a. Before leaving the regulated area, remove all gross contamination and debris from work clothing using a HEPA vacuum.

b. Employees must remove their protective clothing in the equipment room and deposit the clothing in labeled impermeable bags or containers for disposal.

c. Employees must not remove their respirators until showering.

d. Employees must shower prior to entering the clean room. If a shower has not been located between the equipment room and the clean room or the work is performed outdoors, ensure that employees engaged in Class I asbestos jobs: a) Remove asbestos contamination from their work suits in the equipment room or decontamination area using a HEPA vacuum before proceeding to a shower that is not adjacent to the work area; or b) Remove their contaminated work suits in the equipment room, without cleaning worksuits, and proceed to a shower that is not adjacent to the work area.

3.2 WORK PROCEDURE

Perform asbestos related work in accordance with 29 CFR 1926.1101, 40 CFR 61-SUBPART M, 25 TAC 296, and as specified herein. Use wet or if given prior Texas Department of State Health Services approval, dry removal procedures and negative pressure enclosure techniques. Wear and utilize protective clothing and equipment as specified herein. No eating, smoking, drinking, chewing gum, tobacco, or applying cosmetics is permitted in the asbestos work or control areas. Personnel of other trades not engaged in the removal and demolition of asbestos containing material must not be exposed at any time to airborne concentrations of asbestos unless all the personnel protection and training provisions of this specification are complied with by the trade personnel. Seal all roof top penetrations, except plumbing vents, prior to asbestos roofing work. Shut down the building heating, ventilating, and air conditioning system, cap the openings to the system,[and provide temporary[heating,][and][ventilation,][and][air conditioning]] prior to the commencement of asbestos work. Power to the regulated area must be locked-out and tagged in accordance with 29 CFR 1910.147. Disconnect electrical service when wet removal is performed and provide temporary electrical service with verifiable ground fault circuit interrupter (GFCI) protection prior to the use of any water. All electrical work must be performed by a licensed electrician. Stop abatement work in the regulated area immediately when the airborne total fiber concentration: (1) equals or exceeds 0.01 f/cc, or the pre-abatement concentration, whichever is greater, outside the regulated area; or (2) equals or exceeds 1.0 f/cc inside the regulated area. Correct the condition to the satisfaction of the Contracting Officer, including visual inspection and air sampling. Work must resume only upon notification by the Contracting Officer. Corrective actions must be documented. If an asbestos fiber release or spill occurs outside of the asbestos control area, stop work immediately, correct the condition to the satisfaction of the Contracting Officer including clearance sampling, prior to resumption of work.

3.2.1 Notice to Occupants

Prior to start of work, ATT-2 shall be posted around the outer perimeter of the area where abatement work will occur.

3.2.2 Building Ventilation System and Critical Barriers

Building ventilation system supply and return air ducts in a regulated area must be shut down and isolated by lockable switch or other positive means in accordance with 29 CFR 1910.147 and isolated by airtight seals to prevent the spread of contamination throughout the system. The airtight seals must consist of two layers of polyethylene. Edges to wall, ceiling and floor surfaces must be sealed with industrial grade duct tape.

a. A Competent Person must supervise the work.

b. For indoor work, critical barriers must be placed over all openings to the regulated area.

c. Impermeable dropcloths must be placed on surfaces beneath all removal activity.

3.2.3 Protection of Existing Work to Remain

Perform work without damage or contamination of adjacent work. Where such

work is damaged or contaminated as verified by the Contracting Officer using visual inspection or sample analysis, it must be restored to its original condition or decontaminated by the Contractor at no expense to the Government as deemed appropriate by the Contracting Officer. This includes inadvertent spill of dirt, dust, or debris in which it is reasonable to conclude that asbestos may exist. When these spills occur, stop work immediately. Then clean up the spill. When satisfactory visual inspection and air sampling results are obtained from the PQP work may proceed at the discretion of the Contracting Officer.

3.2.4 Furnishings

[Furniture[, (_____)] and equipment will be removed from the area of work by the Government before asbestos work begins.

][Furniture[, (_____)] and equipment will remain in the building. Cover and seal furnishings with 6-mil plastic sheet or remove from the work area and store in a location on site approved by the Contracting Officer.

][Furnishings listed below and located in the work area are considered to be contaminated with asbestos fibers. Transfer these items to an area on site approved by the Contracting Officer, decontaminate (wet methods where possible), and then store until the room from which they came is declared clean and safe for entry.[Carpets, draperies, and other items with porous, non-solid surfaces can not be suitably cleaned and must be properly disposed of as contaminated waste.] At the conclusion of the asbestos removal work and cleanup operations, transfer all objects so removed and cleaned back to the area from which they came and re-install them. Base bids on decontaminating:

a. [_____] Desks

b. [_____] Filing cabinets

c. [_____] Linear feet of shelving

d. [_____] Cubic feet of books, papers, files, [_____]

e. [_____].

]3.2.5 Precleaning

Wet wipe and HEPA vacuum all surfaces potentially contaminated with asbestos prior to establishment of an enclosure.

3.2.6 Asbestos Control Area Requirements

3.2.6.1 Negative Pressure Enclosure

Removal of asbestos contaminated acoustical ceiling tiles, spray applied fireproofing, thermal system insulation, gypsum wallboard/joint compound [, [_____]] require the use of a negative pressure enclosure. Block and seal openings in areas where the release of airborne asbestos fibers can be expected. Establish an asbestos negative pressure enclosure with the use of curtains, portable partitions, or other enclosures in order to prevent the escape of asbestos fibers from the contaminated asbestos work area. Negative pressure enclosure development must include protective covering of uncontaminated walls, and ceilings with a continuous membrane of two layers of minimum 6-mil plastic sheet sealed with tape to prevent

water or other damage. Provide two layers of 6-mil plastic sheet over floors and extend a minimum of 12 inches up walls. Seal all joints with tape. Provide local exhaust system in the asbestos control area. Openings are allowed in enclosures of asbestos control areas for personnel and equipment entry and exit, the supply and exhaust of air for the local exhaust system and the removal of properly containerized asbestos containing materials. Replace local exhaust system filters as required to maintain the efficiency of the system.

3.2.6.2 Glovebag

If the construction of a negative pressure enclosure is infeasible for the removal of [_____] located [_____]. Use alternate techniques as indicated in 29 CFR 1926.1101. Establish designated limits for the asbestos regulated area with the use of rope or other continuous barriers, and maintain all other requirements for asbestos control areas. The PQP must conduct personal samples of each worker engaged in asbestos handling (removal, disposal, transport and other associated work) throughout the duration of the project. If the quantity of airborne asbestos fibers monitored at the breathing zone of the workers at any time exceeds background or 0.01 fibers per cubic centimeter whichever is greater, stop work, evacuate personnel in adjacent areas or provide personnel with approved protective equipment at the discretion of the Contracting Officer. This sampling may be duplicated by the Government at the discretion of the Contracting Officer. If the air sampling results obtained by the Government differ from those obtained by the Contractor, the Government will determine which results predominate. If adjacent areas are contaminated as determined by the Contracting Officer, clean the contaminated areas, monitor, and visually inspect the area as specified herein.

3.2.6.3 Regulated Area for Class II Removal

Removal of asbestos containing floor tile/mastic, carpet/mastic, sealants, and wallboard are Class II removal activities. Establish designated limits for the asbestos regulated work area with the use of red barrier tape; install critical barriers, splash guards and signs, and maintain all other requirements for asbestos control area except local exhaust. Place impermeable dropcloths on surfaces beneath removal activity extending out 3 feet in all directions. A detached decontamination system may be used. Conduct area monitoring of airborne fibers during the work shift at the designated limits of the asbestos work area and conduct personal samples of each worker engaged in the work. If the airborne fiber concentration of the workers or designated limits at any time exceeds background or 0.01 fibers per cubic centimeter, whichever is greater, stop work immediately and correct the situation.

3.2.7 Removal Procedures

Wet asbestos material with a fine spray of[amended water][a specific wetting agent such as light oil] during removal, cutting, or other handling so as to reduce the emission of airborne fibers. Remove material and immediately place in 6 mil plastic disposal bags. Remove asbestos containing material in a gradual manner, with continuous application of the amended water or wetting agent in such a manner that no asbestos material is disturbed prior to being adequately wetted. Where unusual circumstances prohibit the use of 6 mil plastic bags, submit an alternate proposal for containment of asbestos fibers to the Contracting Officer for approval. For example, in the case where both piping and insulation are

to be removed, the Contractor may elect to wet the insulation, wrap the pipes and insulation in plastic and remove the pipe by sections. Containerize asbestos containing material while wet. Do not allow asbestos material to accumulate or become dry. Lower and otherwise handle asbestos containing material as indicated in 40 CFR 61-SUBPART M.

[3.2.7.1 Sealing Contaminated Items Designated for Disposal

Remove contaminated architectural, mechanical, and electrical appurtenances such as venetian blinds, full-height partitions, carpeting, duct work, pipes and fittings, radiators, light fixtures, conduit, panels, and other contaminated items designated for removal by completely coating the items with an asbestos lock-down encapsulant at the demolition site before removing the items from the asbestos control area. These items need not be vacuumed. The asbestos lock-down encapsulant must be tinted a contrasting color and spray-applied by airless method. Thoroughness of sealing operation must be visually gauged by the extent of colored coating on exposed surfaces. Lock-down encapsulants must comply with the performance requirements specified herein.

]3.2.7.2 Exposed Pipe Insulation Edges

Contain edges of asbestos insulation to remain that are exposed by a removal operation. Wet and cut the rough ends true and square with sharp tools and then encapsulate the edges with a 1/4 inch thick layer of non-asbestos containing insulating cement troweled to a smooth hard finish. When cement is dry, lag the end with a layer of non-asbestos lagging cloth, overlapping the existing ends by at least 4 inches. When insulating cement and cloth is an impractical method of sealing a raw edge of asbestos, take appropriate steps to seal the raw edges as approved by the Contracting Officer.

[3.2.7.3 Presumed ACM

Presumed ACM must be treated as ACM throughout the abatement and disposal process. Testing can be performed by a trained and certified asbestos professional following applicable local, state, and federal regulations to either confirm the material is ACM or non-ACM. If testing proves asbestos is not present, the material can be managed as non-ACM.

]3.2.8 Methods of Compliance

3.2.8.1 Mandated Practices

The specific abatement techniques and items identified must be detailed in the Contractor's Asbestos Hazard Abatement Plan (AHAP). Use the following engineering controls and work practices in all operations, regardless of the levels of exposure:

a. Vacuum cleaners equipped with HEPA filters.

b. Wet methods or wetting agents except where it can be demonstrated that the use of wet methods is unfeasible due to the creation of electrical hazards, equipment malfunction, and in roofing.(1) Item encased in concrete or other similarly hard material must be adequately wet whenever exposed during demolition.

(2) ACM exposed during cutting or disjoining operations must be adequatley wet.

(3) ACM stripped from a facility component while it remains in place must be adequatley wet during the stripping operation.

(4) During periods when wetting operations are suspended due to freezing temperatures, temperatures in the area containing the facility components shall be recorded at the beginning, middle, and end of each workday. Daily temperature records shall be available at the jobsite at all times. These records shall be retained for at least 2 years.

c. Prompt clean-up and disposal.

d. Inspection and repair of polyethylene.

e. Cleaning of equipment and surfaces of containers prior to removing them from the equipment room or area.

3.2.8.1.1 Wet Methods Alternative

Wet methods are not required if the use of wet methods is unfeasible due to the creation of electrical hazards or equipment malfunction, and prior approval is obtained from the Texas Department of State Health Services. Alternative method for removal must be equivalent to the requirements of paragraph MANDATED PRACTICES and CONTROL METHODS and use the following control methods:

a. A local exhaust ventilation and collection system is designed and operated in accordance with 40 CFR 61.152 to capture the particulate asbestos material produced by the stripping and removal of the asbestos materials and exhibits no visible emissions to the outside air;

b. A glove-bag system is designed and operated to contain the particulate asbestos material produced by the stripping of the asbestos materials; and

c. Leak-tight wrapping is used to contain all ACM prior to dismantlement.

A copy of the Texas Department of State Health Services approval shall be kept at the worksite at all times and made available for inspection. Provide a copy of the approval to the Contracting Officer. Any changes to wet methods shall be written by a DSHS-licensed asbestos consultant.

3.2.8.2 Control Methods

Use the following control methods:

a. Local exhaust ventilation equipped with HEPA filter;

b. Enclosure or isolation of processes producing asbestos dust;

c. Where the feasible engineering and work practice controls are not sufficient to reduce employee exposure to or below the PELs, use them to reduce employee exposure to the lowest levels attainable and must supplement them by the use of respiratory protection.

d. Facilities that are structurally damaged or unsound where an asbestos inspection is not possible due to safety concerns must be treated as

asbestos containing material.

3.2.8.3 Unacceptable Practices

The following work practices must not be used:

a. High-speed abrasive disc saws that are not equipped with point of cut ventilator or enclosures with HEPA filtered exhaust air.

b. Compressed air used to remove asbestos containing materials, unless the compressed air is used in conjunction with an enclosed ventilation system designed to capture the dust cloud created by the compressed air.

c. Dry sweeping, shoveling, or other dry clean up.

d. Employee rotation as a means of reducing employee exposure to asbestos.

3.2.9 Class I Work Procedures

In addition to requirements of paragraphs MANDATED PRACTICES and CONTROL METHODS, the following engineering controls and work practices must be used:

a. A Competent Person must supervise the installation and operation of the control methods.

b. For jobs involving the removal of more than 25 feet or 10 square feet of TSI or surfacing material, place critical barriers over all openings to the regulated area.

c. HVAC systems must be isolated in the regulated area by sealing with a double layer of plastic or air-tight rigid covers.

d. Impermeable dropcloths (6 mil or greater thickness) must be placed on surfaces beneath all removal activity.

e. Where a negative exposure assessment has not been provided or where exposure monitoring shows the PEL was exceeded, the regulated area must be ventilated with a HEPA unit and employees must use PPE.

3.2.10 Specific Control Methods for Class I Work

Use Class I work procedures, control methods and removal methods for the following ACM:

a. Spray Applied Fireproofing

b. Gypsum Wallboard and Joint Compound

c. Thermal System Insulation and Mudded Pipe Fittings

d. Plaster and Textured Ceilings and Walls

e. Vermiculite insulation

3.2.10.1 Negative Pressure Enclosure (NPE) System

The system must provide at least four air changes per hour inside the

containment. The local exhaust unit equipment must be operated 24-hours per day until the containment is removed. The NPE must be smoke tested for leaks at the beginning of each shift and be sufficient to maintain a minimum pressure differential of minus 0.02 inch of water column relative to adjacent, unsealed areas. Pressure differential must be monitored continuously, 24-hours per day, with an automatic manometric recording instrument and records must be provided daily on the same day collected to the Contracting Officer. The Contracting Officer must be notified immediately if the pressure differential falls below the prescribed minimum. The building ventilation system must not be used as the local exhaust system for the regulated area. The NPE must terminate outdoors unless an alternate arrangement is allowed by the Contracting Officer. All filters used must be new at the beginning of the project and must be periodically changed as necessary and disposed of as ACM waste.

3.2.10.2 Glovebag Systems

Glovebags must be used without modification, smoke-tested for leaks, and completely cover the circumference of pipe or other structures where the work is to be done. Glovebags must be used only once and must not be moved. Glovebags must not be used on surfaces that have temperatures exceeding 150 degrees F. Prior to disposal, glovebags must be collapsed using a HEPA vacuum. Before beginning the operation, loose and friable material adjacent to the glovebag operation must be wrapped and sealed in two layers of plastic or otherwise rendered intact. At least two persons must perform glovebag removal. Asbestos regulated work areas must be established for glovebag abatement. Designated boundary limits for the asbestos work must be established with rope or other continuous barriers and all other requirements for asbestos control areas must be maintained, including area signage and boundary warning tape.

a. Attach HEPA vacuum systems to the bag to prevent collapse during removal of ACM.

b. The negative pressure glove boxes must be fitted with gloved apertures and a bagging outlet and constructed with rigid sides from metal or other material which can withstand the weight of the ACM and water used during removal. A negative pressure must be created in the system using a HEPA filtration system. The box must be smoke tested for leaks prior to each use.

3.2.10.3 Mini-Enclosure

[Single bulkhead containment][Double bulkhead containment][or][Mini-containment (small walk-in enclosure)]to accommodate no more than two persons, may be used if the disturbance or removal can be completely contained by the enclosure. The mini-enclosure must be inspected for leaks and smoke tested before each use. Air movement must be directed away from the employee's breathing zone within the mini-enclosure.

3.2.10.4 Wrap and Cut Operation

Prior to cutting pipe, the asbestos-containing insulation must be wrapped with polyethylene and securely sealed with duct tape to prevent asbestos becoming airborne as a result of the cutting process. The following steps must be taken: install glovebag, strip back sections to be cut 6 inches from point of cut, and cut pipe into manageable sections.

3.2.10.5 Class I Removal Method

Class I ACM must be removed using a control method described above. Prepare work area as previously specified. Establish designated limits for the asbestos regulated work area with the use of red barrier tape, critical barriers, signs, and maintain all other requirements for asbestos control area. Spread one layer of 6-mil seamless plastic sheeting on the floor below the work area.[Remove asbestos containing spray applied fireproofing using a scraper and wet methods and immediately place into 6-mil thickness disposal bag. After removal of the material use a wire brush to clean the exposed substrate to remove residual material. Continue wet cleaning until surfaces are free of visible debris.][Cut manageable sections of gypsum wallboard and joint compound and immediately place into a 6-mil minimum thickness disposal bag or other approved container. Make every effort to keep the material from falling to the floor of the work area. Use a wire brush and wet clean to remove residual material from studs. Continue wet cleaning until the surface is clean of visible material and encapsulate stud walls.][Remove ACM thermal system insulation and mudded pipe fittings using mechanical means and wet methods and immediately place into 6-mil thickness disposal bag. Continue wet cleaning until surfaces are free of visible debris.][Remove ACM plaster ceilings or walls using mechanical means and adequately wet methods and immediately place into 6-mil thickness disposal bag. Make every effort to keep the material from falling to the floor of the work area. Continue wet cleaning until surfaces are free of visible debris.][Remove ACM textured ceiling finish using a scraper and wet methods and immediately place into 6-mil thickness disposal bag. Floors are considered contaminated from fallen textured ceiling finish. Clean up debris on floor and dispose of[carpet] as asbestos contaminated material. After removal of the material use a wire brush to clean the exposed[concrete] ceiling to remove residual material. Continue wet cleaning until surfaces are free of visible debris.][Remove ACM vermiculite using mechanical means and adequately wet methods and immediately place into 6-mil thickness disposal bag. Make every effort to keep the material from falling to the floor of the work area. Continue wet cleaning until surfaces are free of visible debris.] Bag all asbestos debris which has fallen to the floor as asbestos-containing debris. Place all debris in plastic disposal bags of 6-mil minimum thickness. Once the material is in the disposal bag, apply additional water as needed to achieve "adequately wet" conditions for NESHAP compliance. Place bagged asbestos waste under negative pressure with the use of a HEPA vacuum, goose neck and duct tape to seal the bag, wash to remove any visible contamination and place into a second 6-mil minimum thickness disposal bag. Containerize asbestos containing waste while wet. Lower and otherwise handle asbestos containing materials as indicated in 40 CFR 61-SUBPART M. Conduct area monitoring of airborne fibers during the work shift at the designated limits of the asbestos work area and conduct personal samples of each worker engaged in the work. If the quantity of airborne asbestos fibers monitored at the breathing zone of the workers or the designated limits at any time exceeds background or 0.01 fibers per cubic centimeter, whichever is greater, stop work, and immediately correct the situation.

3.2.11 Class II Work Procedures

In addition to the requirements of paragraphs MANDATED PRACTICES and CONTROL METHODS, the following engineering controls and work practices must be used:

a. A Competent Person must supervise the work.

b. For indoor work, critical barriers must be placed over all openings to the regulated area.

c. Impermeable dropcloths must be placed on surfaces beneath all removal activity.

3.2.12 Specific Control Methods for Class II Work

3.2.12.1 [Vinyl and Asphaltic Flooring Materials][&][Carpet and Mastic]

Establish designated limits for the asbestos regulated work area with the use of red barrier tape, critical barriers, signs, and maintain all other requirements for asbestos control area except local exhaust. A detached decontamination system may be used. When removing[vinyl floor tile and mastic][carpet and mastic] which contains ACM, use the following practices. Remove[floor tile and mastic][carpet and mastic] using adequately wet methods. Remove[floor tiles][carpet and mastic] intact (if possible).[Wetting is not required when floor tiles are heated and removed intact.] Do not sand flooring or its backing. Scrape residual adhesive and backing using wet methods. Mechanical chipping is prohibited unless performed in a negative pressure enclosure. Dry sweeping is prohibited. Use vacuums equipped with HEPA filter, disposable dust bag, and metal floor tool (no brush) to clean floors. Place debris into a 6-mil minimum thickness disposal bag or other approved container. Once the material is in the disposal bag, apply additional water as needed to achieve "adequately wet" conditions for NESHAP compliance. Place bagged asbestos waste under negative pressure with the use of a HEPA vacuum, goose neck and duct tape to seal the bag, wash to remove any visible contamination and place into a second 6-mil minimum thickness disposal bag. Containerize asbestos containing waste while wet. Lower and otherwise handle asbestos containing materials as indicated in 40 CFR 61-SUBPART M. Conduct area monitoring of airborne fibers during the work shift at the designated limits of the asbestos work area and conduct personal samples of each worker engaged in the work. If the airborne fiber concentration of the workers or designated limits at any time exceeds background or 0.01 fibers per cubic centimeter, whichever is greater, stop work immediately and correct the situation.

3.2.12.2 Sealants and Mastic

Establish designated limits for the asbestos regulated work area with the use of red barrier tape, critical barriers and signs, and maintain all other requirements for asbestos control area except local exhaust. Spread 6-mil plastic sheeting on the ground around the perimeter of the work area extending out in all directions. Using adequately wet methods, carefully remove the ACM sealants and mastics using a scraper of knife blade. As it is removed place the material into a disposal bag. Make every effort to keep the asbestos material from falling to the ground or work area floor below. Dry sweeping is prohibited. Use vacuums equipped with HEPA filter and disposable dust bag. Place debris into a 6-mil minimum thickness disposal bag or other approved container. Once the material is in the disposal bag, apply additional water as needed to achieve "adequately wet" conditions for NESHAP compliance. Place bagged asbestos waste under negative pressure with the use of a HEPA vacuum, goose neck and duct tape to seal the bag, wash to remove any visible contamination and place into a second 6-mil minimum thickness disposal bag. Containerize asbestos containing waste while wet. Lower and otherwise handle asbestos containing materials as indicated in 40 CFR 61-SUBPART M. Conduct area

monitoring of airborne fibers during the work shift at the designated limits of the asbestos work area and conduct personal samples of each worker engaged in the work. If the airborne fiber concentration of the workers or at designated limits at any time exceeds background or 0.01 fibers per cubic centimeter, whichever is greater, stop work immediately and correct the situation.

3.2.12.3 Suspect Fire Doors

Establish designated limits for the asbestos regulated work area with the use of red barrier tape, critical barriers, signs, and maintain all other requirements for asbestos control area except local exhaust. A detached decontamination system may be used. Spread 6-mil plastic sheeting on the ground beneath the work area and around the perimeter of the work area extending out in all directions. Remove door intact from hinges and wrap with 6-mil plastic sheeting. Inspect the interior areas of the door to determine if ACM is present. If ACM is not present the door may be disposed of as general construction debris. If ACM is present place whole door in enclosed container for disposal. Conduct area monitoring of airborne fibers during the work shift at the designated limits of the asbestos work area and conduct personal samples of each worker engaged in the work. If the airborne fiber concentration of the workers or designated limits at any time exceeds background or 0.01 fibers per cubic centimeter, whichever is greater, stop work immediately and correct the situation.

3.2.12.4 Roofing Materials

Establish designated limits for the asbestos regulated work area with the use of red barrier tape, critical barriers, signs, and maintain all other requirements for asbestos control area except local exhaust. When removing roofing materials which contain ACM as described in 29 CFR 1926.1101(g)(8)(ii), use the following practices. Roofing material must be removed in an intact state. Wet methods must be used to remove roofing materials that are not intact, or to be rendered not intact during removal, unless such wet methods are not feasible or create safety hazards. When removing built-up roofs, with asbestos-containing roofing felts and an aggregate surface, using a power roof cutter, all dust resulting from the cutting operations must be collected by a HEPA dust collector, or must be HEPA vacuumed by vacuuming along the cut line. Asbestos-containing roofing material must not be dropped or thrown to the ground, but must be lowered to the ground via covered, dust-tight chute, crane, hoist or other method approved by the Contracting Officer. Any ACM that is not intact must be lowered to the ground as soon as practicable, but not later than the end of the work shift. While the material remains on the roof it must be kept wet or placed in an impermeable waste bag or wrapped in plastic sheeting. Intact ACM must be lowered to the ground as soon as practicable, but not later than the end of the work shift. Unwrapped material must be transferred to a closed receptacle. Critical barriers must be placed over roof level heating and ventilation air intakes. Conduct area monitoring of airborne fibers during the work shift at the designated limits of the asbestos work area and conduct personal samples of each worker engaged in the work. If the airborne fiber concentration of the workers or designated limits at any time exceeds background or 0.01 fibers per cubic centimeter, whichever is greater, stop work immediately and correct the situation.

If the asbestos containing roof area undergoing renovation is less than 160 square feet, 40 CFR 61 requirements do not apply; regardless of the

removal method to be used, the type of material (Category I or II), or its condition (friable versus non-friable). However, where a rotating blade roof cutter or equipment that does similar damage is used to remove Category I asbestos containing roofing material, the removal of 5,580 square feet of that material will create 160 square feet of RACM and require compliance with 40 CFR 61.

If a removal operation involves work that is at or above the threshold level of suspect material, Contractor may choose to not test for asbestos if the requirements of 40 CFR 61 are follwed.

3.2.12.5 Cementitious Siding and Shingles or Transite Panels

Establish designated limits for the asbestos regulated work area with the use of red barrier tape, critical barriers, signs, and maintain all other requirements for asbestos control area except local exhaust. When removing cementitious asbestos-containing siding, shingles or Transite panels use the following work practices. Intentionally cutting, abrading or breaking is prohibited. Each panel or shingle must be sprayed with[amended] water or wetting agent prior to removal. Nails must be cut with flat, sharp instruments. Unwrapped or unbagged panels or shingles must be immediately lowered to the ground via covered dust-tight chute, crane or hoist, or placed in an impervious waste bag or wrapped in plastic sheeting and lowered to the ground no later than the end of the work shift. Place debris into a 6-mil minimum thickness disposal bag or other approved container. Once the material is in the disposal bag, apply additional water as needed to achieve "adequately wet" conditions for NESHAP compliance. Place bagged asbestos waste under negative pressure with the use of a HEPA vacuum, goose neck and duct tape to seal the bag, wash to remove any visible contamination and place into a second 6-mil minimum thickness disposal bag. Containerize asbestos containing waste while wet. Conduct area monitoring of airborne fibers during the work shift at the designated limits of the asbestos work area and conduct personal samples of each worker engaged in the work. If the airborne fiber concentration of the workers or designated limits at any time exceeds background or 0.01 fibers per cubic centimeter, whichever is greater, stop work immediately and correct the situation.

3.2.12.6 Gaskets

Establish designated limits for the asbestos regulated work area with the use of red barrier tape, critical barriers, signs, and maintain all other requirements for asbestos control area except local exhaust. Gaskets must be thoroughly wetted with[amended] water or wetting agent prior to removal and immediately placed in a disposal container. If a gasket is visibly deteriorated and unlikely to be removed intact, removal must be undertaken within a glovebag. Any scraping to remove residue must be performed wet. Place debris into a 6-mil minimum thickness disposal bag or other approved container. Once the material is in the disposal bag, apply additional water as needed to achieve "adequately wet" conditions for NESHAP compliance. Place bagged asbestos waste under negative pressure with the use of a HEPA vacuum, goose neck and duct tape to seal the bag, wash to remove any visible contamination and place into a second 6-mil minimum thickness disposal bag. Containerize asbestos containing waste while wet. Conduct area monitoring of airborne fibers during the work shift at the designated limits of the asbestos work area and conduct personal samples of each worker engaged in the work. If the airborne fiber concentration of the workers or designated limits at any time exceeds background or 0.01 fibers per cubic centimeter, whichever is

greater, stop work immediately and correct the situation.

3.2.13 Abatement of Asbestos Contaminated Soil

Establish designated limits for the asbestos regulated work area with the use of red barrier tape, critical barriers, signs, and maintain all other requirements for asbestos control area except local exhaust. Asbestos contaminated soil must be removed from areas to a minimum depth of [2][_____] inches. Abatement of asbestos contaminated soil must be performed in accordance with all federal, state, and local regulations. Soil must be thoroughly dampened with[amended] water and then removed by manual shoveling into labeled containers. Place debris into a 6-mil minimum thickness disposal bag or other approved container. Once the material is in the disposal bag, apply additional water as needed to achieve "adequately wet" conditions for NESHAP compliance. Place bagged asbestos waste under negative pressure with the use of a HEPA vacuum, goose neck and duct tape to seal the bag, wash to remove any visible contamination and place into a second 6-mil minimum thickness disposal bag. Containerize asbestos containing waste while wet. Conduct area monitoring of airborne fibers during the work shift at the designated limits of the asbestos work area and conduct personal samples of each worker engaged in the work. If the airborne fiber concentration of the workers or designated limits at any time exceeds background or 0.01 fibers per cubic centimeter, whichever is greater, stop work immediately and correct the situation.

3.2.14 Air Sampling

Perform sampling of airborne concentrations of asbestos fibers in accordance with 29 CFR 1926.1101, the Contractor's air monitoring plan, applicable local, state and federal regulations, and as specified herein. Sampling performed in accordance with 29 CFR 1926.1101 must be performed by the PQP. Sampling performed for environmental and quality control reasons must be performed by the PQP. Unless otherwise specified, use NIOSH Method 7400 for sampling and analysis. Monitoring may be duplicated by the Government at the discretion of the Contracting Officer. If the air sampling results obtained by the Government differ from those results obtained by the Contractor, the Government will determine which results predominate. Results of breathing zone samples must be made available to the tested employees and Contracting Officer.. Submit all documentation regarding initial exposure assessments, negative exposure assessments, and air-monitoring results.

3.2.14.1 Sampling Prior to Asbestos Work

Provide area air sampling and establish the baseline one day prior to the masking and sealing operations for each demolition or removal site. Establish the background by performing area sampling in similar but uncontaminated sites in the building.

3.2.14.2 Sampling During Asbestos Work

[The PQP must provide personal and area sampling as indicated in 29 CFR 1926.1101 and governing environmental regulations. Breathing zone samples must be taken for at least 25 percent of the workers in each shift, or a minimum of two, whichever is greater. Air sample fiber counting must be completed and results provided within 24-hours (breathing zone samples), and [_____] hours (environmental/clearance monitoring) after completion of a sampling period. In addition, provided the same

type of work is being performed, provide area sampling at least once every work shift close to the work inside the enclosure, outside the clean room entrance to the enclosure, and at the exhaust opening of the local exhaust system. If sampling outside the enclosure shows airborne levels have exceeded background or 0.01 fibers per cubic centimeter, whichever is greater, stop all work, correct the condition(s) causing the increase, and notify the Contracting Officer immediately.[Where alternate methods are used, perform personal and area air sampling at locations and frequencies that accurately characterize the evolving airborne asbestos levels.] The written results must be signed by testing laboratory analyst, testing laboratory principal and the Contractor's PQP. The air sampling results must be documented on a Contractor's daily air monitoring log.

][The PQP must provide personal sampling as indicated in 29 CFR 1926.1101. Breathing zone samples must be taken for at least 25 percent of the workers in each shift, or a minimum of two, whichever is greater. Breathing zone samples must be taken for at least 25 percent of the workers in each shift, or a minimum of two, whichever is greater. Air sample fiber counting must be completed and results provided within 24-hours (breathing zone samples), and [_____] hours (environmental/clearance monitoring) after completion of a sampling period. At the same time the PQP must provide area sampling close to the work inside the enclosure, outside the clean room entrance to the enclosure, and at the exhaust opening of the local exhaust system. In addition, provided the same type of work is being performed, the PQP must provide area sampling once every work shift close to the work inside the enclosure, outside the clean room entrance to the enclosure, and at the exhaust opening of the local exhaust system. If sampling outside the enclosure shows airborne levels have exceeded background or 0.01 fibers per cubic centimeter, whichever is greater, stop all work, correct the condition(s) causing the increase, and notify the Contracting Officer immediately.[Where alternate methods are used, perform personal and area air sampling at locations and frequencies that accurately characterize the evolving airborne asbestos levels.] The written results must be signed by testing laboratory analyst, testing laboratory principal and the Contractor's PQP. The air sampling results must be documented on a Contractor's daily air monitoring log.

]3.2.14.3 Final Clearance Requirements, NIOSH PCM Method

For PCM sampling and analysis using NIOSH NMAM Method 7400, the fiber concentration inside the abated regulated area, for each airborne sample, must be less than 0.01 f/cc. The abatement inside the regulated area is considered complete when every PCM final clearance sample is below the clearance limit. If any sample result is greater than 0.01 total f/cc, the asbestos fiber concentration (asbestos f/cc) must be confirmed from that same filter using NIOSH NMAM Method 7402 (TEM) at no additional cost to the Government. If any confirmation sample result is greater than 0.01 asbestos f/cc, abatement is incomplete and cleaning must be repeated at no additional cost to the Government. Upon completion of any required recleaning, resampling with results to meet the above clearance criteria must be done at no additional cost to the Government.

3.2.14.4 Final Clearance Requirements, EPA TEM Method

For EPA TEM sampling and analysis, using the EPA Method specified in 40 CFR 763, abatement inside the regulated area is considered complete when the arithmetic mean asbestos concentration of the five inside samples is less than or equal to 70 structures per square millimeter (70 S/mm).

When the arithmetic mean is greater than 70 S/mm, the three blank samples must be analyzed. If the three blank samples are greater than 70 S/mm, resampling must be done. If less than 70 S/mm, the five outside samples must be analyzed and a Z-test analysis performed. When the Z-test results are less than 1.65, the decontamination must be considered complete. If the Z-test results are more than 1.65, the abatement is incomplete and cleaning must be repeated. Upon completion of any required recleaning, resampling with results to meet the above clearance criteria must be done at no additional cost to the Government.

3.2.14.5 Sampling After Final Clean-Up (Clearance Sampling)

Provide area sampling of asbestos fibers using aggressive air sampling techniques as defined in the EPA 560/5-85-024 and establish an airborne asbestos concentration of less than 0.01 fibers per cubic centimeter after final clean-up but before removal of the enclosure or the asbestos work control area. After final cleanup and the asbestos control area is dry but prior to clearance sampling, the PQP must perform a visual inspection in accordance with ASTM E1368 to ensure that the asbestos control and work area is free of any accumulations of dirt, dust, or debris. Prepare a written report signed and dated by the PQP documenting that the asbestos control area is free of dust, dirt, and debris and all waste has been removed. Perform at least two samples per containment.[Use transmission electron microscopy (TEM) to analyze clearance samples and report the results in accordance with current NIOSH criteria.] The asbestos fiber counts from these samples must be less than 0.01 fibers per cubic centimeter or be not greater than the background, whichever is greater. If any of the final samples indicate a higher value take appropriate actions to re-clean the area and repeat the sampling and[TEM] analysis at no additional cost to the Government.

3.2.14.6 Air Clearance Failure

If clearance sampling results fail to meet the final clearance requirements, pay all costs associated with the required recleaning, resampling, and analysis, until final clearance requirements are met.

3.2.15 Lock-Down

Prior to removal of plastic barriers and after pre-clearance clean up of gross contamination, the PQP must conduct a visual inspection of all areas affected by the removal in accordance with ASTM E1368. Inspect for any visible fibers. Spray apply a post removal (lock-down) encapsulant to ceiling, walls, floors and other areas exposed in the removal area. The exposed area includes but is not limited to plastic barriers, furnishings and articles to be discarded as well as dirty change room, air locks for bag removal and decontamination chambers.

3.2.16 Site Inspection

While performing asbestos engineering control work, the Contractor must be subject to on-site inspection by the Contracting Officer who may be assisted by or represented by safety or industrial hygiene personnel. If the work is found to be in violation of this specification, the Contracting Officer or his representative will issue a stop work order to be in effect immediately and until the violation is resolved. All related costs including standby time required to resolve the violation must be at no additional cost to the Government.

3.3 CLEAN-UP AND DISPOSAL

3.3.1 Housekeeping

Essential parts of asbestos dust control are housekeeping and clean-up procedures. Maintain surfaces of the asbestos control area free of accumulations of asbestos fibers. Give meticulous attention to restricting the spread of dust and debris; keep waste from being distributed over the general area. Use HEPA filtered vacuum cleaners. DO NOT BLOW DOWN THE SPACE WITH COMPRESSED AIR. When asbestos removal is complete, all asbestos waste is removed from the work-site, and final clean-up is completed, the Contracting Officer will attest that the area is safe before the signs can be removed. After final clean-up and acceptable airborne concentrations are attained but before the HEPA unit is turned off and the enclosure removed, remove all pre-filters on the building HVAC system and provide new pre-filters. Dispose of filters as asbestos contaminated materials. Reestablish HVAC mechanical, and electrical systems in proper working order. The Contracting Officer will visually inspect all surfaces within the enclosure for residual material or accumulated dust or debris. The Contractor must re-clean all areas showing dust or residual materials. If re-cleaning is required, air sample and establish an acceptable asbestos airborne concentration after re-cleaning. The Contracting Officer must agree that the area is safe in writing before unrestricted entry is permitted. The Government must have the option to perform monitoring to determine if the areas are safe before entry is permitted.

3.3.2 Title to Materials

All waste materials, except as specified otherwise, become the property of the Contractor and must be disposed of as specified in applicable local, State, and Federal regulations and herein.

3.3.3 Disposal of Asbestos

3.3.3.1 Procedure for Disposal

Coordinate all waste disposal manifests with the Contracting Officer and JBSA Environmental Office. Collect asbestos waste, contaminated waste water filters, asbestos contaminated water, scrap, debris, bags, containers, equipment, and asbestos contaminated clothing which may produce airborne concentrations of asbestos fibers and place in sealed fiber-proof, waterproof, non-returnable containers (e.g. double plastic bags 6 mils thick, cartons, drums or cans). Wastes within the containers must be adequately wet in accordance with 40 CFR 61-SUBPART M. Affix a warning and Department of Transportation (DOT) label to each container including the bags or use at least 6 mils thick bags with the approved warnings and DOT labeling preprinted on the bag. Clearly indicate on the outside of each container the name of the waste generator and the location at which the waste was generated. Prevent contamination of the transport vehicle (especially if the transport vehicle is a rented truck likely to be used in the future for non-asbestos purposes). These precautions include lining the vehicle cargo area with plastic sheeting (similar to work area enclosure) and thorough cleaning of the cargo area after transport and unloading of asbestos debris is complete. Dispose of waste asbestos material at an Environmental Protection Agency (EPA) or State-approved asbestos landfill off Government property. For temporary storage, store sealed impermeable bags in asbestos waste drums or skids. An area for interim storage of asbestos waste-containing drums or skids

must be assigned by the Contracting Officer or his authorized representative. Comply with 40 CFR 61-SUBPART M, 25 TAC 296, regional, and local standards for hauling and disposal. Sealed plastic bags may be dumped from drums into the burial site unless the bags have been broken or damaged. Damaged bags must remain in the drum and the entire contaminated drum must be buried. Uncontaminated drums may be recycled. All persons handling containers with asbestos containing wastes must comply with applicable federal, state, and local regulations.

3.3.3.2 Asbestos Disposal Quantity Report

[Direct the PQP to record and report, to the Contracting Officer, the amount of asbestos containing material removed and released for disposal. Deliver the report for the previous day at the beginning of each day shift with amounts of material removed during the previous day reported in linear feet or square feet as described initially in this specification and in cubic feet for the amount of asbestos containing material released for disposal.

][Allow the PQP to inspect, record and report the amount of asbestos containing material removed and released for disposal on a daily basis. Exclude hazardous waste from waste reduction calculations in accordance with Section 01 74 19 CONSTRUCTION WASTE MANAGEMENT AND DISPOSAL.

]

ATT-1 - TxDSHS Asbestos/Demolition Notification

ATTACHED IN APPENDIX A

ATT-2 - TxDSHS Required Occupant Notice

ATTACHED IN APPENDIX A

[**ATT-3 - TxDSHS Phased Project Schedule**

ATTACHED IN APPENDIX A

] -- End of Section --

SECTION 02 83 00

LEAD REMEDIATION
01/26

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. For references without a year, use the current published version.

AMERICAN SOCIETY OF SAFETY PROFESSIONALS (ASSP)

ASSP Z9.2	(2018) Fundamentals Governing the Design and Operation of Local Exhaust Ventilation Systems

ASTM INTERNATIONAL (ASTM)

ASTM E1644	(2025) Standard Practice for Hot Plate Digestion of Dust Wipe Samples for the Determination of Lead
ASTM E1726	(2025) Standard Practice for Preparation of Soil Samples by Hotplate Digestion for Subsequent Lead Analysis
ASTM E1727	(2016) Standard Practice for Field Collection of Soil Samples for Subsequent Lead Determination
ASTM E1728/E1728M	(2024) Standard Practice for Collection of Settled Dust Samples Using Wipe Sampling Methods for Subsequent Lead Determination
ASTM E1792	(2024) Standard Specification for Wipe Sampling Materials for Lead in Surface Dust
ASTM E3193	(2023) Standard Test Method for Measurement of Lead (Pb) by Flame Atomic Absorption Spectrophotometry (FAAS)
ASTM E3203	(2024; Rev A) Standard Test Method for Determination of Lead by Inductively Coupled Plasma-Optical Emission Spectroscopy (ICP-OES)

NATIONAL FIRE PROTECTION ASSOCIATION (NFPA)

NFPA 701	(2023; ERTA 1 2023) Standard Methods of Fire Tests for Flame Propagation of Textiles and Films

STATE OF TEXAS ADMINISTRATIVE CODE (TAC)

25 TAC 295 SUBCHAPTER I	Texas Environmental Lead Reduction

U.S. ARMY CORPS OF ENGINEERS (USACE)

EM 385-1-1	(2024) Safety -- Safety and Occupational Health (SOH) Requirements

U.S. DEPARTMENT OF HOUSING AND URBAN DEVELOPMENT (HUD)

24 CFR 35.1345	Occupant Protection and Worksite Preparation
HUD 6780	(1995; Rev July 2012) Guidelines for the Evaluation and Control of Lead-Based Paint Hazards in Housing (2nd Edition)

U.S. ENVIRONMENTAL PROTECTION AGENCY (EPA)

EPA SW-846	(Third Edition; Update VII) Test Methods for Evaluating Solid Waste: Physical/Chemical Methods

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

29 CFR 1926.21	Safety Training and Education
29 CFR 1926.33	Access to Employee Exposure and Medical Records
29 CFR 1926.55	Gases, Vapors, Fumes, Dusts, and Mists
29 CFR 1926.59	Hazard Communication
29 CFR 1926.62	Lead
29 CFR 1926.65	Hazardous Waste Operations and Emergency Response
29 CFR 1926.103	Respiratory Protection
29 CFR 1926.1126	Chromium
29 CFR 1926.1127	Cadmium
40 CFR 260	Hazardous Waste Management System: General
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 268	Land Disposal Restrictions
40 CFR 745	Lead-Based Paint Poisoning Prevention in Certain Residential Structures
49 CFR 172	Hazardous Materials Table, Special Provisions, Hazardous Materials Communications, Emergency Response Information, and Training Requirements
49 CFR 174	Carriage by Rail
49 CFR 175	Carriage by Aircraft
49 CFR 176	Carriage by Vessel
49 CFR 178	Specifications for Packagings

UL SOLUTIONS (UL)

UL 586	(2009; Reprint Sep 2022) UL Standard for Safety High-Efficiency Particulate, Air Filter Units

1.2 DEFINITIONS

1.2.1 Abatement

Measures defined in 40 CFR 745, Section 223, designed to permanently eliminate lead-based paint hazards.

1.2.2 Action Level

Employee exposure, without regard to use of respirators, to an airborne concentration of lead of 30 micrograms per cubic meter of air averaged over an 8-hour period; to an airborne concentration of cadmium of 2.5 micrograms per cubic meter of air averaged over an 8-hour period; to an airborne concentration of chromium (VI) of 2.5 micrograms per cubic meter of air averaged over an 8-hour period.

1.2.3 Area Sampling

Sampling of lead, cadmium, chromium concentrations within the lead, cadmium, chromium control area and inside the physical boundaries which is representative of the airborne lead, cadmium, chromium concentrations but is not collected in the breathing zone of personnel (approximately 5 to 6 feet above the floor).

1.2.4 Cadmium Permissible Exposure Limit (PEL)

Five micrograms per cubic meter of air as an 8-hour time weighted average as determined by 29 CFR 1926.1127. If an employee is exposed for more than 8-hours in a work day, determine the PEL by the following formula:

PEL (micrograms/cubic meter of air) = 40/No. hrs worked per day

1.2.5 Certified Industrial Hygienist (CIH)

As used in this section refers to a person retained by the Contractor who is certified as an industrial hygienist and who is trained in the recognition and control of lead, cadmium and chromium hazards in accordance with current federal, State, and local regulations. CIH must be certified for comprehensive practice by the Board for Global EHS Credentialing (BGC). The Certified Industrial Hygienist must be independent of the Contractor and must have no employee or employer relationship which could constitute a conflict of interest.

1.2.6 Child-Occupied Facility

Real property which is a building or portion of a building constructed prior to 1978 visited regularly by the same child, 6-years of age or under, on at least two different days within any week (Sunday through Saturday period), provided that each day's visit lasts at least 3-hours, and the combined annual visits last at least 60-hours. Child-occupied facilities include but are not limited to, day-care centers, preschools and kindergarten classrooms.

1.2.7 Chromium Permissible Exposure Limit (PEL)

Five micrograms per cubic meter of air as an 8-hour time weighted average as determined by 29 CFR 1926.1126. If an employee is exposed for more than 8-hours in a work day, determine the PEL by the following formula:

PEL (micrograms/cubic meter of air) = 40/No. hrs worked per day

1.2.8 Competent Person (CP)

As used in this section, refers to a person employed by the Contractor who is trained in the recognition and control of lead, cadmium and chromium hazards in accordance with current federal, State, and local regulations and has the authority to take prompt corrective actions to control the lead, cadmium and chromium hazard. The Contractor may provide more than one CP as required to supervise and monitor the work. The CP must be a Certified Industrial Hygienist (CIH) certified by the Board for Global EHS Credentialing (BGC) or a Certified Safety Professional (CSP) certified by the Board of Certified Safety Professionals or a licensed lead-based paint abatement Supervisor/Project Designer in the State of Texas.

1.2.9 Contaminated Room

Refers to a room for removal of contaminated personal protective equipment (PPE).

1.2.10 Decontamination Shower Facility

That facility that encompasses a clean clothing storage room, and a contaminated clothing storage and disposal rooms, with a shower facility in between.

1.2.11 Deleading

Activities conducted by a person who offers to eliminate lead-based paint

or lead-based paint hazards or to plan such activities in commercial buildings, bridges or other structures.

1.2.12 Eight-Hour Time Weighted Average (TWA)

Airborne concentration of lead, cadmium, chromium to which an employee is exposed, averaged over an 8-hour workday as indicated in 29 CFR 1926.62, 29 CFR 1926.1126, 29 CFR 1926.1127.

1.2.13 High Efficiency Particulate Air (HEPA) Filter Equipment

HEPA filtered vacuuming equipment with a UL 586 filter system capable of collecting and retaining lead, cadmium, chromium contaminated particulates. A high efficiency particulate filter demonstrates at least 99.97 percent efficiency against 0.3 micron or larger size particles.

1.2.14 Lead

Metallic lead, inorganic lead compounds, and organic lead soaps. Excludes other forms of organic lead compounds. The use of the term lead in this section also refers to paints which contain detectable concentrations of cadmium and chromium.[For the purpose of the section lead-based paint (LBP) and paint with lead (PWL), cadmium and chromium are included.]

1.2.15 Lead-Based Paint (LBP)

Paint or other surface coating that contains lead in excess of 1.0 milligrams per centimeter squared or 0.5 percent by weight.

1.2.16 Lead-Based Paint Activities

In the case of target housing or child occupied facilities, lead-based paint activities include; a lead-based paint inspection, a risk assessment, or abatement of lead-based paint hazards.

1.2.17 Lead-Based Paint Hazards

Paint-lead hazard, dust-lead hazard or soil-lead hazard as identified in 40 CFR 745, Section 65. Any condition that causes exposure to lead from lead-contaminated dust, lead-contaminated soil, lead-based paint that is deteriorated or present in accessible surfaces, friction surfaces, or impact surfaces that would result in adverse human health effects.

1.2.18 Lead, Cadmium, Chromium Control Area

A system of control methods to prevent the spread of lead, cadmium, chromium dust, paint chips or debris to adjacent areas that may include temporary containment, floor or ground cover protection, physical boundaries, and warning signs to prevent unauthorized entry of personnel. HEPA filtered local exhaust equipment may be used as engineering controls to further reduce personnel exposures or building/outdoor environmental contamination.

1.2.19 Lead Permissible Exposure Limit (PEL)

Fifty micrograms per cubic meter of air as an 8-hour time weighted average as determined by 29 CFR 1926.62. If an employee is exposed for more than 8-hours in a work day, determine the PEL by the following formula:

PEL (micrograms/cubic meter of air) = 400/No. hrs worked per day

1.2.20 Material Containing Lead/Paint with Lead (MCL/PWL)

Any material, including paint, which contains lead as determined by the testing laboratory using a valid test method. The requirements of this section does not apply if no detectable levels of lead are found using a quantitative method for analyzing paint or MCL using laboratory instruments with specified limits of detection (usually 0.01 percent). An X-Ray Fluorescence (XRF) instrument is not considered a valid test method.

1.2.21 Personal Sampling

Sampling of airborne lead, cadmium, chromium concentrations within the breathing zone of an employee to determine the 8-hour time weighted average concentration in accordance with 29 CFR 1926.62, 29 CFR 1926.1126, 29 CFR 1926.1127. Samples must be representative of the employees' work tasks. Breathing zone must be considered an area within a hemisphere, forward of the shoulders, with a radius of 6 to 9 inches and centered at the nose or mouth of an employee.

1.2.22 Physical Boundary

Area physically roped or partitioned off around lead, cadmium, chromium control area to limit unauthorized entry of personnel.

1.2.23 Target Housing

Residential real property which is housing constructed prior to 1978, except housing for the elderly or persons with disabilities (unless any one or more children age 6-years or under resides or is expected to reside in such housing for the elderly or persons with disabilities) or any zero bedroom dwelling.

1.3 DESCRIPTION

Construction activities impacting PWL or material containing lead, cadmium, chromium which are covered by this specification include the demolition or removal of material containing lead, cadmium, chromium in [_____] condition, located [_____] and as indicated on the drawings. [_____] The work covered by this section includes work tasks and the precautions specified in this section for the protection of building occupants and the environment during and after the performance of the hazard abatement activities.

1.3.1 Protection of Existing Areas To Remain

Project work including, but not limited to, lead, cadmium, chromium hazard abatement work, storage, transportation, and disposal must be performed without damaging or contaminating adjacent work and areas. Where such work or areas are damaged or contaminated, restore work and areas to the original condition.

1.3.2 Coordination with Other Work

Coordinate with work being performed in adjacent areas to ensure there are no exposure issues. Explain coordination procedures in the Lead, Cadmium, Chromium Compliance Plan and describe how the Contractor prevents lead, cadmium and chromium exposure to other contractors and Government

personnel performing work unrelated to lead, cadmium and chromium activities.

1.3.3 Sampling and Analysis

Submit a log of the analytical results from sampling conducted during the abatement. Keep the log of results current with project activities and brief the results to the Contracting Officer as analytical results are reported.

1.3.3.1 Dust Wipe Materials, Sampling and Analysis

Sampling must conform to ASTM E1728/E1728M or ASTM E1792. Analysis must conform to ASTM E3193, ASTM E3203 REV A, and ASTM E1644.

1.3.3.2 Soil Sampling and Analysis

Sampling must conform to ASTM E1727. Analysis must conform to ASTM E3193, ASTM E3203 REV A, ASTM E1726, EPA SW-846 Method 7000 series, and state and local regulations.

1.3.3.3 Clearance Monitoring

a. Collect dust wipe samples inside the lead, cadmium and chromium hazard control area after the final visual inspection in the quantities and at the locations specified.

   (1) Floors - one dust sample shall be taken from the floors of each of no less than four rooms, hallways or stairwells within the containment area; unless there are less than four rooms, hallways or stairwells within the containment area, then all rooms, hallways or stairwells shall be sampled. In addition, one dust sample shall be taken from the floor outside the containment area.

   (2) Interior Window Sills - one dust sample shall be taken from one interior window sill.

   (3) Window Troughs - one dust sample shall be taken from one interior window trough.

b. Collect exterior bare soil samples inside the lead, cadmium and chromium hazard control area after the final visual inspection in the quantities and at the locations specified.

   (1) Near the building foundation - one composite soil sample collected around the perimeter of each work area.

   (2) Nearby Play areas - one composite soil sample for each nearby play area.

1.3.4 Clearance Requirements

[Target housing and child occupied facilities clearance levels.
]

   (1) Floors - 5 micrograms/square foot.

   (2) Interior Window Sills - 40 micrograms/square foot.

   (3) Window Troughs - 100 micrograms/square foot.

(4) Bare soils in play areas accessible by children - 400 micrograms/kilogram.

(5) Bare soils in all other areas - 1200 micrograms/kilogram.

1.4 SUBMITTALS

Government approval is required for submittals with a "G" or "S" classification. Refer to Section 01 33 00 SUBMITTAL PROCEDURES for requirements when a classification other than "G" or "S" are used. Submittals not having a classification are for information only. Submit the following in accordance with Section 01 33 00 SUBMITTAL PROCEDURES:

SD-01 Preconstruction Submittals

Competent Person Qualifications; G

Training Certification; G

Occupational and Environmental Assessment Data Report; G

Medical Examinations; G

Lead, Cadmium, Chromium Waste Management Plan; G

Licenses, Permits and Notifications; G

Occupant Protection Plan; G

Lead, Cadmium, Chromium Compliance Plan; G

[Initial Sample Results; G

][Lead Abatement Notification; G

] Written Evidence of TSD Approval; G

SD-03 Product Data

Respirators; G

Vacuum Filters; G

Negative Air Pressure System; G

Materials and Equipment; G

Expendable Supplies; G

Local Exhaust Equipment; G

Pressure Differential Automatic Recording Instrument; G

Pressure Differential Log; G

SD-06 Test Reports

Sampling and Analysis; G

Occupational and Environmental Assessment Data Report; G

Sampling Results; G

Pressure Differential Recordings For Local Exhaust System; G

SD-07 Certificates

Testing Laboratory; G

[Third Party Consultant Qualifications; G

][Occupant Notification; G

] Clearance Certification; G

SD-11 Closeout Submittals

Hazardous Waste Manifest; G

Turn-In Documents or Weight Tickets; G

Nonhazardous Manifest; G

Bill Of Lading; G

1.5 QUALITY ASSURANCE

1.5.1 Qualifications

1.5.1.1 Competent Person (CP)

Submit name, address, and telephone number of the CP selected to perform responsibilities specified in paragraph COMPETENT PERSON (CP) RESPONSIBILITIES. Provide documented construction project-related experience with implementation of OSHA's Lead in Construction standard (29 CFR 1926.62), Chromium standard (29 CFR 1926.1126), Cadmium standard (29 CFR 1926.1127) which shows ability to assess occupational and environmental exposure to lead, cadmium, chromium; experience with the use of respirators, personal protective equipment and other exposure reduction methods to protect employee health. Demonstrate a minimum of[3][5] years experience implementing OSHA's Lead in Construction standard (29 CFR 1926.62), Chromium standard (29 CFR 1926.1126), and Cadmium standard (29 CFR 1926.1127). Submit proper documentation that the CP is trained and certified in accordance with federal, State of Texas and local laws. The competent person must be a licensed lead-based paint abatement Supervisor/Project Designer in the State of Texas.

1.5.1.2 Training Certification

Submit a certificate for each worker and supervisor, signed and dated by the[accredited] training provider, stating that the employee has received the required lead, cadmium and chromium training specified in 29 CFR 1926.62, 29 CFR 1926.1126, 29 CFR 1926.1127 40 CFR 745 and is certified to perform or supervise deleading, lead removal or demolition activities in the State of Texas.

1.5.1.3 Testing Laboratory

Submit the name, address, and telephone number of the testing laboratory selected to perform the air[soil][and wipe] analysis, testing, and reporting of airborne concentrations of lead, cadmium and chromium. Use a laboratory participating in the EPA National Lead Laboratory Accreditation Program (NLLAP) by being accredited by either the American Association for Laboratory Accreditation (A2LA) or the American Industrial Hygiene Association (AIHA) and that is successfully participating in the Environmental Lead Proficiency Analytical Testing (ELPAT) program to perform sample analysis. Laboratories selected to perform blood lead analysis must be OSHA approved.

[1.5.1.4 Third Party Consultant Qualifications

Submit the name, address and telephone number of the third party consultant selected to perform the wipe sampling for determining concentrations of lead, cadmium and chromium in dust. Submit proper documentation that the consultant is trained and certified as an inspector technician or inspector/risk assessor by the USEPA authorized State (or local) certification and accreditation program.

]1.5.1.5 Certified Risk Assessor

The Certified Risk Assessor must be certified pursuant to 40 CFR 745, Section 226 or applicable state certifications and be responsible to perform the clearance sampling, clearance sample data evaluation and summarize clearance sampling results in a section of the abatement report. The risk assessor must sign the abatement report to indicate clearance requirements for the contract have been met.

1.5.2 Requirements

1.5.2.1 Competent Person (CP) Responsibilities

a. Verify training meets all federal, State, and local requirements.

b. Review and approve Lead, Cadmium, Chromium Compliance Plan for conformance to the applicable referenced standards.

c. Continuously inspect LBP/PWL or MCL work for conformance with the approved plan.

d. Perform (or oversee performance of) air sampling.

e. Ensure work is performed in strict accordance with specifications at all times.

f. Control work to prevent hazardous exposure to human beings and to the environment at all times.

g. Supervise final cleaning of the lead, cadmium, chromium control area, take clearance wipe samples if necessary; review clearance sample results and make recommendations for further cleaning.

h. Certify the conditions of the work as called for elsewhere in this specification.

i. The CP must be certified pursuant to 40 CFR 745, Section 226 and is

responsible for development and implementation of the occupant protection plan, the abatement report and supervise lead, cadmium and chromium hazard abatement work activities.

1.5.2.2 Lead, Cadmium, Chromium Compliance Plan

Submit a detailed job-specific plan of the work procedures to be used in the disturbance of lead, cadmium and chromium, LBP/PWL or MCL. Include in the plan a sketch showing the location, size, and details of lead, cadmium, chromium control areas, critical barriers, physical boundaries, location and details of decontamination facilities, viewing ports, and mechanical ventilation system. Include a description of equipment and materials, work practices, controls and job responsibilities for each activity from which lead, cadmium, chromium is emitted. Include in the plan, eating, drinking, smoking, hygiene facilities and sanitary procedures, interface of trades, sequencing of lead, cadmium, chromium related work, collected waste water and dust containing lead, cadmium, chromium and debris, air sampling, respirators, personal protective equipment, and a detailed description of the method of containment of the operation to ensure that lead, cadmium, chromium is not released outside of the lead, cadmium, chromium control area. Include site preparation, cleanup and clearance procedures. Include occupational and environmental sampling, training and strategy, sampling and analysis strategy and methodology, frequency of sampling, duration of sampling, and qualifications of sampling personnel in the air sampling portion of the plan. Include a description of arrangements made among contractors on multicontractor worksites to inform affected employees and to clarify responsibilities to control exposures.

The plan must be developed and signed by a certified Lead Project Designer in the State of Texas. The plan must include the name and certification number of the person signing the plan.

In occupied buildings, the plan must also include an occupant protection program that describes the measures that are taken during the work to notify and protect the building occupants.

1.5.2.3 Occupational and Environmental Assessment Data Report

If initial monitoring is necessary, submit occupational and environmental sampling results to the Contracting Officer within three working days of collection, signed by the testing laboratory employee performing the analysis, the employee that performed the sampling, and the CP.

[In order to reduce the full implementation of 29 CFR 1926.62, 29 CFR 1926.1126, 29 CFR 1926.1127 the Contractor must provide documentation. Submit a report that supports the determination to reduce full implementation of the requirements of 29 CFR 1926.62, 29 CFR 1926.1126, 29 CFR 1926.1127 and supporting the Lead, Cadmium, Chromium Compliance Plan.

] a. The initial monitoring must represent each job classification, or if working conditions are similar to previous jobs by the same employer, provide previously collected exposure data that can be used to estimate worker exposures per 29 CFR 1926.62, 29 CFR 1926.1126, 29 CFR 1926.1127. The data must represent the worker's regular daily exposure to lead, cadmium, chromium for stated work.

b. Submit worker exposure data gathered during the task based trigger

operations of 29 CFR 1926.62, 29 CFR 1926.1126, 29 CFR 1926.1127 with a complete process description. This includes manual demolition, manual scraping, manual sanding, heat gun, power tool cleaning, rivet busting, cleanup of dry expendable abrasives, abrasive blast enclosure removal, abrasive blasting, welding, cutting and torch burning where lead, cadmium and chromium containing coatings are present.

c. The initial assessment must determine the requirement for further monitoring and the need to fully implement the control and protective requirements including the lead, cadmium, chromium compliance plan per 29 CFR 1926.62, 29 CFR 1926.1126, 29 CFR 1926.1127.

1.5.2.4 Medical Examinations

Submit documentation of workers who performed lead, cadmium, chromium activities including the name of each employee, type of exam received, and date of the exam. The documentation must also include a signed statement that the medical examination was reviewed by the contractor's Safety Manager and Industrial Hygienist stating that the listed personnel have received the required medical examination in accordance with 29 CFR 1926.62 and the exam results are saved. Initial medical surveillance as required by 29 CFR 1926.62, 29 CFR 1926.1126, 29 CFR 1926.1127 must be made available to all employees exposed to lead, cadmium, chromium at any time (one day) above the action level. Full medical surveillance must be made available to all employees on an annual basis who are or may be exposed to lead, cadmium and chromium in excess of the action level for more than 30 days a year or as required by 29 CFR 1926.62, 29 CFR 1926.1126, 29 CFR 1926.1127. Adequate records must show that employees meet the medical surveillance requirements of 29 CFR 1926.33, 29 CFR 1926.62, 29 CFR 1926.1126, 29 CFR 1926.1127 and 29 CFR 1926.103. Provide medical surveillance to all personnel exposed to lead, cadmium, chromium as indicated in 29 CFR 1926.62, 29 CFR 1926.1126, 29 CFR 1926.1127. Maintain complete and accurate medical records of employees for the duration of employment plus 30 years.

1.5.2.5 Training

Train each employee performing work that disturbs lead, cadmium, chromium, who performs LBP/MCL/PWL disposal, and air sampling operations prior to the time of initial job assignment and annually thereafter, in accordance with 29 CFR 1926.21, 29 CFR 1926.62, 29 CFR 1926.1126, 29 CFR 1926.1127, 40 CFR 745 and State and local regulations where appropriate.

1.5.2.6 Respiratory Protection Program

a. Provide each employee required to wear a respirator a respirator fit test at the time of initial fitting and at least annually thereafter as required by 29 CFR 1926.62, 29 CFR 1926.1126, 29 CFR 1926.1127.

b. Establish and implement a respiratory protection program as required by 29 CFR 1926.103, 29 CFR 1926.62, 29 CFR 1926.1126, 29 CFR 1926.1127 and 29 CFR 1926.55.

1.5.2.7 Hazard Communication Program

Establish and implement a Hazard Communication Program as required by 29 CFR 1926.59.

1.5.2.8 Lead, Cadmium, Chromium Waste Management

The Lead, Cadmium, Chromium Waste Management Plan must comply with applicable requirements of federal, State, and local hazardous waste regulations and address:

a. Identification and classification of wastes associated with the work.

b. Estimated quantities of wastes to be generated and disposed of.

c. Names and qualifications of each contractor that transports, stores, treats, or disposes of the wastes. Include the facility location and operator and a 24-hour point of contact. Furnish copies of USEPA Identification numbers.

d. Names and qualifications (experience and training) of personnel working on-site with hazardous wastes.

e. List of waste handling equipment to be used in performing the work, to include cleaning, volume reduction, and transport equipment.

f. Spill prevention, containment, and cleanup contingency measures including a health and safety plan to be implemented in accordance with 29 CFR 1926.65.

g. Work plan and schedule for waste containment, removal and disposal. Proper containment of the waste includes using acceptable waste containers (e.g., 55-gallon drums) as well as proper marking/labeling of the containers. All drums must meet applicable United Nations (UN) requirements and DOT regulations. Clean up and containerize wastes daily.

h. Include any process that may alter or treat waste rendering a hazardous waste non hazardous.

i. Unit cost for hazardous waste disposal according to this plan.

1.5.2.9 Environmental, Safety and Health Compliance

In addition to the detailed requirements of this specification, comply with laws, ordinances, rules, and regulations of federal, State, and local authorities regarding lead, cadmium and chromium. Comply with the applicable requirements of the current issue of 29 CFR 1926.62, 29 CFR 1926.1126, 29 CFR 1926.1127, EM 385-1-1and 25 TAC 295 SUBCHAPTER I. Submit matters regarding interpretation of standards to the Contracting Officer for resolution before starting work. Where specification requirements and the referenced documents vary, the most stringent requirements apply.[The following[local][and][State] laws, ordinances, criteria, rules and regulations regarding removing, handling, storing, transporting, and disposing of lead, cadmium and chromium-contaminated materials apply:

a. [_____]

b. [_____]

c. [_____]

[d. [Licensing][and certification] in the state of [_____] is required.

]]1.5.3 Pressure Differential Recordings for Local Exhaust System

Provide a local exhaust system that creates a negative pressure of at least 0.02 inches of water relative to the pressure external to the enclosure and operate it continuously, 24-hours a day, until the temporary enclosure of the lead, cadmium, chromium control area is removed. Submit pressure differential recordings for each work day to the PQP for review and to the Contracting Officer within 24-hours from the end of each work day.

1.5.4 Licenses, Permits and Notifications

Certify and submit in writing to the Texas Department of State Health Services and the Contracting Officer at least 14 calendar days prior to the commencement of work that licenses, permits and notifications have been obtained. All associated fees or costs incurred in obtaining the licenses, permits and notifications are included in the contract price.

1.5.5 Occupant Protection Plan

The certified project designer must develop and implement an Occupant Protection Plan describing the measures and management procedures to be taken during lead, cadmium and chromium hazard abatement activities to protect the building occupants/building facilities and the outside environment from exposure to any lead, cadmium and chromium contamination while lead, cadmium and chromium hazard abatement activities are performed.

1.5.6 Pre-Construction Conference

Along with the CP, meet with the Contracting Officer to discuss in detail the Lead, Cadmium, Chromium Waste Management Plan and the Lead, Cadmium, Chromium Compliance Plan, including procedures and precautions for the work.

1.6 EQUIPMENT

1.6.1 Respirators

Furnish appropriate respirators approved by the National Institute for Occupational Safety and Health (NIOSH), Department of Health and Human Services, for use in atmospheres containing lead, cadmium and chromium dust, fume and mist. Respirators must comply with the requirements of 29 CFR 1926.62, 29 CFR 1926.1126, and 29 CFR 1926.1127.

1.6.2 Special Protective Clothing

Personnel exposed to lead, cadmium, chromium contaminated dust must wear proper[disposable][uncontaminated, reusable] protective whole body clothing, head covering, gloves, eye, and foot coverings as required by 29 CFR 1926.62, 29 CFR 1926.1126, 29 CFR 1926.1127 and applicable state and local regulations. Furnish proper disposable plastic or rubber gloves to protect hands. Reduce the level of protection only after obtaining approval from the CP.

1.6.3 Rental Equipment Notification

If rental equipment is to be used during PWL or MCL handling and disposal, notify the rental agency in writing concerning the intended use of the equipment.

1.6.4 Vacuum Filters

UL 586 labeled HEPA filters.

1.6.5 Equipment for Government Personnel

Furnish the Contracting Officer with [two][_____] complete sets of personal protective equipment (PPE) daily, as required herein, for entry into and inspection of the lead, cadmium and chromium removal work within the lead, cadmium and chromium controlled area. Personal protective equipment must include disposable whole body covering, including appropriate foot, head, eye, and hand protection. PPE remains the property of the Contractor. The Government will provide respiratory protection for the Contracting Officer.

1.6.6 Abrasive Removal Equipment

The use of powered machine for vibrating, sanding, grinding, or abrasive blasting is prohibited unless equipped with local exhaust ventilation systems equipped with high efficiency particulate air (HEPA) filters.

1.6.7 Negative Air Pressure System

1.6.7.1 Minimum Requirements

Do not proceed with work in the area until containment is set up and HEPA filtration systems are in place. The negative air pressure system must meet the requirements of ASSP Z9.2 including approved HEPA filters in accordance with UL 586. Negative air pressure equipment must be equipped with new HEPA filters, and be sufficient to maintain a minimum pressure differential of minus 0.02 inch of water column relative to adjacent, unsealed areas. Negative air pressure system minimum requirements are listed as follows:

a. The unit must be capable of delivering its rated volume of air with a clean first stage filter, an intermediate filter and a primary HEPA filter in place.

b. The HEPA filter must be certified as being capable of trapping and retaining mono-disperse particles as small as 0.3 micrometers at a minimum efficiency of 99.97 percent.

c. The unit must be capable of continuing to deliver no less than 70 percent of rated capacity when the HEPA filter is 70 percent full or measures 2.5 inches of water static pressure differential on a magnehelic gauge.

d. Equip the unit with a manometer-type negative pressure differential monitor with minor scale division of 0.02 inch of water and accuracy within plus or minus 1.0 percent. The manometer must be calibrated daily as recommended by the manufacturer.

e. Equip the unit with a means for the operator to easily interpret the readings in terms of the volumetric flow rate of air per minute moving through the machine at any given moment.

f. Equip the unit with an electronic mechanism that automatically shuts the machine off in the event of a filter breach or absence of a filter.

g. Equip the unit with an audible horn that sounds an alarm when the machine has shut itself off.

h. Equip the unit with an automatic safety mechanism that prevents a worker from improperly inserting the main HEPA filter.

1.6.7.2 Auxiliary Generator

Provide an auxiliary generator with capacity to power a minimum of 50 percent of the negative air machines at any time during the work. When power fails, the generator controls must automatically start the generator and switch the negative air pressure system machines to generator power. The generator must not present a carbon monoxide hazard to workers.

1.6.8 Vacuum Systems

Vacuum systems must be suitably sized for the project, and filters must be capable of trapping and retaining all mono-disperse particles as small as 0.3 micrometers (mean aerodynamic diameter) at a minimum efficiency of 99.97 percent. Properly dispose of used filters that are being replaced.

1.6.9 Heat Blower Guns

Heat blower guns must be flameless, electrical, paint-softener type with controls to limit temperature to less than 1,100 degrees F. Heat blower must be (grounded) 120 volts ac, and must be equipped with cone, fan, glass protector and spoon reflector nozzles.

1.7 PROJECT/SITE CONDITIONS

1.7.1 Protection of Existing Work to Remain

Perform work without damage or contamination of adjacent areas. Where existing work is damaged or contaminated, restore work to its original condition or better as determined by the Contracting Officer.

PART 2 PRODUCTS

2.1 MATERIALS AND EQUIPMENT

Keep materials and equipment needed to complete the project available and on the site. Submit a description of the materials and equipment required; including Safety Data Sheets (SDSs) for material brought onsite to perform the work.

2.1.1 Expendable Supplies

Submit a description of the expendable supplies required.

2.1.1.1 Polyethylene Bags

Disposable bags must be polyethylene plastic and be a minimum of 6 mils thick (4 mils thick if double bags are used) or any other thick plastic material shown to demonstrate at least equivalent performance; and capable of being made leak-tight. Leak-tight means that solids, liquids or dust cannot escape or spill out.

2.1.1.2 Polyethylene Leak-tight Wrapping

Wrapping used to wrap lead, cadmium, chromium contaminated debris must be polyethylene plastic that is a minimum of 6 mils thick or any other thick plastic material shown to demonstrate at least equivalent performance.

2.1.1.3 Polyethylene Sheeting

Sheeting must be polyethylene plastic with a minimum thickness of 6 mil, or any other thick plastic material shown to demonstrate at least equivalent performance; and be provided in the largest sheet size reasonably accommodated by the project to minimize the number of seams. Where the project location constitutes an out of the ordinary potential for fire, or where unusual fire hazards cannot be eliminated, provide flame-resistant polyethylene sheets which conform to the requirements of NFPA 701.

2.1.1.4 Tape and Adhesive Spray

Tape and adhesive must be capable of sealing joints between polyethylene sheets and for attachment of polyethylene sheets to adjacent surfaces. After dry application, tape or adhesive must retain adhesion when exposed to wet conditions, including water or amended water or wetting agents. Tape must be minimum 2 inches wide, industrial strength.

2.1.1.5 Containers

When used, containers must be leak-tight and be labeled in accordance with EPA, DOT and OSHA standards and UN Regulations.

2.1.1.6 Chemical Paint Strippers

Chemical paint strippers must not contain methylene chloride, n-methylpyrrodlidione, or other regulated solvents, and be formulated to prevent stain, discoloration, or raising of the substrate materials.

2.1.1.7 Chemical Paint Stripper Neutralizer

Neutralizers for paint strippers must be compatible with the substrate and suitable for use with the chemical stripper that has been applied to the surface.

2.1.1.8 Detergents and Cleaners

Detergents or cleaning agents must not contain trisodium phosphate and have demonstrated effectiveness in lead, cadmium and chromium control work using cleaning techniques specified by HUD 6780 guidelines.

PART 3 EXECUTION

3.1 PREPARATION

3.1.1 Protection

3.1.1.1 Notification

a. Notify the Contracting Officer [21][_____] calendar days prior to the start of any lead, cadmium and chromium work.

b. Occupant Notification

(1) Submit occupant written acknowledgment of the delivery of lead hazard information pamphlet (EPA 747-K-99-001 "Protect Your Family From Lead in Your Home" and "The Lead Safe Certified Guide to Renovate Right") prior to commencing the renovation work for each affected unit using language provided in 40 CFR 745 Subpart E. Pamphlets ordering or digital download information is available at: https://www.epa.gov/lead/protect-your-family-lead-your-home-real-estate-disclosure and https://www.epa.gov/lead/renovate-right-important-lead-hazard-information-families-child-care-providers-and-schools

c. Occupant Notification

(1) Submit occupant written acknowledgment of the delivery of lead hazard information pamphlet ("The Lead Safe Certified Guide to Renovate Right") prior to commencing the renovation work using language provided in 40 CFR 745 Subpart E. If the facility is not occupied, then the pamphlet shall be provided to the facility manager to satisfy the delivery requirement. Pamphlet ordering or digital download information is available at: https://www.epa.gov/lead/renovate-right-important-lead-hazard-information-families-child-care-providers-and-schools

d. Lead Abatement Notification

(1) Submit a draft copy of the abatement notification (ATT-1) to the Contracting Officer for review by the JBSA Environmental Office.

(2) Upon concurrence by the JBSA Environmental Office, Contractor shall submit the notification to the Texas Department of State Health Services. All associated costs are the responsibility of the Contractor.

(3) As required, Contractor shall ensure that amendments to the notification as submitted. All associated costs are the responsibility of the Contractor.

3.1.1.2 Lead, Cadmium, Chromium Control Area

a. Physical Boundary - Provide physical boundaries around the lead, cadmium, chromium control area by roping off the area designated in the work plan or providing curtains, portable partitions or other enclosures to ensure that lead, cadmium and chromium does not escape outside of the lead, cadmium and chromium control area. Prohibit the general public from accessing the lead, cadmium, chromium control areas.

b. Warning Signs - Provide warning signs at approaches to lead, cadmium, chromium control areas. These signs must be posted in English and Spanish. Locate signs at such a distance that personnel may read the sign and take the necessary precautions before entering the area. Signs must remain in place and be readable until the renovation and third-party clearances have been completed. Signs must comply with the requirements of 29 CFR 1926.62 and 24 CFR 35.1345.

3.1.1.3 Furnishings

[The Government will remove furniture[, rugs, window coverings,] and equipment from the building before lead, cadmium and chromium work begins.

][Furniture[, rugs, window coverings,] and equipment remaining in the[building][lead, cadmium, chromium control area]. Protect and cover furnishings or remove furnishings from the work area and store in a location approved by the Contracting Officer.

][Existing[furniture][, rugs, window coverings,][and][equipment] is lead, cadmium and chromium contaminated,[decontaminate][dispose of as lead, cadmium, chromium contaminated waste].

]3.1.1.4 Heating, Ventilating and Air Conditioning (HVAC) Systems

Shut down, lock out, and isolate HVAC systems that supply, exhaust, or pass through the lead, cadmium, chromium control areas. Seal intake and exhaust vents in the lead, cadmium, chromium control area with 6 mil plastic sheet and tape. Seal seams in HVAC components that pass through the lead, cadmium, chromium control area.[Provide temporary HVAC system for areas in which HVAC has been shut down outside the lead, cadmium, chromium control area.]

3.1.1.5 Local Exhaust System

Provide a local exhaust system in the lead, cadmium, chromium control area in accordance with ASSP Z9.2, 29 CFR 1926.62, 29 CFR 1926.1126 and 29 CFR 1926.1127 that provides at least [4][_____] air changes per hour inside of the negative pressure enclosure. Local exhaust equipment must be operated 24-hours per day, until the lead, cadmium, chromium control area is removed and must be leak proof to the filter and equipped with HEPA filters. Maintain a minimum pressure differential in the lead, cadmium, chromium control area of minus 0.02 inch of water column relative to adjacent, unsealed areas. Provide continuous 24-hour per day monitoring of the pressure differential with a pressure differential automatic recording instrument. The building ventilation system must not be used as the local exhaust system for the lead, cadmium, chromium control area. Filters on exhaust equipment must conform to ASSP Z9.2 and UL 586. Terminate the local exhaust system out of doors and remote from any public access or ventilation system intakes.

3.1.1.6 Negative Air Pressure System Containment

a. Operate the negative air pressure systems to provide at least [4][10][_____] air changes per hour inside the containment. Operate the local exhaust unit equipment continuously until the containment is removed. Smoke test the negative air pressure system for leaks at the beginning of each shift. The certified supervisor is responsible to continuously monitor and keep a pressure differential log with an automatic manometric recording instrument. Notify the Contracting Officer immediately if the pressure differential falls below the prescribed minimum. Submit the continuously monitored pressure differential log, as specified. Do not use the building ventilation system as the local exhaust system. Terminate the local exhaust system out of doors unless the Contracting Officer allows an alternate arrangement. All filters must be new at the beginning of the project and be periodically changed as necessary to maintain specified pressure differential and disposed of as lead, cadmium and chromium

contaminated waste.

b. Discontinuing Negative Air Pressure System. Operate the negative air pressure system continuously during abatement activities unless otherwise authorized by the Contracting Officer. At the completion of the project, units must be run until full cleanup has been completed and final clearance testing requirements have been met. Dismantling of the negative air pressure systems must conform to written decontamination procedures as presented in the Lead, Cadmium, Chromium Compliance Plan. Seal the HEPA filter machine intakes with polyethylene to prevent environmental contamination.

3.1.1.7 Decontamination Shower Facility

Provide clean and contaminated change rooms and shower facilities in accordance with this specification and 29 CFR 1926.62, 29 CFR 1926.1126, 29 CFR 1926.1127.

3.1.1.8 Eye Wash Station

Provide suitable facilities within the work area for quick drenching or flushing of the eyes where eyes may be exposed to injurious corrosive materials.

3.1.1.9 Mechanical Ventilation System

a. Use adequate ventilation to control personnel exposure to lead, cadmium and chromium in accordance with 29 CFR 1926.62, 29 CFR 1926.1126, 29 CFR 1926.1127. To the extent feasible, use local exhaust ventilation or other collection systems, approved by the CP. Evaluate and maintain local exhaust ventilation systems in accordance with 29 CFR 1926.62, 29 CFR 1926.1126, 29 CFR 1926.1127.

b. Vent local exhaust outside the building and away from building ventilation intakes or ensure system is connected to HEPA filters.

c. Use locally exhausted, power actuated tools or manual hand tools.

3.1.1.10 Personnel Protection

Personnel must wear and use protective clothing and equipment as specified herein. Eating, smoking, or drinking or application of cosmetics is not permitted in the lead, cadmium, chromium control area. No one is permitted in the lead, cadmium, chromium control area unless they have been appropriately trained, medically cleared, and provided with protective equipment.

3.1.1.11 Interior

a. Close windows and doors in the work area. Doors must be covered with plastic sheeting or other impermeable material. Doors used as an entrance to the work area must be covered with plastic sheeting or other impermeable material in a manner that allows workers to pass through while confining dust and debris to the work area.

b. Cover the floor surface, including installed carpet, with taped-down plastic sheeting or other impermeable material in the work area 6 feet beyond the perimeter of surfaces undergoing renovation or a sufficient distance to contain the dust, whichever is greater.

c. Use precautions to ensure that all personnel, tools, and other items, including the exteriors of containers of waste, are free of dust and debris before leaving the work area.

3.1.1.12 Exterior

a. Close all doors and windows within 20 feet of the renovation. On multi-story buildings, close all doors and windows within 20 feet of the renovation on the same floor as the renovation, and close all doors and windows on all floors below that are the same horizontal distance from the renovation.

b. Ensure that doors within the work area that will be used while the job is being performed are covered with plastic sheeting or other impermeable material in a manner that allows workers to pass through while confining dust and debris to the work area.

c. Cover the ground with plastic sheeting or other disposable impermeable material extending 10 feet beyond the perimeter of surfaces undergoing renovation or a sufficient distance to collect falling paint debris, whichever is greater, unless the property line prevents 10 feet of such ground covering.

d. Ensure that dust and debris from the work does not contaminate other buildings or other areas of the property or migrate to adjacent properties.

3.2 ERECTION

3.2.1 Lead, Cadmium, Chromium Control Area Requirements

[

Establish a lead, cadmium, chromium control area by completely establishing barriers and physical boundaries around the area or structure where PWL or MCL removal operations are performed. Maintain the integrity of the containment by ensuring that any plastic or other impermeable materials are not torn or displaced. Ensure that the containment area does not interfere with emergency egress.

][

Full containment - Contain removal operations by the use of[critical barriers][and HEPA filtered exhaust][a negative pressure enclosure system with decontamination facilities and with HEPA filtered exhaust if required by the CP]. For containment areas larger than 1,000 square feet install a minimum of two 18 inch square viewing ports. Locate ports to provide a view of the required work from the exterior of the enclosed contaminated area. Glaze ports with laminated safety glass. Maintain the integrity of the containment by ensuring that any plastic or other impermeable materials are not torn or displaced. Ensure that the containment area does not interfere with emergency egress.

]3.3 APPLICATION

3.3.1 Lead, Cadmium, Chromium Work

Perform lead, cadmium, chromium work in accordance with approved Lead, Cadmium, Chromium Compliance Plan. Use procedures and equipment required to limit occupational exposure and environmental contamination with lead, cadmium, chromium when the work is performed in accordance with

29 CFR 1926.62, 29 CFR 1926.1126, 29 CFR 1926.1127[or 40 CFR 745], and as specified herein. Dispose of all PWL or MCL and associated waste in compliance with federal, State, and local requirements.

3.3.2 Paint with Lead, Cadmium, Chromium or Material Containing Lead, Cadmium, Chromium Removal

Manual or power sanding or grinding of lead, cadmium, chromium surfaces or materials is not permitted unless tools are equipped with HEPA attachments or wet methods. The dry sanding or grinding of surfaces that contain lead, cadmium, chromium is prohibited. Pressure washing is not permitted due to potential for cross contamination of surrounding areas and soils that would necessitate additional cleanup. No detergents are permitted to be used as this could result in contamination of waterways. Provide methodology for removing lead, cadmium, chromium in the Lead, Cadmium, Chromium Compliance Plan. Select lead, cadmium, chromium removal processes to minimize contamination of work areas outside the control area with lead, cadmium, chromium contaminated dust or other lead, cadmium, chromium contaminated debris or waste and to ensure that unprotected personnel are not exposed to hazardous concentrations of lead, cadmium, chromium. Describe this removal process in the Lead, Cadmium, Chromium Compliance Plan.

The following items are either prohibited practices or restricted practices:

a. Open-flame burning or torching of lead-based paint is prohibited.

b. use of machines that remove lead-based paint through high-speed operation such as sanding, grinding, power planning, needle gun, pressure washing, abrasive blasting, or sandblasting, is prohibited unless such machines are used with HEPA exhaust control.

c. Operating a heat gun on lead-based paint is permitted only at temperatures below 1000 degrees Fahrenheit.

Avoid flash rusting or deterioration of the substrate. Provide surface preparations for painting in accordance with Section 09 90 00 PAINTS AND COATINGS.

Provide methodology for lead, cadmium and chromium, LBP/PWL[removal][abatement/control] and processes to minimize contamination of work areas outside the control area with lead, cadmium, chromium contaminated dust or other lead, cadmium, chromium contaminated debris/waste and to ensure that unprotected personnel are not exposed to hazardous concentrations of lead, cadmium, chromium. Describe this lead,, cadmium and chromium, LBP/PWL removal/control process in the Lead, Cadmium, Chromium Compliance Plan.

3.3.2.1 Paint with Lead, Cadmium, Chromium or Material Containing Lead, Cadmium, Chromium - Indoor Removal

Perform[manual][mechanical] removal in the lead, cadmium, chromium control areas using enclosures, barriers or containments[and powered locally exhausted tools equipped with HEPA filters]. Collect residue and debris for disposal in accordance with federal, State, and local requirements.

3.3.2.2 Paint with Lead, Cadmium, Chromium or Material Containing Lead, Cadmium, Chromium - Outdoor Removal

Perform outdoor removal as indicated in federal, State, and local regulations and in the Lead, Cadmium, Chromium Compliance Plan. The worksite preparation (barriers or containments) must be job dependent and presented in the Lead, Cadmium, Chromium Compliance Plan.

3.3.3 Personnel Exiting Procedures

Whenever personnel exit the lead, cadmium, chromium controlled area, they must perform the following procedures and must not leave the work place wearing any clothing or equipment worn in the control area:

a. Vacuum all clothing before entering the contaminated change room.

b. Remove protective clothing in the contaminated change room, and place them in an approved impermeable disposal bag.

[c. Shower.

][d. Wash hands and face at the site, don appropriate disposable or uncontaminated reusable clothing, move to an appropriate shower facility, shower.

] e. Change to clean clothes prior to leaving the clean clothes storage area.

3.4 FIELD QUALITY CONTROL

3.4.1 Tests

3.4.1.1 Air and Wipe Sampling

Conduct sampling for lead, cadmium, chromium in accordance with 29 CFR 1926.62, 29 CFR 1926.1126, 29 CFR 1926.1127, and as specified herein. Air and wipe sampling must be directed or performed by the CP.

a. The CP must be on the job site directing the air and wipe sampling and inspecting the PWL or MCL removal work to ensure that the requirements of the contract have been satisfied during the entire PWL or MCL operation.

b. Collect personal air samples on employees who are anticipated to have the greatest risk of exposure as determined by the CP. In addition, collect air samples on at least twenty-five percent of the work crew or a minimum of two employees, whichever is greater, during each work shift.

c. Submit results of air samples, signed by the CP, within 72-hours after the air samples are taken.

d. Conduct area air sampling daily, on each shift in which lead, cadmium and chromium and lead-based paint removal operations are performed, in areas immediately adjacent to the lead, cadmium and chromium control area. Conduct sufficient area monitoring to ensure unprotected personnel are not exposed at or above 30 micrograms of lead per cubic meter of air or 2.5 micrograms of cadmium/chromium per cubic meter of air. If 30 micrograms of lead per cubic meter of air or 2.5

micrograms of cadmium/chromium per cubic meter of air is reached or exceeded, stop work, correct the conditions(s) causing the increased levels. Notify the Contracting Officer immediately. Determine if condition(s) require any further change in work methods. Resume removal work only after the CP and the Contracting Officer give approval.

[e. Before any work begins,[a third party consultant must] collect and analyze baseline wipe[and soil] samples in accordance with methods defined by federal, State, and local standards inside and outside of the physical boundary to assess the degree of dust contamination in the facility prior to lead, cadmium and chromium disturbance or removal. Provide Initial Sample Results to the Contracting Officer before work begins.

]
[f. Surface Wipe Samples - Collect surface wipe samples on floors at a location no greater than 10 feet outside the lead, cadmium, chromium control area at a frequency of once per day while lead, cadmium, chromium removal work is conducted in occupied buildings. Surface wipe samples or Micro Vacuum surface sample results must meet criteria in paragraph CLEARANCE CERTIFICATION.

]3.4.1.2 Sampling After Removal

After the visual inspection,[conduct soil sampling if bare soil is present during external removal operations and] collect wipe[and soil] samples according to the HUD protocol contained in HUD 6780 to determine the lead, cadmium and chromium content of settled dust in micrograms per square foot of surface area[and parts per million (ppm) for soil].

[3.4.1.3 Testing of Material Containing Lead, Cadmium, Chromium Residue

Test residue in accordance with 40 CFR 261 or applicable state or local regulations for hazardous waste.

]3.5 CLEANING AND DISPOSAL

3.5.1 Cleanup

Maintain surfaces of the lead, cadmium, chromium control area free of accumulations of dust and debris. Restrict the spread of dust and debris; keep waste from being distributed over the work area. Do not dry sweep or use pressurized air to clean up the area. At the end of each shift and when the lead, cadmium, chromium operation has been completed, clean the controlled area of all visible contamination by vacuuming with a HEPA filtered vacuum cleaner, wet mopping the area and wet wiping the area as indicated by the Lead, Cadmium, Chromium Compliance Plan. Clean walls starting at the ceiling and working down to the floor. Thoroughly vacuum all remaining surfaces and objects in the work area, including furniture and fixtures. The vacuum must be equipped with a beater bar when vacuuming carpets and rugs. Reclean areas showing dust or debris. After visible dust and debris is removed, wet wipe and HEPA vacuum all surfaces in the controlled area. If adjacent areas become contaminated at any time during the work, clean, visually inspect, and then wipe sample all contaminated areas. The CP must then certify in writing that the area has been cleaned of lead, cadmium and chromium contamination before clearance testing.

3.5.1.1 Clearance Certification

The CP must certify in writing that air samples collected outside the lead, cadmium, chromium control area during paint removal operations are less than 30 micrograms of lead per cubic meter of air and less than 2.5 micrograms of cadmium/chromium per cubic meter of air; the respiratory protection used for the employees was adequate; the work procedures were performed in accordance with 29 CFR 1926.62, 29 CFR 1926.1126, 29 CFR 1926.1127; and that there were no visible accumulations of material and dust containing lead, cadmium, chromium left in the work site. Do not remove the lead, cadmium, chromium control area or roped off boundary and warning signs prior to the Contracting Officer's acknowledgement of receipt of the CP certification.

[The third party consultant must certify surface wipe sample results collected inside and outside the work area are less than 5 micrograms of lead per square foot on floors, less than 40 micrograms of lead per square foot on interior window sills, and less than 100 micrograms of lead per square foot on window troughs

][The third party consultant must certify surface wipe sample or Micro Vacuum surface sample results collected inside and outside the work area are less than 200 micrograms of lead per square foot on floors or horizontal surfaces. Use Micro Vacuum technique on rough or porous surfaces which are difficult to achieve clearance by the wipe sampling methodology. Micro Vacuum readings must be calculated by a certified industrial hygienist.

][Certify surface wipe samples are not significantly greater than the initial surface loading determined prior to work.

][Clear the lead, cadmium, chromium control area in industrial facilities of all visible dust and debris.

][For exterior work, soil samples taken at the exterior of the work site must be used to determine if soil lead, cadmium, chromium levels have increased at a statistically significant level (significant at the 95 percent confidence limit) from the soil lead, cadmium, chromium levels prior to the operation. If soil lead, cadmium, chromium levels either show a statistically significant increase above soil lead, cadmium, chromium levels prior to work or soil lead, cadmium, chromium levels above any applicable federal or state standard for lead, cadmium, chromium in soil, the soil must be remediated.

] For lead, cadmium and chromium-based paint hazard abatement work, surface wipe and soil sampling must be conducted and clearance determinations made according to the work practice standards presented in 40 CFR 745.227.

3.5.2 Disposal

a. Dispose of material, whether hazardous or non-hazardous in accordance with all laws and provisions and all federal, State or local regulations. Ensure all waste is properly characterized. The result of each waste characterization (TCLP for RCRA materials) dictates disposal requirements. All copies of lab results shall be provided to the Contracting Officer and the JBSA Environmental Office prior to disposal of such material. All analysis shall be accomplished by an approved TCEQ National Environmental Laboratory Accreditation Conference (NELAC), synonymous with the National Environmental

Laboratory Accreditation Program (NELAP), laboratory. Separate hazardous waste from non-hazardous waste to be recycled or reclaimed to the greatest extent practicable in accordance with Section 01 74 19 CONSTRUCTION WASTE MANAGEMENT AND DISPOSAL.

b. Contractor is responsible for segregation of waste. Collect lead, cadmium, chromium contaminated waste, scrap, debris, bags, containers, equipment, and lead, cadmium, chromium contaminated clothing that may produce airborne concentrations of lead, cadmium, chromium particles. Label the containers in accordance with 29 CFR 1926.62, 29 CFR 1926.1126, 29 CFR 1926.1127 and 40 CFR 261, 40 CFR 262 and corresponding state regulations.

c. Dispose of lead, cadmium, chromium contaminated material classified as hazardous waste at an State approved hazardous waste treatment, storage, or disposal facility off Government property and in accordance with Section [01 57 19 TEMPORARY ENVIRONMENTAL CONTROLS][01 57 20 ENVIRONMENTAL PROTECTION] and 01 74 19 CONSTRUCTION WASTE MANAGEMENT AND DISPOSAL.

d. Accumulate waste materials in U.S. Department of Transportation (49 CFR 178) compliant container. Properly label each drum to identify the type of hazardous material (49 CFR 172). For hazardous waste, the collection container requires marking/labeling in accordance with 40 CFR 262 and corresponding state regulations during the accumulation/collection timeframe. The Contracting Officer or an authorized representative will assign an area for accumulation of waste containers. Coordinate authorized accumulation volumes and time limits with the host installation environmental function.

e. Handle, store, transport, and dispose lead, cadmium, chromium or lead, cadmium, chromium contaminated waste in accordance with 40 CFR 260, 40 CFR 261, 40 CFR 262, 40 CFR 263, 40 CFR 264,[and] 40 CFR 265[and][49 CFR 174,][and][49 CFR 175,][and][49 CFR 176] and state and local regulations. Comply with land disposal restriction notification requirements as required by 40 CFR 268.

f. All lead, cadmium, and chromium waste generation, management, and disposal must be coordinated with the host installation environmental function.

g. Lead-contaminated waste in residential housing may be disposed of as Household Waste.

3.5.2.1 Disposal Documentation

Coordinate all disposal or off-site shipments of lead, cadmium, and chromium waste with the host installation environmental function. Submit written evidence of TSD approval to demonstrate the hazardous waste treatment, storage, or disposal facility (TSD) is approved for lead, cadmium, chromium disposal by the EPA, State or local regulatory agencies. Submit one copy of the completed hazardous waste manifest, nonhazardous manifest, or bill of lading, signed and dated by the initial transporter in accordance with 40 CFR 262. Provide a certificate that the waste was accepted by the disposal facility. Provide turn-in documents or weight tickets for non-hazardous waste disposal. Exclude hazardous waste from waste reduction calculations in accordance with Section 01 74 19 CONSTRUCTION WASTE MANAGEMENT AND DISPOSAL.

3.5.2.2 Payment for Hazardous Waste

Payment for disposal of hazardous and non-hazardous waste will not be made until a signed copy of the manifest from the treatment or disposal facility is received and approved by the Contracting Officer. The manifest must detail and certify the amount of lead, cadmium, chromium containing materials or non-hazardous waste delivered to the treatment or disposal facility.

[

ATT-1 - TxDSHS Lead Abatement Notification Form

ATTACHED IN APPENDIX A

] -- End of Section --

SECTION 03 30 00

CAST-IN-PLACE CONCRETE
02/19, CHG 10: 08/25

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 CONCRETE INSTITUTE (ACI)

ACI 117	(2010; R 2015) 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 213R	(2014; E2017) Guide for Structural Lightweight-Aggregate Concrete
ACI 301	(2020) Specifications for Structural Concrete
ACI 302.1R	(2015) Guide for Concrete Floor and Slab Construction
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 305.1	(2014) Specification for Hot Weather Concreting
ACI 305R	(2020) Guide to Hot Weather Concreting
ACI 306.1	(1990; R 2002) Standard Specification for Cold Weather Concreting
ACI 306R	(2016) Guide to Cold Weather Concreting
ACI MNL-2	(2019; 11th Edition) ACI Manual of Concrete Inspection
ACI MNL-15	(2020) Field Reference Manual: Specifications for Concrete Construction ACI 301-20 with Selected ACI References
ACI SPEC 308.1	>(2023) External Curing of Cast-in-Place Concrete - Specification

AMERICAN WELDING SOCIETY (AWS)

AWS D1.4/D1.4M	(2018; Amd 1 2020) Structural Welding Code - Reinforcing Steel

ASTM INTERNATIONAL (ASTM)

ASTM A36/A36M	(2019) Standard Specification for Carbon Structural Steel
ASTM A53/A53M	(2024) Standard Specification for Pipe, Steel, Black and Hot-Dipped, Zinc-Coated, Welded and Seamless
ASTM A615/A615M	(2025) Standard Specification for Deformed and Plain Carbon-Steel Bars for Concrete Reinforcement
ASTM A775/A775M	(2022) Standard Specification for Epoxy-Coated Steel Reinforcing Bars
ASTM A780/A780M	(2020) Standard Practice for Repair of Damaged and Uncoated Areas of Hot-Dip Galvanized Coatings
ASTM A884/A884M	(2025) Standard Specification for Epoxy-Coated Steel Wire and Welded Wire Reinforcement
ASTM A934/A934M	(2022) Standard Specification for Epoxy-Coated Prefabricated Steel Reinforcing Bars
ASTM A996/A996M	(2016) Standard Specification for Rail-Steel and Axle-Steel Deformed Bars for Concrete Reinforcement
ASTM A1022/A1022M	(2016b) Standard Specification for Deformed and Plain Stainless Steel Wire and Welded Wire for Concrete Reinforcement
ASTM A1060/A1060M	(2016b) Standard Specification for Zinc-Coated (Galvanized) Steel Welded Wire Reinforcement, Plain and Deformed, for Concrete
ASTM A1064/A1064M	(2024) Standard Specification for Carbon-Steel Wire and Welded Wire Reinforcement, Plain and Deformed, for Concrete
ASTM C31/C31M	(2026) Standard Practice for Making and Curing Concrete Test Specimens in the Field
ASTM C33/C33M	(2024a) Standard Specification for Concrete Aggregates
ASTM C39/C39M	(2024) 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	(2022) Standard Test Method for Flexural Strength of Concrete (Using Simple Beam with Third-Point Loading)
ASTM C94/C94M	(2025a) Standard Specification for Ready-Mixed Concrete
ASTM C136/C136M	(2025) Standard Test Method for Sieve Analysis of Fine and Coarse Aggregates
ASTM C143/C143M	(2020) Standard Test Method for Slump of Hydraulic-Cement Concrete
ASTM C150/C150M	(2024) Standard Specification for Portland Cement
ASTM C172/C172M	(2017) Standard Practice for Sampling Freshly Mixed Concrete
ASTM C173/C173M	(2024a) Standard Test Method for Air Content of Freshly Mixed Concrete by the Volumetric Method
ASTM C231/C231M	(2026) Standard Test Method for Air Content of Freshly Mixed Concrete by the Pressure Method
ASTM C260/C260M	(2024) Standard Specification for Air-Entraining Admixtures for Concrete
ASTM C330/C330M	(2017a) Standard Specification for Lightweight Aggregates for Structural Concrete
ASTM C494/C494M	(2024) Standard Specification for Chemical Admixtures for Concrete
ASTM C595/C595M	(2025) Standard Specification for Blended Hydraulic Cements
ASTM C618	(2025a) Standard Specification for Coal Fly Ash and Raw or Calcined Natural Pozzolan for Use in Concrete
ASTM C803/C803M	(2023) Standard Test Method for Penetration Resistance of Hardened Concrete
ASTM C873/C873M	(2015) Standard Test Method for Compressive Strength of Concrete Cylinders Cast in Place in Cylindrical Molds
ASTM C900	(2015) Standard Test Method for Pullout Strength of Hardened Concrete

ASTM C920	(2018; R 2024) Standard Specification for Elastomeric Joint Sealants
ASTM C989/C989M	(2025) Standard Specification for Slag Cement for Use in Concrete and Mortars
ASTM C1012/C1012M	(2024) Standard Test Method for Length Change of Hydraulic-Cement Mortars Exposed to a Sulfate Solution
ASTM C1074	(2019; E 2021) Standard Practice for Estimating Concrete Strength by the Maturity Method
ASTM C1077	(2026) 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 C1116/C1116M	(2023) Standard Specification for Fiber-Reinforced Concrete
ASTM C1157/C1157M	(2025) Standard Performance Specification for Hydraulic Cement
ASTM C1260	(2023) Standard Test Method for Potential Alkali Reactivity of Aggregates (Mortar-Bar Method)
ASTM C1293	(2008; R 2015) Standard Test Method for Determination of Length Change of Concrete Due to Alkali-Silica Reaction
ASTM C1567	(2025) Standard Test Method for Determining the Potential Alkali-Silica Reactivity of Combinations of Cementitious Materials and Aggregate (Accelerated Mortar-Bar Method)
ASTM C1602/C1602M	(2022) Standard Specification for Mixing Water Used in Production of Hydraulic Cement Concrete
ASTM C1611/C1611M	(2021) Standard Test Method for Slump Flow of Self-Consolidating Concrete
ASTM C1621/C1621M	(2017; R 2023) Standard Test Method for Passing Ability of Self-Consolidating Concrete by J-Ring
ASTM C1758/C1758M	(2023) Standard Practice for Fabricating Test Specimens with Self-Consolidating Concrete
ASTM C1778	(2023) Standard Guide for Reducing the

	Risk of Deleterious Alkali-Aggregate Reaction in Concrete
ASTM D3042	(2017) Standard Test Method for Insoluble Residue in Carbonate Aggregates
ASTM E329	(2025b) Standard Specification for Agencies Engaged in Construction Inspection, Testing, or Special Inspection
ASTM E1155	(2020) Standard Test Method for Determining Floor Flatness and Floor Levelness Numbers
ASTM E1643	(2018a) Standard Practice for Selection, Design, Installation, and Inspection of Water Vapor Retarders Used in Contact with Earth or Granular Fill Under Concrete Slabs

COMPOSITE PANEL ASSOCIATION (CPA)

ANSI/CPA A135.4	(2012; R2020) Basic Hardboard

CONCRETE REINFORCING STEEL INSTITUTE (CRSI)

CRSI RB4.1	(2016) Supports for Reinforcement Used in Concrete
CRSI SP0001-31-DL-I	(2024) Manual of Standard Practice

NATIONAL INSTITUTE OF STANDARDS AND TECHNOLOGY (NIST)

NIST PS 1	(2009) DOC Voluntary Product Standard PS 1-07, Structural Plywood

U.S. ARMY CORPS OF ENGINEERS (USACE)

COE CRD-C 104	(1980) Method of Calculation of the Fineness Modulus of Aggregate

U.S. GENERAL SERVICES ADMINISTRATION (GSA)

FS SS-S-200	(Rev E; Notice 1; Notice 2) Sealant, Joint, Two-Component, Jet-Blast-Resistant, Cold-Applied, for Portland Cement Concrete Pavement

1.2 DEFINITIONS

a. "Cementitious material" as used herein includes all portland cement, pozzolan, fly ash, slag cement, and silica fume.

b. "Exposed to public view" means situated so that it can be seen from eye level from a public location after completion of the building. A public location is accessible to persons not responsible for operation or maintenance of the building.

c. "Chemical admixtures" are materials in the form of powder or fluids that are added to the concrete to give it certain characteristics not

obtainable with plain concrete mixes.

d. "Supplementary cementing materials" (SCM) include coal fly ash, silica fume, slag cement, natural or calcined pozzolans, and ultra-fine coal ash when used in such proportions to replace the portland cement that result in improvement to sustainability and durability and reduced cost.

e. "Design strength" (f'c) is the specified compressive strength of concrete at time(s) specified in this section to meet structural design criteria.

f. "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.

g. "Mixture proportioning" is the process of designing concrete mixture proportions to enable it to meet the strength, service life and constructability requirements of the project while minimizing the initial and life-cycle cost.

h. "Mixture proportions" are the masses or volumes of individual ingredients used to make a unit measure (cubic meter or cubic yard) of concrete.

i. "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.

j. "Workability (or consistence)" is the ability of a fresh (plastic) concrete mix to fill the form/mould properly with the desired work (vibration) and without reducing the concrete's quality. Workability depends on water content, chemical admixtures, aggregate (shape and size distribution), cementitious content and age (level of hydration).

1.3 SUBMITTALS

Government approval is required for submittals with a "G" or "S" classification. Submittals not having a "G" or "S" classification are for Contractor Quality Control approval. Submit the following in accordance with Section 01 33 00 SUBMITTAL PROCEDURES:

SD-01 Preconstruction Submittals

Concrete Curing Plan

Quality Control Program; G

Quality Control Personnel Certifications; G

Quality Control Organizational Chart

Laboratory Accreditation; G

Form Removal Schedule; G

Maturity Method Data

SD-02 Shop Drawings

Formwork

Reinforcing Steel; G

SD-03 Product Data

Joint Sealants; S

Joint Filler; S

Formwork Materials

Recycled Aggregate Materials; S

Cementitious Materials; S

Vapor Retarder and Vapor Barrier

Concrete Curing Materials

Reinforcement; S

Liquid Chemical Floor Hardeners and Sealers

Admixtures

Reinforcing Fibers

Mechanical Reinforcing Bar Connectors

Waterstops

Local/Regional Materials; S

Biodegradable Form Release Agent

Pumping Concrete

Finishing Plan

Nonshrink Grout

SD-04 Samples

Slab Finish Sample

Surface Finish Samples

SD-05 Design Data

Construction and Movement Joints Locations and Details; G

Concrete Mix Design; G

Formwork Calculations

SD-06 Test Reports

Concrete Mix Design; G

Fly Ash; G

Pozzolan; G

Slag Cement; G

Aggregates; G

Fiber-Reinforced Concrete; G

Portland Cement; G

Blended Cements; G

Tolerance Report

Compressive Strength Tests; G

Unit Weight of Structural Concrete

Chloride Ion Concentration

Air Content

Slump Tests

Slump Flow and Visual Stability Index

Water

SD-07 Certificates

Reinforcing Bars

Welder Qualifications

Silica Fume Manufacturer's Representative

VOC Content for Form Release Agents, Curing Compounds, and Concrete Penetrating Sealers

Safety Data Sheets

Forest Stewardship Council (FSC) Certification

Field Testing Technician and Testing Agency

SD-08 Manufacturer's Instructions

Liquid Chemical Floor Hardeners and Sealers

Joint Sealants; S

Curing Compound

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

1.5 DELIVERY, STORAGE, AND HANDLING

Follow ACI 301, ACI 304R and ASTM A934/A934M requirements and recommendations. Do not deliver concrete until vapor retarder, vapor barrier, forms, reinforcement, embedded items, and chamfer strips are in place and ready for concrete placement. Do not store concrete curing compounds or sealers with materials that have a high capacity to adsorb volatile organic compound (VOC) emissions. Do not store concrete curing compounds or sealers in occupied spaces.

1.5.1 Reinforcement

Store reinforcement of different sizes and shapes in separate piles or racks raised above the ground to avoid excessive rusting. Protect from contaminants such as grease, oil, and dirt. Ensure bar sizes can be accurately identified after bundles are broken and tags removed.

1.5.1.1 Epoxy Coated Reinforcing Steel

Record coating lot on each shipping notice and carefully identify and re-tag bar bundles from bending plant. Provide systems for handling coated bars which have padded contact areas such as, nylon slings, all free of dirt and grit. Lift bundled coated bars with strong back, multiple supports, or platform bridge to prevent sagging and abrasion. Pad bundling bands 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. Space the dunnage close enough to prevent excessive sags. Stack large quantities of straight bars with adequate protective blocking between layers. Schedule deliveries of epoxy coated bars to the job site to avoid the need for long term storage. Protect from direct sunlight and weather. Cover bars to be stored longer than 12 hours at the job site with opaque polyethylene sheeting or other suitable equivalent protective material.

1.6 QUALITY ASSURANCE

1.6.1 Shop Drawings

1.6.1.1 Formwork

Drawings showing details of formwork including, but not limited to; joints, supports, studding and shoring, and sequence of form and shoring removal. Indicate placement schedule, construction, location and method of forming control joints. Include locations of inserts, conduit, sleeves and other embedded items. Reproductions of contract drawings are unacceptable. Submit form removal schedule indicating element and minimum length of time for form removal.

Design, fabricate, erect, support, brace, and maintain formwork so that it is able to support, without failure, all vertical and lateral loads that

may reasonably be anticipated to be applied to the formwork.

1.6.1.2 Reinforcing Steel

Indicate bending diagrams, assembly diagrams, splicing 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. Reproductions of contract drawings are unacceptable.

1.6.2 Control Submittals

1.6.2.1 Concrete Curing Plan

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

1.6.2.2 Pumping Concrete

Submit proposed materials and methods for pumping concrete. Include mix designs, pumping equipment including type of pump and size and material for pipe, and maximum length and height concrete is to be pumped.

1.6.2.3 Finishing Plan

Submit proposed material and procedures to be used in obtaining the finish for the floors. Include qualification of person to be used for obtaining floor tolerance measurement, description of measuring equipment to be used, and a sketch showing lines and locations the measuring equipment will follow.

1.6.2.4 Safety Data Sheets

Submit Safety Data Sheets (SDS) for all materials that are regulated for hazardous health effects. SDS must be readily accessible during each work shift to employees when they are at the construction site.

1.6.3 Test Reports

1.6.3.1 Aggregates

Submit test results in accordance with ASTM C33/C33M, or ASTM C330/C330M for lightweight aggregate, and ASTM C1293 or ASTM C1567 as required in the paragraph titled ALKALI-AGGREGATE REACTION.

1.6.3.2 Fiber-Reinforced Concrete

Test to determine flexural toughness index I5 in accordance with ASTM C1116/C1116M.

1.6.4 Field Samples

1.6.4.1 Slab Finish Sample

Install minimum of 10 foot by 10 foot slab. Slab finish sample must not be part of the final project. Finish as required by specification. Silica fume manufacturer's representative must attend and advise.

1.6.5 Quality Control Program

Develop and submit for approval a concrete quality control program in accordance with the guidelines of ACI 121R and as specified herein. Include approved laboratories. Provide direct oversight for the concrete qualification program inclusive of associated sampling and testing. Provide all quality control reports to the Contracting Officer, Quality Manager and Concrete Supplier. Maintain a copy of ACI MNL-15 and CRSI SP0001-31-DL-I at project site.

1.6.6 Quality Control Personnel Certifications

Submit for approval the responsibilities of the various quality control personnel, including the names and qualifications of the individuals in those positions and a quality control organizational chart defining the quality control hierarchy and the responsibility of the various positions. Quality control personnel must be employed by the Contractor.

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.

1.6.6.1 Quality Manager Qualifications

Holds 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.

1.6.6.2 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 must be performed by an ACI Concrete Field Testing Technician Grade 1 qualified in accordance with ACI MNL-2 or equivalent. Equivalent certification programs must include requirements for written and performance examinations as stipulated in ACI MNL-2.

b. Testing agencies that perform testing services on reinforcing steel must meet the requirements of ASTM E329.

c. Testing agencies that perform testing services on concrete materials must meet the requirements of ASTM C1077.

1.6.7 Laboratory Qualifications for Concrete Qualification Testing

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

1.6.8 Laboratory Accreditation

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

a. Aggregate Testing and Mix Proportioning: Studies performed by an accredited laboratory and under the direction of a registered professional engineer in a U.S. state or territory competent in concrete materials who is competent in concrete materials and must 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 must be performed by an approved, onsite, independent, accredited laboratory.

1.7 ENVIRONMENTAL REQUIREMENTS

Provide space ventilation according to material manufacturer recommendations, at a minimum, during and following installation of concrete curing compound and sealer. Maintain one of the following ventilation conditions during the curing period or for 72 hours after installation:

a. Supply 100 percent outside air 24 hours a day.

b. Supply airflow at a rate of 6 air changes per hour, when outside temperatures are between 55 degrees F and 84 degrees F and humidity is between 30 percent and 60 percent.

c. Supply airflow at a rate of 1.5 air changes per hour, when outside air conditions are not within the range stipulated above.

1.7.1 Submittals for Environmental Performance

a. Provide data indication the percentage of post-industrial pozzolan (fly ash, slag cement) cement substitution as a percentage of the full product composite by weight.

b. Provide data indicating the percentage of post-industrial and post-consumer recycled content aggregate.

c. Provide product data indicating the percentage of post-consumer recycled steel content in each type of steel reinforcement as a percentage of the full product composite by weight.

d. Provide product data stating the location where all products were manufactured

e. For projects using FSC certified formwork, provide chain-of-custody documentation for all certified wood products.

f. For projects using reusable formwork, provide data showing how formwork is reused.

g. Provide SDS product information data showing that form release agents meet any environmental performance goals such as using vegetable and soy based products.

h. Provide SDS product information data showing that concrete adhesives meet any environmental performance goals including low emitting, low volatile organic compound products.

PART 2 PRODUCTS

2.1 FORMWORK MATERIALS

a. Form-facing material in contact with concrete must be lumber, plywood, tempered concrete-form-grade hardboard, metal, plastic, or treated paper that creates specified appearance and texture of concrete surface. Submit product information on proposed form-facing materials if different from that specified herein.

b. Design formwork, shores, reshores, and backshores to support loads transmitted to them and to comply with applicable building code requirements.

c. Design formwork and shoring for load redistribution resulting from stressing of post-tensioned reinforcement. Ensure that formwork allows movement resulting from application of prestressing force.

d. Design formwork to withstand pressure resulting from placement and vibration of concrete and to maintain specified tolerances.

e. Design formwork to accommodate waterstop materials in joints at locations indicated in Contract Documents.

f. Provide temporary openings in formwork if needed to facilitate cleaning and inspection.

g. Design formwork joints to inhibit leakage of mortar.

h. Limit deflection of facing materials for concrete surfaces exposed to view to 1/240 of center-to-center spacing of facing supports.

i. Do not use earth cuts as forms for vertical or sloping surfaces.

j. Submit product information on proposed form-facing materials if different from that specified herein.

k. Submit shop drawings for formwork, shoring, reshoring, and backshoring, signed and sealed by a licensed design engineer.

l. Submit design calculations for formwork, shoring, reshoring, and backshoring, signed and sealed by a licensed design engineer.

m. Submit procedure for reshoring and backshoring, including drawings signed and sealed by a licensed design engineer. Include on shop

drawings the formwork removal procedure and magnitude of construction loads used for design of reshoring or backshoring system. Indicate in procedure the magnitude of live and dead loads assumed for required capacity of the structure at time of reshoring or backshoring.

n. Submit manufacturer's product data on form liner proposed for use with each formed surface.

2.1.1 Wood Forms

Use lumber as specified in Section 06 10 00 ROUGH CARPENTRY and as follows. Provide lumber that is square edged or tongue-and-groove boards, free of raised grain, knotholes, or other surface defects. Provide plywood that complies with NIST PS 1, B-B concrete form panels or better or ANSI/CPA A135.4, hardboard for smooth form lining. Submit data verifying that composite wood products contain no urea formaldehyde resins. Virgin wood used must be FSC-certified.

2.1.1.1 Concrete Form Plywood (Standard Rough)

Provide plywood that conforms to NIST PS 1, B-B, concrete form, not less than 5/8-inch thick.

2.1.1.2 Overlaid Concrete Form Plywood (Standard Smooth)

Provide plywood that conforms to NIST PS 1, B-B, high density form overlay, not less than 5/8-inch thick.

2.2 FORMWORK ACCESSORIES

a. Use commercially manufactured formwork accessories, including ties and hangers.

b. Form ties and accessories must not reduce the effective cover of the reinforcement.

2.2.1 Form Ties

a. Use form ties with ends or end fasteners that can be removed without damage to concrete.

b. Where indicated in Contract Documents, use form ties with integral water barrier plates or other acceptable positive water barriers in walls.

c. The breakback distance for ferrous ties must be at least 3/4 in. for Surface Finish-2.0 or Surface Finish-3.0, as defined in ACI 301.

d. If the breakback distance is less than 3/4 in., use coated or corrosion-resistant ties.

e. Submit manufacturer's data sheet on form ties.

2.2.2 Biodegradable Form Release Agent

a. Provide form release agent that is colorless, biodegradable, and rapeseed oil-based, with a zero VOC content. A minimum of 85 percent of the total product must be biobased material.

b. Provide product that does not bond with, stain, or adversely affect concrete surfaces and does not impair subsequent treatments of concrete surfaces.

c. Provide form release agent that reduces formwork moisture absorption, and does not contain diesel fuel, petroleum-based lubricating oils, waxes, or kerosene. Submit documentation indicating type of biobased material in product and biobased content. Indicate relative dollar value of biobased content products to total dollar value of products included in project.

d. Submit manufacturer's product data on formwork release agent for use on each form-facing material.

2.2.3 Construction and Movement Joints Locations and Details

a. Submit details and locations of construction joints in accordance with the requirements herein.

b. Locate construction joints within middle one-third of spans of slabs, beams, and girders. If a beam intersects a girder within the middle one-third of girder span, the distance between the construction joint in the girder and the edge of the beam must be at least twice the width of the larger member.

c. For members with post-tensioning tendons, locate construction joints where tendons pass through centroid of concrete section.

d. Locate construction joints in walls and columns at underside of slabs, beams, or girders and at tops of footings or slabs.

e. Make construction joints perpendicular to main reinforcement.

f. Provide movement joints where indicated in Contract Documents or in accepted alternate locations.

g. Submit location and detail of movement joints if different from those indicated in Contract Documents.

h. Submit manufacturer's data sheet on expansion joint materials.

i. Provide keyways where indicated in Contract Documents. Longitudinal keyways indicated in Contract Documents must be at least 1-1/2 in. deep, measured perpendicular to the plane of the joint.

2.2.4 Other Embedded items

Use sleeves, inserts, anchors, and other embedded items of material and design indicated in Contract Documents.

2.3 CONCRETE MATERIALS

2.3.1 Cementitious Materials

2.3.1.1 Portland Cement

a. Unless otherwise specified, provide cement that conforms to ASTM C150/C150M Type I .

b. Use one brand and type of cement for formed concrete having exposed-to-view finished surfaces.

c. For portland cement manufactured in a kiln fueled by hazardous waste, maintain a record of source for each batch. Supplier must certify that no hazardous waste is used in the fuel mix or raw materials. Supplier must certify that the hazardous waste is neutralized by the manufacturing process and that no additional pollutants are discharged.

d. Submit information along with evidence demonstrating compliance with referenced standards. Include types of cementitious materials, manufacturing locations, shipping locations, and certificates showing compliance.

e. Store cementitious materials and keep dry and free from contaminants.

2.3.1.2 Slag Cement

ASTM C989/C989M, Grade 100.

2.3.1.3 Other Supplementary Cementitious Materials

Natural pozzolan must be raw or calcined and conform to ASTM C618, Class N, including the optional requirement for uniformity.

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

a. The strength activity index at 28 days of age at least 95 percent of the control specimens.

b. The average particle size not exceed 6 microns.

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

2.3.2 Water

a. Water or ice must comply with the requirements of ASTM C1602/C1602M.

b. Minimize the amount of water in the mix. Improve workability by adjusting the grading of the aggregate and using admixture rather than by adding water.

c. Provide water potable from rainwater collection from graywater from recycled water; free from injurious amounts of oils, acids, alkalis, salts, organic materials, or other substances deleterious to concrete.

d. Protect mixing water and ice from contamination during storage and delivery.

e. Submit test report showing water complies with ASTM C1602/C1602M.

f. When nonpotable source is proposed for use, submit documentation on effects of water on strength and setting time in compliance with ASTM C1602/C1602M.

2.3.3 Aggregate

2.3.3.1 Normal-Weight Aggregate

a. Conform to ASTM C33/C33M unless otherwise specified in the Contract Documents or approved by the contracting officer Fine aggregate for concrete for slabs-on-ground and suspended-slab floors must conform to gradation requirements of ACI 302.1R, Table 8.5.1 .

b. Obtain aggregates used in concrete from the same sources and have the same size range as aggregates used in concrete represented by submitted field test records or used in trial mixtures.

c. Provide sand that is at least 50 percent acid insoluble based on ASTM D3042.Provide sand that is at least 50 percent natural sand.

d. Store and handle aggregate in a manner that will avoid segregation and prevents contamination by other materials or other sizes of aggregates. Store aggregates in locations that will permit them to drain freely. Do not use aggregates that contain frozen lumps.

e. Submit types, pit or quarry locations, producers' names, aggregate supplier statement of compliance with ASTM C33/C33M, and ASTM C1293 expansion data not more than 18 months old.

2.3.4 Admixtures

a. Chemical admixtures must conform to ASTM C494/C494M.

b. Air-entraining admixtures must conform to ASTM C260/C260M.

c. Do not use calcium chloride admixtures unless approved by the contracting officer.

d. Use a corrosion-inhibiting admixture for concrete classified under exposure category C1 C2.Use an ASR-inhibiting admixture for concrete containing aggregate susceptible to ASR.

e. Viscosity modifying admixtures (VMA) must conform to ASTM C494/C494M, Type S.

f. Admixtures used in concrete must be the same as those used in the concrete represented by submitted field test records or used in trial mixtures.

g. Protect stored admixtures against contamination, evaporation, or damage.

h. To ensure uniform distribution of constituents, provide agitating equipment for admixtures used in the form of suspensions or unstable solutions. Protect liquid admixtures from freezing and from temperature changes that would adversely affect their characteristics.

i. Submit types, brand names, producers' names, manufacturer's technical data sheets, and certificates showing compliance with standards required herein.

2.4 MISCELLANEOUS MATERIALS

2.4.1 Concrete Curing Materials

Provide concrete curing material in accordance with ACI 301 Section 5 and ACI SPEC 308.1 Section 2. Submit product data for concrete curing compound s. Submit manufactures instructions for placement of curing compound.

2.4.2 Nonshrink Grout

Nonshrink grout in accordance with ASTM C1107/C1107M.

2.4.3 Floor Finish Materials

2.4.4 Joint Sealants

Submit manufacturer's product data, indicating VOC content.

2.4.4.1 Vertical Surfaces Greater Than 3 Percent Slope

ASTM C920, Type M, Grade NS, Class 25, Use T NT. FS SS-S-200, no sag.

2.5 CONCRETE MIX DESIGN

2.5.1 Properties and Requirements

a. Use materials and material combinations listed in this section and the contract documents.

b. Cementitious material content must be adequate for concrete to satisfy the specified requirements for strength, w/cm, durability, and finishability described in this section and the contract documents.

c. The minimum cementitious material content for concrete used in floors must meet the following requirements:

Nominal maximum size of aggregate, in.	**Minimum cementitious material content, pounds per cubic yard**
1-1/2	470
1	520
3/4	540
3/8	610

d. Selected target slump must meet the requirements of this section, the contract documents, and must not exceed 9 in. Concrete must not show visible signs of segregation.

e. Enforce the target slump for the duration of the project. Determine the slump by ASTM C143/C143M. Slump tolerances must meet the requirements of ACI 117.

f. Slump Flow and Visual Stability Index. The slump flow of

self-consolidating concrete (SCC) must be determined in accordance with ASTM C1611/C1611M and must have a flow of 22 to 26 inches. The Visual Stability Index (VSI) rating of the mixture must be maintained at 1 or less.

g. Passing Ability by J-Ring Test. For self-consolidating concrete, the passing ability of proposed mix design must be tested in accordance with ASTM C1621/C1621M. The difference between the slump flow and J-ring flow must not exceed 12 in..

h. The nominal maximum size of coarse aggregate for a mixture must not exceed three-fourths of the minimum clear spacing between reinforcement, one-fifth of the narrowest dimension between sides of forms, or one-third of the thickness of slabs or toppings.

i. Concrete must be air entrained for members assigned to Exposure Class F1, F2, or F3, with the total air content in accordance with the requirements of the paragraph titled DURABILITY.

j. Measure air content at the point of delivery in accordance with ASTM C173/C173M or ASTM C231/C231M.

k. Concrete for slabs to receive a hard-troweled finish must not contain an air-entraining admixture or have a total air content greater than 3 percent.

l. Concrete properties and requirements for each portion of the structure are specified in the table below. Refer to the paragraph titled DURABILITY for more details on exposure categories and their requirements.

	Minimum *f'c* psi	**Exposure Categories^**	**Miscellaneous Requirements**
Footings	3000 at 7 days	S0 ; C0 ; W0 ; F0	Max. slump: 6 in. Nominal maximum aggregate size must be 3/4 in.
Columns and walls	3000 at 7 days	; [C0] [C1] [C2]; [W0] [W1] [W2]; [F0] [F1] [F2] [F3]	[Nominal maximum aggregate size must be [1/2 in.][3/4 in.][1 in.] [_____]]

	Minimum *f'c* psi	Exposure Categories^	Miscellaneous Requirements
Beams and elevated slabs	[5000] [3000] [_____] at [7] [28] [56] [90] days	[S0] [S1] [S2] [S3]; [C0] [C1] [C2]; [W0] [W1] [W2]; [F0] [F1] [F2] [F3]	[Nominal maximum aggregate size must be [1/2 in.][3/4 in.][1 in.] [_____]]
Slabs-on-ground	[5000] [3000] [_____] at [7] [28] [56] [90] days	[S0] [S1] [S2] [S3]; [C0] [C1] [C2]; [W0] [W1] [W2]; [F0] [F1] [F2] [F3]	[Min. dosage [1.5] [_____] (pounds per cubic yard) for synthetic micro-fiber] [Min. dosage[4] [_____] (pounds per cubic yard) for synthetic macro-fiber] [Min. dosage [50] [_____] (pounds per cubic yard) for steel fibers]
Lightweight concrete suspended slab	[5000] [3000] [_____] at [7] [28] [56] [90] days	[S0] [S1] [S2] [S3]; [C0] [C1] [C2]; [W0] [W1] [W2]; [F0] [F1] [F2] [F3]	[Max. density of [115] [105] [_____] (pounds per cubic foot)]
Concrete Toppings	[5000] [3000] [_____] at [7] [28] [56] [90] days	[S0] [S1] [S2] [S3]; [C0] [C1] [C2]; [W0] [W1] [W2]; [F0] [F1] [F2] [F3]	[Max. slump: [6 in.] [_____]]

2.5.2 Durability

2.5.2.1 Alkali-Aggregate Reaction

Do not use any aggregate susceptible to alkali-carbonate reaction (ACR). Use one of the three options below for qualifying concrete mixtures to reduce the potential of alkali-silica reaction (ASR):

a. For each aggregate used in concrete, the expansion result determined in accordance with ASTM C1293 must not exceed 0.04 percent at one year.

b. For each aggregate used in concrete, the expansion result of the aggregate and cementitious materials combination determined in accordance with ASTM C1567 must not exceed 0.10 percent at an age of 16 days.

c. Alkali content in concrete (LBA) must not exceed [4 pounds per cubic yard] [_____] for moderately reactive aggregate or [3 pounds per cubic yard] [_____] for highly reactive aggregate. Determine reactivity by testing in accordance with ASTM C1293 and categorize in accordance with ASTM C1778. Alkali content is calculated as follows:
LBA = (cement content, pounds per cubic yard) × (equivalent alkali content of portland cement in percent/100 percent)

2.5.2.2 Sulfate Resistance

a. Provide concrete meeting the requirements of the following table based on the exposure class assigned to members for sulfate exposure.

Exposure class	**Maximum w/cm**	**Minimum f'c, psi**	**Required cementitious materials-types**			**Calcium chloride admixture**
			ASTM C150/C150M	**ASTM C595/C595M**	**ASTM C1157/C1157M**	
S0	N/A	2500	N/A	N/A	N/A	No restrictions
S1	0.50	4000	II*^	Types with (MS) designation	MS	No restrictions
S2	0.45	4500	V^	Types with (HS) designation	HS	Not permitted
S3	0.45	4500	V + pozzolan or slag cement**	Types with (HS) designation plus pozzolan or slag cement**	HS + pozzolan or slag cement**	Not permitted
S3	0.40	5000	V***	Types with (HS) designation	HS	Not permitted

* For seawater exposure, other types of portland cements with tricalcium aluminate (C3A) contents up to 10 percent are acceptable if the w/cm does not exceed 0.40.

** The amount of the specific source of the pozzolan or slag cement to be used must be at least the amount determined by test or service record to improve sulfate resistance when used in concrete containing Type V cement. Alternatively, the amount of the specific source of the pozzolan or slag used must not be less than the amount tested in accordance with ASTM C1012/C1012M and meeting the requirements maximum expansion requirements listed herein.

*** If Type V cement is used as the sole cementitious material, the optional sulfate requirement of 0.040 percent maximum expansion in ASTM C150/C150M is required.

^ Other available types of cement, such as Type III or Type I, are acceptable in exposure classes S1 or S2 if the C3A contents are less than 8 or 5 percent, respectively.

b. The maximum w/cm limits for sulfate exposure do not apply to lightweight concrete.

c. Alternative combinations of cementitious materials of those listed in this paragraph are acceptable if they meet the maximum expansion requirements listed in the following table:

Exposure class	**Maximum expansion when tested using ASTM C1012/C1012M**		
	At 6 months	**At 12 months**	**At 18 months**
S1	0.10 percent	N/A	N/A
S2	0.05 percent	0.10 percent^	N/A
S3	N/A	N/A	0.10 percent

^The 12-month expansion limit applies only when the measured expansion exceeds the 6-month maximum expansion limit.

2.5.2.3 Concrete Temperature

The temperature of concrete as delivered must not exceed[95 degrees F] [_____].

2.5.2.4 Concrete Permeability

a. Provide concrete meeting the requirements of the following table based on exposure class assigned to members requiring low permeability in the Contract Documents.

Exposure class	**Maximum *w/cm****	**Minimum f'c, psi**	**Additional minimum requirements**
W0	N/A	2500	None
W1	0.5	4000	None
W2	0.50	4000	None

*The maximum w/cm limits do not apply to lightweight concrete.

b. Submit documentation verifying compliance with specified requirements.

2.5.3 Trial Mixtures

In accordance with ACI 301.

2.5.4 Ready-Mix Concrete

Provide concrete that meets the requirements of ASTM C94/C94M.

Ready-mixed concrete manufacturer must provide duplicate delivery tickets with each load of concrete delivered. Provide delivery tickets with the following information in addition to that required by ASTM C94/C94M:

a. Type and brand cement

b. Cement and supplementary cementitious materials content in 94-pound bags per cubic yard of concrete

c. Maximum size of aggregate

d. Amount and brand name of admixtures

e. Total water content expressed by water cementitious material ratio

2.6 REINFORCEMENT

Shop Fabricate reinforcing bars to conform to shapes and dimensions indicated for reinforcement, and as follows:

a. Bend reinforcement cold. Reinforcement must be bent cold in the shop to shapes as indicated. Rebending of a reinforcing bar that has been bent incorrectly is not permitted. Bending must be in accordance with the standard approved practice and by approved machine methods. Provide hooks and bends that are in accordance with the Contract Documents. Fabricate reinforcement in accordance with fabricating tolerances of ACI 117.

b. Submit manufacturer's certified test report for reinforcement.

c. Submit placing drawings showing fabrication dimensions and placement locations of reinforcement and reinforcement supports. Indicate locations of splices, lengths of lap splices, and details of mechanical and welded splices.

d. Submit request with locations and details of splices not indicated in Contract Documents.

e. Submit request to place column dowels without using templates.

[f. Submit request and procedure to field-bend or straighten reinforcing bars partially embedded in concrete at locations not indicated in Contract Documents. Field bending or straightening of reinforcing bars is permitted[where indicated in the Contract Documents][in the following locations: [_____]]

][g. Submit request for field cutting, including location and type of bar to be cut and reason field cutting is required.

] Deliver reinforcing bars bundled, tagged, and marked. Tags must be metal with bar size, length, mark, and other information pressed in by machine. Marks must correspond with those used on the placing drawings.

2.6.1 Reinforcing Bars

a. Deformed, except spirals, load-transfer dowels, and welded wire reinforcement, which may be plain.

b. ASTM A615/A615M with the bars marked S, Grade [60][80][100]; or ASTM A996/A996M with the bars marked R, Grade [50][60], or marked A, Grade [40][60].[Cold drawn wire used for spiral reinforcement must conform to ASTM A1064/A1064M.][Provide reinforcing bars that contain a minimum of [100][_____] percent recycled content.][See Section 01 33 29 SUSTAINABILITY REQUIREMENTS AND REPORTING for cumulative total recycled content requirements.]

c. [Reinforcing bars may contain post-consumer or post-industrial recycled content.][Submit documentation indicating percentage of post-industrial and post-consumer recycled content per unit of product. Indicate relative dollar value of recycled content products to total dollar value of products included in project.]

d. Submit mill certificates for reinforcing bars.

2.6.1.1 Epoxy-Coated Reinforcing Bars

a. Provide epoxy-coated reinforcing bars that conform to[ASTM A775/A775M][ASTM A934/A934M], Grade[60][80][100].

b. Apply coatings in plants that are certified in accordance with Concrete Reinforcing Steel Institute (CRSI) Epoxy Coating Plant Certification Program or an equivalent program acceptable to the contracting officer.

c. Repair coating damage incurred during shipment, storage, handling, and placing of epoxy-coated reinforcing bars. Repair damaged coating areas with patching material conforming to ASTM A775/A775M or ASTM A934/A934M as applicable and in accordance with material manufacturer's written recommendations. If damaged coating area on bars exceed 2 percent of surface area in each linear foot, bar must not be used. The 2 percent limit on damaged coating area includes repaired areas damaged before shipment as required by ASTM A775/A775M or ASTM A934/A934M as applicable. Fading of coating color is not a cause for rejection of epoxy-coated reinforcing bars.

d. [Submit concrete Reinforcing Steel Institute (CRSI) Epoxy Coating Plant Certification][inspection and quality-control program of plant applying epoxy coating if proposed plant is not certified in accordance with CRSI Epoxy Coating Plant Certification Program].

e. Handle and store coated reinforcing bars in accordance with[ASTM A775/A775M][or][ASTM A934/A934M]. If the manufacturer stores bars outdoors for more than 2 months, cover coated reinforcement with opaque protective material.

2.6.2 Welded Wire Reinforcement

a. Use welded wire reinforcement specified in Contract Documents and conforming to one or more of the specifications given herein.

b. Plain welded wire reinforcement must conform to ASTM A1064/A1064M, with welded intersections spaced no greater than 12 in. apart in direction of principal reinforcement.

c. Deformed welded wire reinforcement must conform to ASTM A1064/A1064M, with welded intersections spaced no greater than 16 in. apart in direction of principal reinforcement.

d. Epoxy-coated welded wire reinforcement must conform to ASTM A884/A884M. Repair coating damage incurred during shipment, storage, handling, and placing of epoxy-coated welded wire reinforcement in accordance with ASTM A884/A884M. Repair damaged coating areas with patching material in accordance with material manufacturer's written recommendations. If damaged area exceeds 2 percent of surface area in each linear foot of each wire or welded wire reinforcement, the sheet containing the damaged area must not be used. The 2 percent limit on damaged coating area includes repaired areas damaged before shipment as required by ASTM A884/A884M. Fading of coating color is not a cause for rejection of epoxy-coated welded wire reinforcement.

e. Stainless steel welded wire reinforcement must conform to ASTM A1022/A1022M.

f. Zinc-coated (galvanized) welded wire reinforcement must conform to ASTM A1060/A1060M. Repair coating damage incurred during shipment, storage, handling, and placing of zinc-coated (galvanized) welded wire reinforcement in accordance with ASTM A780/A780M. If damaged area exceeds 2 percent of surface area in each linear foot of each wire or welded wire reinforcement, the sheet containing the damaged area must not be used. The 2 percent limit on damaged coating area includes repaired areas damaged before shipment as required by ASTM A1060/A1060M.

2.6.3 Dowels for Load Transfer in Floors

Provide greased dowels for load transfer in floors of the type, design, weight, and dimensions indicated. Provide dowel bars that are plain-billet steel conforming to ASTM A615/A615M, Grade 40. Provide dowel pipe that is steel conforming to ASTM A53/A53M.

[Plate dowels must conform to ASTM A36/A36M, and of size and spacing indicated. Minimize shrinkage restraint in plate dowel system by[using a tapered shape][or][formed void][or][by having compressible material on the vertical faces with a thin bond breaker on the top and bottom dowel surfaces].

]PART 3 EXECUTION

3.1 PREPARATION

Determine quantity of concrete needed and minimize the production of excess concrete. Designate locations or uses for potential excess concrete before the concrete is poured.

3.1.1 General

a. Surfaces against which concrete is to be placed must be free of debris, loose material, standing water, snow, ice, and other deleterious substances before start of concrete placing.

b. Remove standing water without washing over freshly deposited concrete. Divert flow of water through side drains provided for such purpose.

3.1.2 Subgrade Under Foundations and Footings

a. When subgrade material is semi-porous and dry, sprinkle subgrade surface with water as required to eliminate suction at the time

concrete is deposited, or seal subgrade surface by covering surface with specified vapor retarder.

b. When subgrade material is porous, seal subgrade surface by covering surface with specified vapor retarder.

3.1.3 Subgrade Under Slabs on Ground

a. Before construction of slabs on ground, have underground work on pipes and conduits completed and approved.

b. Clean previously constructed subgrade or fill of foreign materials.

c. Finish surface of capillary water barrier under interior slabs on ground must not show deviation in excess of 1/4 inch when tested with a 10-foot straightedge parallel with and at right angles to building lines.

d. Finished surface of subgrade or fill under exterior slabs on ground must not be more than 0.02-foot above or 0.10-foot below elevation indicated.

3.1.4 Edge Forms and Screed Strips for Slabs

a. Set edge forms or bulkheads and intermediate screed strips for slabs to obtain indicated elevations and contours in finished slab surface, strong enough to support vibrating bridge screeds or roller pipe screeds if nature of specified slab finish requires use of such equipment.

b. Align concrete surface to elevation of screed strips by use of strike-off templates or approved compacting-type screeds.

3.1.5 Reinforcement and Other Embedded Items

a. Secure reinforcement, joint materials, and other embedded materials in position, inspected, and approved before start of concrete placing.

b. When concrete is placed, reinforcement must be free of materials deleterious to bond. Reinforcement with rust, mill scale, or a combination of both will be considered satisfactory, provided minimum nominal dimensions, nominal weight, and minimum average height of deformations of a hand-wire-brushed test specimen are not less than applicable ASTM specification requirements.

3.2 FORMS

a. Provide forms, shoring, and scaffolding for concrete placement. Set forms mortar-tight and true to line and grade.

b. Chamfer above grade exposed joints, edges, and external corners of concrete 0.75 inch. Place chamfer strips in corners of formwork to produce beveled edges on permanently exposed surfaces.[Do not bevel reentrant corners or edges of formed joints of concrete.]

c. Provide formwork with clean-out openings to permit inspection and removal of debris.

d. Inspect formwork and remove foreign material before concrete is placed.

e. At construction joints, lap form-facing materials over the concrete of previous placement. Ensure formwork is placed against hardened concrete so offsets at construction joints conform to specified tolerances.

f. Provide positive means of adjustment (such as wedges or jacks) of shores and struts. Do not make adjustments in formwork after concrete has reached initial setting. Brace formwork to resist lateral deflection and lateral instability.

g. Fasten form wedges in place after final adjustment of forms and before concrete placement.

h. Provide anchoring and bracing to control upward and lateral movement of formwork system.

i. Construct formwork for openings to facilitate removal and to produce opening dimensions as specified and within tolerances.

j. Provide runways for moving equipment. Support runways directly on formwork or structural members. Do not support runways on reinforcement. Loading applied by runways must not exceed capacity of formwork or structural members.

k. Position and support expansion joint materials, waterstops, and other embedded items to prevent displacement. Fill voids in sleeves, inserts, and anchor slots temporarily with removable material to prevent concrete entry into voids.

l. Clean surfaces of formwork and embedded materials of mortar, grout, and foreign materials before concrete placement.

3.2.1 Coating

a. Cover formwork surfaces with an acceptable material that inhibits bond with concrete.

b. If formwork release agent is used, apply to formwork surfaces in accordance with manufacturer's recommendations before placing reinforcement. Remove excess release agent on formwork prior to concrete placement.

c. Do not allow formwork release agent to contact reinforcement or hardened concrete against which fresh concrete is to be placed.

3.2.2 Reshoring

a. Do not allow structural members to be loaded with combined dead and construction loads in excess of loads indicated in the accepted procedure.

b. Install and remove reshores or backshores in accordance with accepted procedure.

c. For floors supporting shores under newly placed concrete, either leave original supporting shores in place, or install reshores or backshores. Shoring system and supporting slabs must resist anticipated loads. Locate reshores and backshores directly under a

shore position or as indicated on formwork shop drawings.

d. In multistory buildings, place reshoring or backshoring over a sufficient number of stories to distribute weight of newly placed concrete, forms, and construction live loads.

3.2.3 Reuse

a. Reuse forms providing the structural integrity of concrete and the aesthetics of exposed concrete are not compromised.

b. Wood forms must not be clogged with paste and must be capable of absorbing high water-cementitious material ratio paste.

c. Remove leaked mortar from formwork joints before reuse.

3.2.4 Forms for Standard Rough Form Finish

Provide formwork in accordance with ACI 301 Section 5 with a surface finish, SF-1.0, for formed surfaces that are to be concealed by other construction.

3.2.5 Forms for Standard Smooth Form Finish

Provide formwork in accordance with ACI 301 Section 5 with a surface finish, SF-3.0, for formed surfaces that are exposed to view.[Do not provide mockup of concrete surface appearance and texture.]

3.2.6 Form Ties

a. For post-tensioned structures, do not remove formwork supports until stressing records have been accepted by the Contracting Officer.

b. After ends or end fasteners of form ties have been removed, repair tie holes in accordance with ACI 301 Section 5 requirements.

3.2.7 Forms for Concrete Pan Joist Construction

Factory-fabricate pan-form units for one-way or two-way concrete joist and slab construction of the approximate section indicated, consisting of steel or molded fiberglass concrete form pans. Furnish closure units as required.

3.2.8 Tolerances for Form Construction

a. Construct formwork so concrete surfaces conform to tolerances in ACI 117.

b. Position and secure sleeves, inserts, anchors, and other embedded items such that embedded items are positioned within ACI 117 tolerances.

c. To maintain specified elevation and thickness within tolerances, install formwork to compensate for deflection and anticipated settlement in formwork during concrete placement. Set formwork and intermediate screed strips for slabs to produce designated elevation, camber, and contour of finished surface before formwork removal. If specified finish requires use of vibrating screeds or roller pipe screeds, ensure that edge forms and screed strips are strong enough to

support such equipment.

3.2.9 Removal of Forms and Supports

a. If vertical formed surfaces require finishing, remove forms as soon as removal operations will not damage concrete.

b. Remove top forms on sloping surfaces of concrete as soon as removal will not allow concrete to sag. Perform repairs and finishing operations required. If forms are removed before end of specified curing period, provide curing and protection.

c. Do not damage concrete during removal of vertical formwork for columns, walls, and sides of beams. Perform needed repair and finishing operations required on vertical surfaces. If forms are removed before end of specified curing period, provide curing and protection.

[d. Leave formwork and shoring in place to support construction loads and weight of concrete in beams, slabs, and other structural members until in-place required strength of concrete is reached.

] e. Form-facing material and horizontal facing support members may be removed before in-place concrete reaches specified compressive strength if shores and other supports are designed to allow facing removal without deflection of supported slab or member.

3.2.10 Strength of Concrete Required for Removal of Formwork

If removal of formwork, reshoring, or backshoring is based on concrete reaching a specified in-place strength, mold and field-cure cylinders in accordance with ASTM C31/C31M[except self-consolidating cylinders must be molded in accordance with ASTM C1758/C1758M.]. Test cylinders in accordance with ASTM C39/C39M. Alternatively, use one or more of the methods listed herein to evaluate in-place concrete strength for formwork removal.

a. Tests of cast-in-place cylinders in accordance with ASTM C873/C873M. This option is limited to slabs with concrete depths from 5 to 12 in.

b. Penetration resistance in accordance with ASTM C803/C803M.

c. Pullout strength in accordance with ASTM C900.

d. Maturity method in accordance with ASTM C1074. Submit maturity method data using project materials and concrete mix proportions used on the project to demonstrate the correlation between maturity and compressive strength of laboratory cured test specimens to the Contracting Officer.

3.3 PLACING REINFORCEMENT AND MISCELLANEOUS MATERIALS

a. Unless otherwise specified, place reinforcement and miscellaneous materials in accordance to ACI 301. Provide bars, welded wire reinforcement, wire ties, supports, and other devices necessary to install and secure reinforcement.

b. Reinforcement must not have rust, scale, oil, grease, clay, or foreign substances that would reduce the bond. Rusting of reinforcement is a

basis of rejection if the effective cross-sectional area or the nominal weight per unit length has been reduced. Remove loose rust prior to placing steel. Tack welding is prohibited.

c. Nonprestressed cast-in-place concrete members must have concrete cover for reinforcement given in the following table:

Concrete Exposure	**Member**	**Reinforcement**	**Specified cover, in.**
Cast against and permanently in contact with ground	All	All	3
Exposed to weather or in contact with ground	All	No. 6 through No. 18 bars	2
		No. 5 bar, W31 or D31 wire, and smaller	1-1/2
Not exposed to weather or in contact with ground	Slabs, joists, and walls	No. 14 and No. 18 bars	1-1/2
		No. 11 bar and smaller	3/4
	Beams, columns, pedestals, and tension ties	Primary reinforcement, stirrups, ties, spirals, and hoops	1-1/2

d. Cast-in-place prestressed concrete members must have concrete cover for reinforcement, ducts, and end fittings given in the following table:

Concrete	**Member**	**Reinforcement**	**Specified**
Cast against and permanently in contact with ground	All	All	3

Concrete	Member	Reinforcement	Specified
Exposed to weather or in contact with ground	Slabs, joists, and walls	All	1
	All other	All	1-1/2
Not exposed to weather or in contact with ground	Slabs, joists, and walls	All	3/4
	Beams, columns, and tension ties	Primary reinforcement	1-1/2
		Stirrups, ties, spirals, and hoops	1

e. Precast nonprestressed or prestressed concrete members manufactured under plant conditions must have concrete cover for reinforcement, ducts, and end fittings given in the following table:

Concrete Exposure	Member	Reinforcement	Specified cover, in.
Exposed to weather or in contact with ground	Walls	No. 14 and No. 18 bars; tendons larger than 1-1/2 in. diameter	1-1/2
		No. 11 bars and smaller; W31 and D31 wire, and smaller; tendons and strands 1-1/2 in.	3/4
	All other	No. 14 and No. 18 bars; tendons larger than 1-1/2 in.	2
		No. 6 through No. 11 bars; tendons and strands larger than 5/8 in. diameter through 1-1/2 in.	1-1/2
		No. 5 bar, W31 or D31 wire, and smaller; tendons and strands 5/8 in. diameter and smaller	1-1/4

Concrete Exposure	Member	Reinforcement	Specified cover, in.
Not exposed to weather or in contact with ground	Slabs, joists, and walls	No. 14 and No. 18 bars; tendons larger than 1-1/2 in. diameter	1-1/4
		Tendons and strands 1-1/2 in. diameter and smaller	3/4
		No. 11 bar, W31 or D31	5/8
	Beams, columns, pedestals, and tension ties	Primary reinforcement	Greater of bar diameter and 5/8 and need not exceed 1-1/2
		Stirrups, ties, spirals, and hoops	3/8

3.3.1 General

Provide details of reinforcement that are in accordance with the Contract Documents.

3.3.2 Vapor Retarder[and Vapor Barrier]

a. Install in accordance with ASTM E1643. Provide beneath the on-grade concrete floor slab. Use the greatest widths and lengths practicable to eliminate joints wherever possible. Lap joints a minimum of 12 inches and tape.

b. Remove torn, punctured, or damaged vapor retarder[and vapor barrier] material and provide with new vapor retarder[and vapor barrier] prior to placing concrete. Concrete placement must not damage vapor retarder[and vapor barrier material].[Place a 2 inch layer of clean concrete sand on vapor retarder[and vapor barrier] before placing concrete.][Place vapor barrier directly on underlying subgrade, base course, or capillary water barrier, unless it consists of crushed material or large granular material which could puncture the vapor barrier. In this case, a thin layer of approximately 1/2 inch of fine graded material should be rolled or compacted over the fill before installation of the vapor barrier to reduce the possibility of puncture. Control concrete placement so as to prevent damage to the vapor barrier.]

3.3.3 Perimeter Insulation

Install perimeter insulation at locations indicated. Adhesive must be used where insulation is applied to the interior surface of foundation walls and may be used for exterior application.

3.3.4 Reinforcement Supports

Provide reinforcement support in accordance with CRSI RB4.1 and ACI 301 Section 3 requirements. Also, coat supports for coated or galvanized bars with electrically compatible material for a distance of at least 2 inches beyond the point of contact with the bars.

[3.3.5 Epoxy Coated Reinforcing

Meet the requirements of[ASTM A934/A934M including Appendix X2,] "Guidelines for Job Site Practices" except as otherwise specified herein.

3.3.5.1 Epoxy Coated Reinforcing Steel Placement and Coating Repair

Carefully handle and install bars to minimize job site patching. Use the same precautions as described in the paragraph titled EPOXY-COATED REINFORCING BARS. Do not drag bars over other bars or over abrasive surfaces. Keep bar free of dirt and grit. When possible, assemble reinforcement as tied cages prior to final placement into the forms. Support assembled cages on padded supports. It is not expected that coated bars, when in final position ready for concrete placement, are completely free of damaged areas; however, excessive nicks and scrapes which expose steel is cause for rejection. Criteria for defects which require repair and for those that do not require repair are as indicated. Inspect for defects and provide required repairs prior to assembly. After assembly, reinspect and provide final repairs.

a. Immediately prior to application of the patching material, manually remove any rust and debonded coating from the reinforcement by suitable techniques employing devices such as wire brushes and emery paper. Exercise cars during this surface preparation so that the damaged areas are not enlarged more than necessary to accomplish the repair. Clean damaged areas of dirt, debris, oil, and similar materials prior to application of the patching material.

b. Do repair and patching in accordance with the patching material manufacturer's recommendations. Have these recommendations, including cure times, 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 fresh water to remove chloride contamination prior to placing concrete.

]]3.3.6 Splicing

As indicated in the Contract Documents. For splices not indicated follow ACI 301. Do not splice at points of maximum stress. Overlap welded wire reinforcement the spacing of the cross wires, plus 2 inches.[AWS D1.4/D1.4M. Approve welded splices prior to use.][Repair the cut ends of hot-dipped galvanized reinforcement steel to completely coat exposed steel, ASTM A780/A780M.]

3.3.7 Future Bonding

Plug exposed, threaded, mechanical reinforcement bar connectors with a greased bolt. Provide bolt threads that match the connector. Countersink the connector in the concrete. Caulk the depression after the bolt is installed.

3.3.8 Setting Miscellaneous Material

Place and secure anchors and bolts, pipe sleeves, conduits, and other such items in position before concrete placement and support against displacement. Plumb anchor bolts and check location and elevation. Temporarily fill voids in sleeves with readily removable material to prevent the entry of concrete.

3.3.9 Inspection of Reinforcement

Inspect and verify proper reinforcement grade, shape, cross section and condition. Do not use reinforcement with the following defects:

a. Bar lengths, depths, and bends beyond specified fabrication tolerances.

b. Bends or kinks not indicated on drawings or approved shop drawings.

c. Bars with reduced cross section due to rusting or other cause.

3.3.10 Placing Reinforcement

Place reinforcement in accordance with ACI 301.

For slabs on grade (over earth or over capillary water barrier) and for footing reinforcement, support bars or welded wire reinforcement on precast concrete blocks, spaced at intervals required by size of reinforcement, to keep reinforcement the minimum height specified above the underside of slab or footing.

For slabs other than on grade, supports for which any portion is less than 1 inch from concrete surfaces that are exposed to view or to be painted may be precast concrete units, plastic-coated steel, or stainless steel protected bar supports. Precast concrete units must be wedge shaped, not larger than 3-1/2 by 3-1/2 inches, and of thickness equal to that indicated for concrete protection of reinforcement. Provide precast units that have cast-in galvanized tie wire hooked for anchorage and blend with concrete surfaces after finishing is completed.

Provide reinforcement that is supported and secured together to prevent displacement by construction loads or by placing of wet concrete, and as follows:

a. Provide supports for reinforcing bars that are sufficient in number and have sufficient strength to carry the reinforcement they support, and in accordance with ACI 301 and CRSI SP0001-31-DL-I. Do not use supports to support runways for concrete conveying equipment and similar construction loads.

b. Equip supports on ground and similar surfaces with sand-plates.

c. Support welded wire reinforcement as required for reinforcing bars.

d. Secure reinforcements to supports by means of tie wire. Provide black, soft iron wire, not less than 16 gage.

e. Accurately place reinforcement, securely tie at intersections, and hold in position during placing of concrete by spacers, chairs, or other approved supports. Point wire-tie ends away from the form. Unless otherwise indicated, numbers, type, and spacing of supports must conform to the Contract Documents.

f. Bending of reinforcing bars partially embedded in concrete is permitted only as specified in the Contract Documents.

3.3.11 Spacing of Reinforcing Bars

a. As indicated in the Contract Documents.

b. Reinforcing bars may be relocated to avoid interference with other reinforcement, or with conduit, pipe, or other embedded items. If any reinforcing bar is moved a distance exceeding one bar diameter or specified placing tolerance, resulting rearrangement of reinforcement is subject to preapproval by the Contracting Officer.

3.3.12 Concrete Protection for Reinforcement

In accordance with the Contract Documents.

3.3.13 Welding

In accordance with AWS D1.4/D1.4M.

3.4 BATCHING, MEASURING, MIXING, AND TRANSPORTING CONCRETE

In accordance with ASTM C94/C94M, ACI 301, ACI 302.1R and ACI 304R, except as modified herein. Utilize batching equipment 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 ticket information for each load of ready mix concrete.

3.4.1 Measuring

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

3.4.2 Mixing

a. Mix concrete in accordance with ASTM C94/C94M, ACI 301 and ACI 304R.

b. Machine mix concrete. Begin mixing within 30 minutes after the cement has been added to the aggregates. Place concrete within[90] minutes of either addition of mixing water to cement and aggregates or addition of cement to aggregates.[If discharge is acceptable after more than 90 minutes the air content, slump[, slump flow and Visual Stability index], and concrete temperature must be tested and must be within the specified limits.] A retarder must be used to facilitate placing and finishing when concrete temperature is 85 degrees F or greater.

c. [If the entrained air content falls below the specified limit, add a sufficient quantity of admixture, within the manufacturer's recommended dosage, to bring the entrained air content within the specified limits.]Dissolve admixtures in the mixing water and mix in the drum to uniformly distribute the admixture throughout the batch. Do not reconstitute concrete that has begun to solidify.

d. When fibers are used, add fibers together with the aggregates and never as the first component in the mixer. Dispense fibers into the mixing system using appropriate dispensing equipment and procedure as recommended by the manufacturer.

3.4.3 Transporting

Transport concrete from the mixer to the forms as rapidly as practicable. Prevent segregation or loss of ingredients. Clean transporting equipment thoroughly before each batch. Do not use aluminum pipe or chutes. Remove concrete which has segregated in transporting and dispose of as directed.

3.5 PLACING CONCRETE

Place concrete in accordance with ACI 301 Section 5. Place concrete within 15 minutes of discharge into non-agitating equipment.

[3.5.1 Footing Placement

Concrete for footings may be placed in excavations without forms upon inspection and approval by the Contracting Officer. Excavation width must be a minimum of 4 inches greater than indicated.

][3.5.2 Pumping

ACI 304R and ACI 304.2R. Pumping must not result in separation or loss of materials nor cause interruptions sufficient to permit loss of plasticity between successive increments. Loss of slump in pumping equipment must not exceed 2 inches at discharge/placement. Do not convey concrete through pipe made of aluminum or aluminum alloy. Avoid rapid changes in pipe sizes. Limit maximum size of course aggregate to 33 percent of the diameter of the pipe. Limit maximum size of well-rounded aggregate to 40 percent of the pipe diameter. Take samples for testing at both the point of delivery to the pump and at the discharge end.

[3.5.2.1 Pumping Lightweight Concrete

In accordance with ACI 213R unless otherwise specified. Presoak or presaturate aggregates. Cement content must be minimum of [564 pounds per cubic yard] [_____] and be sufficient to accommodate a 4 to 6 inch slump.[Make field trial run in accordance with ACI 213R.]

]]3.5.3 Cold Weather

Meet the requirements of[ACI 301][ACI 306.1] unless otherwise specified. Do not allow concrete temperature to decrease below 50 degrees F. Obtain approval prior to placing concrete when the ambient temperature is below 40 degrees F or when concrete is likely to be subjected to freezing temperatures within 24 hours. Cover concrete and provide sufficient heat to maintain 50 degrees F minimum adjacent to both the formwork and the structure while curing. Limit the rate of cooling to 5 degrees F in any one hour and 18 degrees F per 24 hours after heat application.

3.5.4 Hot Weather

[Meet the requirements of[ACI 301][ACI 305.1] unless otherwise specified.]Maintain required concrete temperature using Figure 4.2 in ACI 305R to prevent the evaporation rate from exceeding 0.2 pound of water per square foot of exposed concrete per hour. 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. 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.

3.5.5 Bonding

Roughen and clean surfaces of set concrete at joints of laitance, coatings, loose particles, and foreign matter. Roughen surfaces in a manner that exposes the aggregate uniformly and does not leave laitance, loosened particles of aggregate, nor damaged concrete at the surface.

Obtain bonding of fresh concrete that has set as follows:

a. At joints between footings and walls or columns, between walls or columns and the beams or slabs they support, and elsewhere unless otherwise specified; dampen but do not saturate roughened and cleaned surface of set concrete immediately prior to placing fresh concrete.

b. At joints in exposed-to-view work; at vertical joints in walls; at joints near midpoint of span in girders, beams, supported slabs, other structural members; in work designed to contain liquids; dampen but do not saturate the roughened and cleaned surface of set concrete and cover with a cement grout coating.

c. Provide cement grout that consists of equal parts of portland cement and fine aggregate by weight with not more than 6 gallons of water per sack of cement. Apply cement grout with a stiff broom or brush to a minimum thickness of 1/16 inch. Deposit fresh concrete before cement grout has attained its initial set.

3.6 WASTE MANAGEMENT

Provide as specified in the Waste Management Plan and as follows.

3.6.1 Mixing Equipment

Before concrete pours, designate[Contractor-owned site meeting environmental standards][on-site area to be paved later in project] for cleaning out concrete mixing trucks. Minimize water used to wash equipment.

3.6.2 Hardened, Cured Waste Concrete

[Crush and reuse hardened, cured waste concrete as fill or as a base

course for pavement.][Use hardened, cured waste concrete as aggregate in concrete mix if approved by Contracting Officer.]

3.6.3 Reinforcing Steel

Collect reinforcing steel and place in designated area for recycling.

3.6.4 Other Waste

Identify concrete manufacturer's or supplier's policy for collection or return of construction waste, unused material, deconstruction waste, and/or packaging material.[Return excess cement to supplier.][Institute deconstruction and construction waste separation and recycling for use in manufacturer's programs. When such a program is not available, seek local recyclers to reclaim the materials.]

3.7 SURFACE FINISHES EXCEPT FLOOR, SLAB, AND PAVEMENT FINISHES

3.7.1 Defects

Repair surface defects in accordance with ACI 301 Section 5.

3.7.2 Not Against Forms (Top of Walls)

Finish surfaces not otherwise specified with wood floats to even surfaces. Match adjacent finishes.

3.7.3 Formed Surfaces

3.7.3.1 Tolerances

Tolerances in accordance with ACI 117 and as indicated.

3.7.3.2 As-Cast Rough Form

Provide for surfaces not exposed to public view a surface finish SF-1.0. Patch holes and defects in accordance with ACI 301.

3.7.3.3 Standard Smooth Finish

Provide for surfaces exposed to public view a surface finish SF-3.0. Patch holes and defects in accordance with ACI 301.

3.7.4 [Smooth-Rubbed][Grout-Cleaned Rubbed][Cork-Floated][Exposed Aggregate]Finish

[Provide a smooth-rubbed finish per ACI 301 Section 5 in the locations indicated.][Provide a grout-cleaned rubbed finish per ACI 301 Section 5 in the locations indicated.][Provide a cork-floated finish per ACI 301 Section 5 in the locations indicated.][Provide an exposed aggregate finish per ACI 301 Section 5 in the locations indicated.]

3.8 FLOOR, SLAB, AND PAVEMENT FINISHES AND MISCELLANEOUS CONSTRUCTION

In accordance with ACI 301 and ACI 302.1R, unless otherwise specified. Slope floors uniformly to drains where drains are provided.[Depress the concrete base slab where quarry tile, ceramic tile,[or] [_____] are indicated.][Steel trowel and fine-broom finish concrete slabs that are to receive quarry tile, ceramic tile, or paver tile [_____].] Where

straightedge measurements are specified, provide straightedge.

3.8.1 Finish

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 the excess water off or remove by absorption with porous materials. Do not use dry cement to absorb bleedwater. Do no use grate tampers ("jitterbugs").

3.8.1.1 Scratched

Use for surfaces intended to receive bonded applied cementitious applications. Finish concrete in accordance with ACI 301 Section 5 for a scratched finish.

3.8.1.2 Floated

Use for[surfaces to receive[roofing,][waterproofing membranes,][sand bed terrazzo,]] [_____][and][exterior slabs where not otherwise specified.] Finish concrete in accordance with ACI 301 Section 5 for a floated finish.

[3.8.1.3 Concrete Containing Silica Fume

Finish using magnesium floats or darbies.[Finish using techniques demonstrated in the sample installation.]

]3.8.1.4 Steel Troweled

Use for floors intended as walking surfaces[,][and] for reception of floor coverings[, and] [_____]. Finish concrete in accordance with ACI 301 Section 5 for a steel troweled finish.

[3.8.1.5 Nonslip Finish

Use on surfaces of exterior platforms, steps, and landings; and on exterior and interior pedestrian ramps. Finish concrete in accordance with ACI 301 Section 5 for a dry-shake finish. After the selected material has been embedded by the two floatings, complete the operation with a[broomed][floated][troweled] finish.

]3.8.1.6 Broomed

Use on surfaces of exterior walks, platforms, patios, and ramps, unless otherwise indicated. Finish concrete in accordance with ACI 301 Section 5 for a broomed finish.

3.8.1.7 Pavement

Screed the concrete with a template advanced with a combined longitudinal and crosswise motion. Maintain a slight surplus of concrete ahead of the template. After screeding, float the concrete longitudinally. Use a straightedge to check slope and flatness; correct and refloat as necessary. Obtain final finish by[belting. Lay belt flat on the concrete surface and advance with a sawing motion; continue until a uniform but gritty nonslip surface is obtained.][a burlap drag. Drag a

strip of clean, wet burlap from 3 to 10 feet wide and 2 feet longer than the pavement width across the slab. Produce a fine, granular, sandy textured surface without disfiguring marks.] Round edges and joints with an edger having a radius of 1/8 inch.

3.8.1.8 Concrete Toppings Placement

The following requirements apply to the placement of toppings of concrete on base slabs that are either freshly placed and still plastic, or on hardened base slabs.

a. Placing on a Fresh Base: Screed and bull float the base slab. As soon as the water sheen has disappeared, lightly rake the surface of the base slab with a stiff bristle broom to produce a bonding surface for the topping. Immediately spread the topping mixture evenly over the roughened base before final set takes place. Give the topping the finish[indicated on the drawings][specified herein].

b. Bonding to a Hardened Base: When the topping is to be bonded to a floated or troweled hardened base, roughen the base by scarifying, grit-blasting, scabbling, planing, flame cleaning, or acid-etching to lightly expose aggregate and provide a bonding surface. Remove dirt, laitance, and loose aggregate by means of a stiff wire broom. Keep the clean base wet for a period of 12 hours preceding the application of the topping. Remove excess water and apply a 1:1:1/2 cement-sand-water grout, and brush into the surface of the base slab. Do not allow the cement grout to dry, and spread it only short distances ahead of the topping placement. Do not allow the temperature differential between the completed base and the topping mixture to exceed 9 degrees F at the time of placing. Place the topping and finish as[indicated][specified herein].

3.8.1.9 Chemical-Hardener Treatment

[Apply liquid-chemical floor hardener where indicated after curing and drying concrete surface. Dilute liquid hardener with water and apply in three coats. Apply first coat at one-third strength, second coat one-half strength, and third coat two-thirds strength. Apply each coat evenly and allow to dry 24 hours between coats.

Apply approved proprietary chemical hardeners in accordance with manufacturer's printed directions.

]3.8.1.10 Colored Wear-Resistant Finish

[a. Give finish to monolithic slab surfaces where indicated.

b. Apply dry shake materials for colored wear-resistant finish at the rate of 60 pounds per 100 square feet of surface.

c. Immediately following first floating operation, distribute approximately two-thirds of specified weight of dry shake material uniformly over surface and embedded by means of power floating. After first dry-shake application has been embedded, uniformly distribute remainder of dry-shake material over surface at right angles to first dry-shake application and embed by means of power floating. Trueness of surface and other requirements for floating operations not specified in this paragraph are as specified for float finish.

d. After completion of float finish, apply a trowel finish as specified.

]3.8.1.11 Heavy-Duty Wear-Resistant Finish

a. Give finish to slab surfaces where indicated.

b. Dry-shake material for heavy-duty, wear-resistant finish must consist of a mixture of standard portland cement and aggregate for heavy-duty, wear-resistant finish proportioned by weight as follows:

One part standard portland cement and[two parts traprock aggregate for heavy-duty wear-resistant finish][four parts emery aggregate for heavy-duty wear-resistant finish][two parts by weight iron aggregate for heavy-duty, wear-resistant finish].

c. Apply blended dry-shake material as follows:

Maximum type of aggregate in dry shake	**Amount per 100 square feet of Surface**
Traprock	160 pounds
Emery	130 pounds
Iron	130 pounds

d. Immediately following the first floating operation, approximately one-half the specified weight of blended, uniformly distribute dry-shake materials over the surface and embedded by means of power floating. After the first dry-shake application has been embedded, uniformly distribute the remaining one-half of the blended dry-shake material over the surface at right angles to the first dry-shake application and embedded by means of power floating. Trueness of surface and other requirements for floating operations not specified in this paragraph are as specified for float finish.

e. After completion of the float finish, trowel finish the surface as specified.

[3.8.2 Flat Floor Finishes

ACI 302.1R. Construct in accordance with one of the methods recommended in Table 10.15.3a, "Slab-on-ground flatness/levelness construction guide" or Table 10.15.3b, "Suspended slab flatness/levelness construction guide" appropriate for the type of construction. ACI 117 for tolerance tested by ASTM E1155.

a. Specified Conventional Value:

Floor Flatness (Ff) [20] [_____] [13] [_____] minimum

Floor Levelness (FL) [15] [_____] [10] [_____] minimum

b. Specified Industrial:

Floor Flatness (Ff) [30] [_____] [15] [_____] minimum

Floor Levelness (FL) [20] [_____] [10] [_____] minimum

3.8.2.1 Measurement of Floor Tolerances

Test slab within 24 hours of the final troweling. Provide tests to Contracting Officer within 12 hours after collecting the data. Floor flatness inspector is required to provide a tolerance report which includes:

a. Key plan showing location of data collected.

b. Results required by ASTM E1155.

3.8.2.2 Remedies for Out of Tolerance Work

Repair and retest any floors not meeting specified tolerances. Prior to repair, submit and receive approval for the proposed repair, including product data from any materials proposed. Repairs must not result in damage to structural integrity of the floor. For floors exposed to public view, repairs must prevent any uneven or unusual coloring of the surface.

]3.8.3 Concrete Walks

Provide 4 inches thick minimum. Provide contraction joints spaced every 5 linear feet unless otherwise indicated. Cut contraction joints 1 inch deep, or one fourth the slab thickness whichever is deeper, with a jointing tool after the surface has been finished. Provide 0.5 inch thick transverse expansion joints at changes in direction where sidewalk abuts curb, steps, rigid pavement, or other similar structures; space expansion joints every 50 feet maximum. Give walks a broomed finish. Unless indicated otherwise, provide a transverse slope of 1/48. Limit variation in cross section to 1/4 inch in 5 feet.

3.8.4 Pits and Trenches

Place bottoms and walls monolithically or provide waterstops and keys.

3.8.5 Curbs[and Gutters]

Provide contraction joints spaced every 10 feet maximum unless otherwise indicated. Cut contraction joints 3/4 inch deep with a jointing tool after the surface has been finished. Provide expansion joints 1/2 inch thick and spaced every 100 feet maximum unless otherwise indicated. Perform pavement finish.

[3.8.6 Splash Blocks

Provide at outlets of downspouts emptying at grade. Splash blocks may be precast concrete, 24 inches long, 12 inches wide and 4 inches thick, unless otherwise indicated, with smooth-finished countersunk dishes sloped to drain away from the building.

]3.9 JOINTS

3.9.1 Construction Joints

Make and locate joints not indicated so as not to impair strength and appearance of the structure, as approved. Make joints perpendicular to main reinforcement. Continue and develop reinforcement across

construction joints. Locate construction joints as follows:

3.9.1.1 Construction Joints for Constructability Purposes

a. In walls, at top of footing; at top of slabs on ground; at top and bottom of door and window openings or where required to conform to architectural details; and at underside of deepest beam or girder framing into wall.

b. In columns or piers, at top of footing; at top of slabs on ground; and at underside of deepest beam or girder framing into column or pier.

c. Near midpoint of spans for supported slabs, beams, and girders unless a beam intersects a girder at the center, in which case construction joints in girder must offset a distance equal to twice the width of the beam. Make transfer of shear through construction joint by use of inclined reinforcement.

Provide keyways at least 1-1/2-inches deep in construction joints in walls and slabs and between walls and footings; approved bulkheads may be used for slabs.

3.9.2 Isolation Joints in Slabs on Ground

a. Provide joints at points of contact between slabs on ground and vertical surfaces, such as column pedestals, foundation walls, grade beams, and elsewhere as indicated.

b. Fill joints with premolded joint filler strips 1/2 inch thick, extending full slab depth. Install filler strips at proper level below finish floor elevation with a slightly tapered, dress-and-oiled wood strip temporarily secured to top of filler strip to form a groove not less than 3/4 inch in depth where joint is sealed with sealing compound and not less than 1/4 inch in depth where joint sealing is not required. Remove wood strip after concrete has set. Clean groove of foreign matter and loose particles after surface has dried.

3.9.3 Contraction Joints in Slabs on Ground

a. Provide joints to form panels as indicated.

b. Under and on exact line of each control joint, cut 50 percent of welded wire reinforcement before placing concrete.

c. Sawcut contraction joints into slab on ground in accordance with ACI 301 Section 5.

[d. Provide joints 1/8-inch wide by 1/5 to 1/4 of slab depth and form by inserting hand-pressed fiberboard strip into fresh concrete until top surface of strip is flush with slab surface. After concrete has cured for at least 7 days, remove inserts and clean groove of foreign matter and loose particles.

]
[e. Sawcutting will be limited to within 12 hours after set and at 1/4 slab depth.

]3.9.4 Sealing Joints in Slabs on Ground

a. Seal contraction and control joints which are to receive finish flooring material with joint sealing compound after concrete curing period. Slightly underfill groove with joint sealing compound to prevent extrusion of compound. Remove excess material as soon after sealing as possible.

b. Leave sealed groove ready to receive filling material that is provided as part of finish floor covering work.

3.10 CURING AND PROTECTION

Curing and protection in accordance with ACI 301 Section 5, unless otherwise specified. Begin curing immediately following form removal. Avoid damage to concrete from vibration created by blasting, pile driving, movement of equipment in the vicinity, disturbance of formwork or protruding reinforcement, 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. Allow curing compound/sealer installations to cure prior to the installation of materials that adsorb VOCs.

3.10.1 Requirements for Type III, High-Early-Strength Portland Cement

The curing periods are required to be not less than one-fourth of those specified for portland cement, but in no case less than 72 hours.

3.10.2 Curing Periods

ACI 301 Section 5, except 10 days for retaining walls, pavement or chimneys. 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.

3.10.3 Curing Formed Surfaces

Accomplish curing of formed surfaces, including undersurfaces of girders, beams, supported slabs, and other similar surfaces by moist curing with forms in place for full curing period or until forms are removed. If forms are removed before end of curing period, accomplish final curing of formed surfaces by any of the curing methods specified above, as applicable.

3.10.4 Curing Unformed Surfaces

a. Accomplish initial curing of unformed surfaces, such as monolithic

slabs, floor topping, and other flat surfaces, by membrane curing.

b. Accomplish final curing of unformed surfaces by any of curing methods specified, as applicable.

c. Accomplish final curing of concrete surfaces to receive liquid floor hardener of finish flooring by moisture-retaining cover curing.

3.10.5 Temperature of Concrete During Curing

When temperature of atmosphere is 41 degrees F and below, maintain temperature of concrete at not less than 55 degrees F throughout concrete curing period or 45 degrees F when the curing period is measured by maturity. When necessary, make arrangements before start of concrete placing for heating, covering, insulation, or housing as required to maintain specified temperature and moisture conditions for concrete during curing period.

When the temperature of atmosphere is 80 degrees F and above or during other climatic conditions which cause too rapid drying of concrete, make arrangements before start of concrete placing for installation of wind breaks, of shading, and for fog spraying, wet sprinkling, or moisture-retaining covering of light color as required to protect concrete during curing period.

Changes in temperature of concrete must be uniform and not exceed 5 degrees F in any one hour nor 49 degrees F in any 24-hour period.

3.10.6 Protection from Mechanical Injury

During curing period, protect concrete from damaging mechanical disturbances, particularly load stresses, heavy shock, and excessive vibration and from damage caused by rain or running water.

3.10.7 Protection After Curing

Protect finished concrete surfaces from damage by construction operations.

3.11 FIELD QUALITY CONTROL

3.11.1 Aggregate Testing

3.11.1.1 Fine Aggregate

At least once during each shift when the concrete plant is operating, there must be one sieve analysis and fineness modulus determination in accordance with ASTM C136/C136M and COE CRD-C 104 for the fine aggregate or for each fine aggregate if it is batched in more than one size or classification. The location at which samples are taken may be selected by the Contractor as the most advantageous for control. However, the Contractor is responsible for delivering fine aggregate to the mixer within specification limits. When the amount passing on any sieve is outside the specification limits, immediately resample and retest the fine aggregate. If there is another failure on any sieve, immediately report the fact to the Contracting Officer, stop concreting, and take immediate steps to correct the grading.

3.11.1.2 Coarse Aggregate

At least once during each shift in which the concrete plant is operating, provide a sieve analysis in accordance with ASTM C136/C136M for each size of coarse aggregate. The location at which samples are taken may be selected by the Contractor as the most advantageous for production control. However, the Contractor is responsible for delivering the aggregate to the mixer within specification limits. A test record of samples of aggregate taken at the same locations must show the results of the current test as well as the average results of the five most recent tests including the current test. The Contractor may adopt limits for control coarser than the specification limits for samples taken other than as delivered to the mixer to allow for degradation during handling. When the amount passing any sieve is outside the specification limits, immediately resample and retest the coarse aggregate. If the second sample fails on any sieve, report that fact to the Contracting Officer. Where two consecutive averages of 5 tests are outside specification limits, the operation will be considered out of control and reported to the Contracting Officer. Stop concreting and take immediate steps to correct the grading.

3.11.2 Concrete Sampling

ASTM C172/C172M. Collect samples of fresh concrete to perform tests specified except self-consolidating cylinders must be molded in accordance with ASTM C1758/C1758M.. ASTM C31/C31M for making test specimens.

3.11.3 Concrete Testing

3.11.3.1 Slump Tests

ASTM C143/C143M. Take concrete samples during concrete placement/discharge. The maximum slump may be increased as specified with the addition of an approved admixture provided that the water-cementitious material ratio is not exceeded. Perform tests at commencement of concrete placement, when test cylinders are made. If the measured slump at point of delivery is greater than specified, a check test will be performed on a new sample from point of delivery. If the check test fails, concrete is considered to have failed to meet the requirements of this specification. If the measured slump is less than specified, adjustments will be permitted in accordance with ASTM C94/C94M. If the test of slump of the adjusted mixture fails, concrete is considered to have failed to meet the requirements of this specification.

3.11.3.2 Slump Flow and Visual Stability Index Tests

ASTM C1611/C1611M. Take concrete samples during concrete placement/discharge. Perform tests at commencement of concrete placement on the first two batches, when test cylinders are made, and for each 8 cubic yards (maximum) of concrete. If the measured slump flow at point of delivery is greater than specified, a check test will be performed on a new sample from point of delivery. If the check test fails, concrete is considered to have failed to meet the requirements of this specification. If the measured slump flow is less than specified, adjustments will be permitted in accordance with ASTM C94/C94M. If the test for slump flow of the adjusted mixture fails, concrete is considered to have failed to meet the requirements of this specification.

3.11.3.3 Temperature Tests

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 20 cubic yards (maximum) of concrete, until the specified temperature is obtained, and whenever test cylinders and slump tests are made.

3.11.3.4 Compressive Strength Tests

ASTM C39/C39M. Make six 6 inch by 12 inch or nine 4 inch by 8 inch test cylinders for each set of tests in accordance with ASTM C31/C31M, ASTM C172/C172M and applicable requirements of ACI 305R and ACI 306R except self-consolidating cylinders must be molded in accordance with ASTM C1758/C1758M.. Take precautions to prevent evaporation and loss of water from the specimen. Test two 6 inch by 12 inch or three 4 inch by 8 inch cylinders at 7 days, two 6 inch by 12 inch or three 4 inch by 8 inch cylinders at 28 days, two 6 inch by 12 inch or three 4 inch by 8 inch cylinders at 56 days two 6 inch by 12 inch or three 4 inch by 8 inch cylinders at 90 days and hold two 6 inch by 12 inch or three 4 inch by 8 inch cylinders in reserve. Take samples for strength tests for each concrete mixture placed each day not less than once a day, nor less than once for each 150 cubic yards of concrete, nor less than once for each 5000 square feet of surface area for slabs or walls. For the entire project, take no less than five sets of samples and perform strength tests for each mix design of concrete placed. Each strength test result must be the average of two 6 inch by 12 inch or three 4 inch by 8 inch cylinders from the same concrete sample tested at 28 days . Concrete compressive tests must meet the requirements of this section, the Contract Document, and ACI 301.

3.11.3.5 Air Content

ASTM C173/C173M or ASTM C231/C231M for normal weight concrete and ASTM C173/C173M for lightweight concrete. Test air-entrained concrete for air content at the same frequency as specified for slump tests. If the measured air content at point of delivery is greater than the specified upper limit, a check test of air content will be performed on a new sample from point of delivery. If the check test fails, concrete has failed to meet the requirements of this specification. If the measured air content is less than the specified lower limit, adjustments will be permitted in accordance with ASTM C94/C94M. If the check test of the adjusted mixture fails, concrete has failed to meet the requirements of this specification.

3.11.3.6 Strength of Concrete Structure

The strength of the concrete structure will be considered to be deficient if any of the following conditions are identified:

a. Failure to meet compressive strength tests as evaluated.

b. Reinforcement not conforming to requirements specified.

c. Concrete which differs from required dimensions or location in such a manner as to reduce strength.

d. Concrete curing and protection of concrete against extremes of temperature during curing, not conforming to requirements specified.

e. Concrete subjected to damaging mechanical disturbances, particularly load stresses, heavy shock, and excessive vibration.

f. Poor workmanship likely to result in deficient strength.

Where the strength of the concrete structure is considered deficient submit a mitigation or remediation plan for review and approval by the Contracting Officer.

3.11.3.7 Non-Conforming Materials

Factors that indicate that there are non-conforming materials include (but not limited to) excessive compressive strength, inadequate compressive strength, excessive slump, excessive voids and honeycombing, concrete delivery records that indicate excessive time between mixing and placement, 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 and testing.

Conduct investigations into non-conforming materials at the Contractor's expense. The Contractor is responsible for the investigation and must 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.

3.11.3.8 Testing Concrete Structure for Strength

When there is evidence that strength of concrete structure in place does not meet specification requirements or there are non-conforming materials, make cores drilled from hardened concrete for compressive strength determination in accordance with ASTM C42/C42M, and as follows:

a. Take at least three representative cores from each member or area of concrete-in-place that is considered potentially deficient. Location of cores will be determined by the Contracting Officer.

b. Test cores after moisture conditioning in accordance with ASTM C42/C42M if concrete they represent is more than superficially wet under service.

c. Air dry cores, (60 to 80 degrees F with relative humidity less than 60 percent) for 7 days before test and test dry if concrete they represent is dry under service conditions.

d. Strength of cores from each member or area are considered satisfactory if their average compressive strength is equal to or greater than 85 percent of the design compressive strength, and if no single core strength is less than 75 percent of the design compressive strength. Additional testing of cores extracted from locations represented by erratic core strength results will be permitted only when approved by the Contracting Officer.

e. Core specimens will be taken and tested by the Government. If the results of core-boring tests indicate that the concrete as placed does not conform to the drawings and specification, the cost of such tests and restoration required must be borne by the Contractor.

Fill core holes solid with patching mortar and finished to match adjacent

concrete surfaces.

Correct concrete work that is found inadequate by core tests in a manner approved by the Contracting Officer.

3.12 REPAIR, REHABILITATION AND REMOVAL

Before the Contracting Officer accepts the structure, inspect the structure for cracks, damage and substandard concrete placements that may adversely affect the service life of the structure. Prepare a report documenting these defects which includes recommendations for repair, removal or remediation and submit to the Contracting Officer for approval before any corrective work is accomplished.

3.12.1 Crack Repair

Prior to final acceptance, document all cracks in excess of 0.02 inches wide and repair. Submit the proposed method and materials to repair the cracks to the Contracting Officer for approval. Address the amount of movement expected in the crack due to temperature changes and loading.

3.12.2 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 must be diamond ground to remove the weak surface. Surfaces containing weak surfaces greater than 1/4 inch thick must be removed and replaced or mitigated in a manner acceptable to the Contracting Officer.

3.12.3 Failure of Quality Assurance Test Results

Proposed mitigation efforts must be approved by the Contracting Officer prior to proceeding.

-- End of Section --

SECTION 31 00 00

EARTHWORK
08/23

PART 1 GENERAL

1.1 REFERENCES

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

AMERICAN ASSOCIATION OF STATE HIGHWAY AND TRANSPORTATION OFFICIALS (AASHTO)

AASHTO T 180	(2025) Standard Method of Test for Moisture-Density Relations of Soils Using a 4.54-kg (10-lb) Rammer and a 457-mm (18-in.) Drop

AMERICAN WATER WORKS ASSOCIATION (AWWA)

AWWA C600	(2023) Installation of Ductile-Iron Mains and Their Appurtenances

AMERICAN WELDING SOCIETY (AWS)

AWS D1.1/D1.1M	(2025) Structural Welding Code - Steel

ASTM INTERNATIONAL (ASTM)

ASTM C33/C33M	(2024a) Standard Specification for Concrete Aggregates
ASTM C117	(2023) Standard Test Method for Materials Finer than 75-um (No. 200) Sieve in Mineral Aggregates by Washing
ASTM C136/C136M	(2025) Standard Test Method for Sieve Analysis of Fine and Coarse Aggregates
ASTM C150/C150M	(2024) Standard Specification for Portland Cement
ASTM C260/C260M	(2024) Standard Specification for Air-Entraining Admixtures for Concrete
ASTM C618	(2025a) Standard Specification for Coal Fly Ash and Raw or Calcined Natural Pozzolan for Use in Concrete
ASTM C989/C989M	(2025) Standard Specification for Slag Cement for Use in Concrete and Mortars
ASTM D698	(2012; R 2021) Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400

	ft-lbf/cu. ft. (600 kN-m/cu. m.))
ASTM D1140	(2017) Standard Test Methods for Determining the Amount of Material Finer than 75-µm (No. 200) Sieve in Soils by Washing
ASTM D1556/D1556M	(2015; E 2016) Standard Test Method for Density and Unit Weight of Soil in Place by Sand-Cone Method
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 D2167	(2015) Density and Unit Weight of Soil in Place by the Rubber Balloon Method
ASTM D2216	(2019) Standard Test Methods for Laboratory Determination of Water (Moisture) Content of Soil and Rock by Mass
ASTM D2321	(2020) Standard Practice for Underground Installation of Thermoplastic Pipe for Sewers and Other Gravity-Flow Applications
ASTM D2487	(2017; R 2025) Standard Practice for Classification of Soils for Engineering Purposes (Unified Soil Classification System)
ASTM D2974	(2020; E 2020) Moisture, Ash, and Organic Matter of Peat and Other Organic Soils
ASTM D4253	(2016; E 2019) Standard Test Methods for Maximum Index Density and Unit Weight of Soils Using a Vibratory Table
ASTM D4254	(2016) Standard Test Methods for Minimum Index Density and Unit Weight of Soils and Calculation of Relative Density
ASTM D4318	(2017; E 2018) Standard Test Methods for Liquid Limit, Plastic Limit, and Plasticity Index of Soils
ASTM D4829	(2021) Standard Test Method for Expansion Index of Soils
ASTM D4832	(2016; E 2018) Standard Test Method for Preparation and Testing of Controlled Low Strength Material (CLSM) Test Cylinders
ASTM D5268	(2019) Topsoil Used for Landscaping Purposes
ASTM D6023	(2016) Standard Test Method for Density (Unit Weight), Yield, Cement Content, and

	Air Content (Gravimetric) of Controlled Low-Strength Material (CLSM)
ASTM D6103/D6103M	(2017; E 2021) Standard Test Method for Flow Consistency of Controlled Low Strength Material (CLSM)
ASTM D6938	(2017a) Standard Test Method for In-Place Density and Water Content of Soil and Soil-Aggregate by Nuclear Methods (Shallow Depth)
ASTM D8167/D8167M	(2023) Standard Test Method for In-Place Bulk Density of Soil and Soil-Aggregate by a Low-Activity Nuclear Method (Shallow Depth)

U.S. ARMY CORPS OF ENGINEERS (USACE)

EM 385-1-1	(2024) Safety -- Safety and Occupational Health (SOH) Requirements

U.S. GENERAL SERVICES ADMINISTRATION (GSA)

CID A-A-203	(Rev C; Notice 3) Paper, Kraft, Untreated

1.2 DEFINITIONS

1.2.1 Structural Fill

Soil material placed to support buildings, walls, pads, and other similar facilities.

1.2.2 Embankment Fill

Soil material placed to construct embankment.

1.2.3 Porous Fill

Free-draining material placed for subsurface drainage, as a capillary break, or another specific purpose.

1.2.4 Topsoil

Surface layer of primarily organic soil capable of supporting vegetation growth.

1.2.5 Utility Bedding Material

Fill placed to directly support pipes, conduits, cables, and appurtenant structures. Bedding may also be used to provide a cushion between utilities and bedrock, obstacles, obstructions and other unyielding materials.

1.2.6 Flowable Fill

Fill placed in a plastic or liquid form that flows to near its final placement location with limited assistance and subsequently cures or solidifies to provide a stable or impermeable barrier.

1.2.7 Satisfactory Materials

Satisfactory materials for fill, backfill, and/or any in-situ soils to remain in place comprise any materials classified by ASTM D2487 as GW, GP, GM, GP-GM, GW-GM, GC, GP-GC, GM-GC, SW, SP, , , ,, , , , , , , . Maximum particle size to be no greater than one-half of the allowable lift thickness in any dimension.

1.2.8 Unsatisfactory Materials

Materials which do not comply with the requirements for satisfactory materials are unsatisfactory. Unsatisfactory materials also include man-made fills; trash; refuse; backfills from previous construction; roots and other organic matter or frozen material. Notify the Contracting Officer when encountering any contaminated materials.

1.2.9 Cohesionless Materials

Cohesionless materials include materials classified in ASTM D2487 as GW, GP, SW, and SP. Materials classified as GM and SM will be identified as cohesionless only when the fines are nonplastic. Perform testing, required for classifying materials, in accordance with ASTM D4318, ASTM C117, ASTM C136/C136M and ASTM D1140.

1.2.10 Cohesive Materials

Cohesive materials include materials classified as GC, SC, ML, CL, MH, and CH. Materials classified as GM and SM will be identified as cohesive only when the fines are plastic. Perform testing, required for classifying materials, in accordance with ASTM D4318, ASTM C117, ASTM C136/C136M and ASTM D1140.

1.2.11 Hard/Unyielding Materials

Hard/Unyielding materials comprise weathered rock, dense consolidated deposits, or conglomerate materials which are not included in the definition of "rock" with stones greater than 3 inch in any dimension or as defined by the pipe manufacturer, whichever is smaller. These materials usually require the use of heavy excavation equipment, ripper teeth, or jack hammers for removal.

1.2.12 Unstable Material

Unstable materials are too weak to adequately support the utility pipe, conduit, equipment, or appurtenant structure. Satisfactory material may become unstable due to ineffective drainage, dewatering, becoming frozen, excessive loading.

1.2.13 Expansive Soils

Expansive soils are defined as soils that have an expansion index greater than 20 when tested in accordance with ASTM D4829.

1.2.14 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.

1.2.15 Capillary Water Barrier

A layer of clean, poorly graded crushed rock, stone, or natural sand or gravel having a high porosity which is placed beneath a building slab with or without a vapor barrier to cut off the capillary flow of pore water to the area immediately below a slab.

1.2.16 Degree of Compaction (Proctor)

Degree of compaction required, except as noted in the second sentence, is expressed as a percentage of the maximum dry density obtained by the test procedure presented in ASTM D1557 ASTM D698 abbreviated as a percent of laboratory maximum dry density. Since ASTM D1557 applies only to soils that have 30 percent or less by weight of their particles retained on the 3/4 inch sieve, express the degree of compaction for material having more than 30 percent by weight of their particles retained on the 3/4 inch sieve as a percentage of the maximum dry density in accordance with AASHTO T 180-21 paragraph 1.5, Note 1.

1.2.17 Degree of Compaction (Relative Density)

Degree of compaction required for soils with less than 5 percent passing the No. 200 sieve, is expressed as a relative percentage of the maximum index density/dry unit weight and minimum index density/dry unit weight, obtained by the test procedures in accordance with ASTM D4253 and ASTM D4254, respectively, abbreviated as a percent of laboratory relative density.

1.2.18 Overhaul

Overhaul is the authorized transportation of satisfactory excavation or borrow materials in excess of the free-haul limit of stations. Overhaul is the product of the quantity of materials hauled beyond the free-haul limit, and the distance such materials are hauled beyond the free-haul limit, expressed in station yards.

1.2.19 Borrow

Soil brought to the project site from an external location for the purposes of project construction.

1.2.20 Subgrade

Earth materials directly below foundations and directly below granular base materials in building slab and pavement areas including shoulders.

1.3 SUBSURFACE DATA

Subsurface soil boring logs are shown in project plans . These data represent available subsurface information; however, variations may exist between boring locations.

1.4 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. Ground water elevation is in boring logs feet below existing surface elevation.

d. Ground water elevation is refer boring log feet below existing surface elevation.

e. Material character is indicated by the boring logs.

f. Hard materialsSubmit notification of encountering rock in the project. Include rock excavation with blasting, excavating, grading, disposing of material classified as rock, and the satisfactory removal and disposal of boulders 1/2 cubic yard or more in volume; solid rock; rock material that is in ledges, bedded deposits, and unstratified masses, which cannot be removed without systematic drilling and blasting; firmly cemented conglomerate deposits possessing the characteristics of solid rock impossible to remove without systematic drilling and blasting; and hard materials (see Definitions). Include the removal of any concrete or masonry structures, except pavements, exceeding 1/2 cubic yard in volume that may be encountered in the work in this classification. If at any time during excavation, including excavation from borrow areas, the Contractor encounters material that may be classified as rock excavation, uncover such material and notify the Contracting Officer. Do not proceed with the excavation of this material until the Contracting Officer has classified the materials as common excavation or rock excavation and has taken cross sections as required. Failure on the part of the Contractor to uncover such material, notify the Contracting Officer, and allow ample time for classification and cross sectioning of the undisturbed surface of such material will cause the forfeiture of the Contractor's right of claim to any classification or volume of material to be paid for other than that allowed by the Contracting Officer for the areas of work in which such deposits occur.

1.5 SUBMITTALS

Government approval is required for submittals with a "G" or "S" classification. Submittals not having a "G" or "S" classification are for Contractor Quality Control approval. Submittals not having a "G" or "S"

classification are for information only. When used, a code following the "G" classification identifies the office that will review the submittal for the Government. Submit the following in accordance with Section 01 33 00 SUBMITTAL PROCEDURES:

SD-01 Preconstruction Submittals

Excavation and Trenching Plan; G,

Borrow Plan; G,

Jacking, Boring, and Tunneling Plan; G,

Preconstruction Meeting; G

SD-03 Product Data

Flowable Fill Mix Design; G,

Geotextiles

SD-04 Samples

Geotextiles

SD-06 Test Reports

Material Test Report; G,

Borrow Site Testing; G,

Pipe Inspection Report; G,

Geotechnical Evaluation Report; G,

1.6 QUALITY CONTROL

1.6.1 Geotechnical Engineer

Provide a Professional Geotechnical Engineer to provide inspection of excavations and soil/groundwater conditions throughout construction. The Geotechnical Engineer is responsible for performing pre-construction and periodic site visits throughout construction to assess site conditions. The Geotechnical Engineer is responsible for preparing and updating the Excavation and Trenching Plan and Dewatering Work Plan as construction progresses to reflect changing conditions and submit an updated plan if necessary. Submit a monthly Geotechnical Evaluation report, 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 Contractor is responsible for arranging meetings with the Geotechnical Engineer and Contracting Officer throughout the contract duration.

1.6.2 Qualified Technician

Provide a Qualified Technician to inspect, monitor, sample, and performing field testing. The technician qualifications need to be one of the

following: a current National Institute for Certification in Engineering Technologies (NICET) Level II minimum certification in Construction Materials Testing Soils; a Geologist-in-Training with minimum one-year experience; an Engineer-in-Training with minimum one-year experience; a Registered Geologist; or a Professional Engineer.

1.6.3 Lab Validation

Perform testing by a Corps validated commercial testing laboratory or Contractor established testing laboratory meeting the requirements of Section 01 45 00 (or similar number) entitled QUALITY CONTROL and approved by the Contracting Officer. Submit testing laboratory validation for the testing to be performed. Do not permit work requiring testing until testing facilities have been inspected, Corps validated and approved by the Contracting Officer.

1.6.4 Preconstruction Meeting

Conduct a preconstruction meeting at the jobsite at least five business days prior to the start of earthwork operations on the project. The preconstruction meeting is to be arranged by the Contractor and is to follow the written agenda submitted prior to the meeting. The purpose of this meeting is to review the requirements of this specification and the associated plans. The following individuals must be in attendance at this meeting: Contractor's Project Manager and Project Superintendent, earthwork subcontractor's Project Manager and Site Foreman, Contractor's Geotechnical Engineer and Testing Agency, Government Geotechnical Engineer and Civil Engineer, and Government Construction Manager and Engineering Technician.

The minutes of this meeting are to be recorded by the Contractor and published via email within 48 hours to all attendees. The minutes must be re-published within 48 hours via email pending any subsequent comments from the attendees.

PART 2 PRODUCTS

2.1 SOIL MATERIALS

2.1.1 Structural Fill

Materials classified as GW, GP,GM, GC, GW-GM, GW-GC, GP-GM, GP-GC, GC-GM, SW, SP, , , , , , , , or in accordance with ASTM D2487. Select material type appropriate for the intended purpose.

2.1.2 Embankment Fill

Materials classified as GW, GP, GM, GC, GW-GM, GW-GC, GP-GM, GP-GC, GC-GM, SW, SP, SM, , , , , , , or in accordance with ASTM D2487. Select material type appropriate for the intended purpose.

2.1.3 Porous Fill

Materials containing less than 5 percent passing the No. 200 sieve. Provide the gradation as appropriate for the intended purpose.

2.1.4 Topsoil

Material suitable for topsoil obtained from offsite areas excavations

areas indicated on the drawings is defined as: 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 . Topsoil material will be in accordance with ASTM D5268.

2.1.5 Capillary Water Barrier

Conform to ASTM C33/C33M for fine aggregate grading with a maximum of 3 percent by weight passing ASTM D1140, No. 200 sieve, or 1-1/2 inch and no more than 2 percent by weight passing the No. 4 size sieve or coarse aggregate Size 57, 67, or 77.

2.1.6 Utility Bedding Material

Except as specified otherwise in the individual piping section, provide bedding for buried piping in accordance with AWWA C600 ASTM D2321. Install bedding for plastic piping to spring line of pipe. Provide geotextile fabric below bedding layer where indicated. Utility bedding material may include the following:

2.1.6.1 Class I

Angular, 0.25 to 1.5 inch, graded stone, including a number of fill materials that have regional significance such as coral, slag, cinders, crushed stone, and crushed shells.

2.1.6.2 Class II

Coarse sands and gravels with maximum particle size of 1.5 inch, including various graded sands and gravels containing small percentages of fines, generally granular and noncohesive, either wet or dry. Soil Types GW, GP, SW, and SP are included in this class as specified in ASTM D2487.

2.1.6.3 Sand

Clean, coarse-grained sand classified as graded, gradation of the State Standard or SW by ASTM D2487 for bedding and backfill as indicated.

2.1.6.4 Gravel and Crushed Stone

Clean, coarsely graded natural gravel, crushed stone or a combination thereof identified as graded, gradation of the State Standard or having a classification of GW GP in accordance with ASTM D2487 for bedding and backfill as indicated. Do not exceed maximum particle size of 3 inches.

2.2 FLOWABLE FILL

Design and submit flowable fill mix design to consist of Portland cement, fly ash, and/or slag cement and fine aggregate. Include the dry weights of cementitious material(s); quality and gradation of aggregates in the saturated surface-dry weights along with gradation tests; quantities, types, and names of admixtures; and quantity of water per cubic yard. The minimum maximum unconfined compressive strength to be 3000 psi ps fat 7 at days in accordance with ASTM D4832. The aggregates in accordance with ASTM C33/C33M Fine Aggregates. Air-entrain fill in accordance with ASTM C260/C260M. The air content to be between 8 and 15 percent in accordance with ASTM D6023. The flow to be between 8 and 12 inches in

accordance with ASTM D6103/D6103M. Portland cement to be Type I or II in accordance with ASTM C150/C150M. Fly ash to be Class C in accordance with ASTM C618. Provide slag cement in Grade 100 or 120 in accordance with ASTM C989/C989M.

2.3 BURIED WARNING AND IDENTIFICATION MARKERS

Provide polyethylene plastic and metallic core or metallic-faced, acid- and alkali-resistant, polyethylene plastic warning tape manufactured specifically for warning and identification of buried utility lines. Provide tape on rolls, 3 inches 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. Provide permanent color and printing, unaffected by moisture or soil.

Warning Tape Color Codes	
Red	Electric
Yellow	Gas, Oil; Dangerous Materials
Orange	Telephone and Other Communications
Blue	Water Systems
Green	Sewer Systems
White	Steam Systems
Gray	Compressed Air

2.3.1 Warning Tape for Metallic Piping

Provide acid and alkali-resistant polyethylene plastic tape conforming to the width, color, and printing requirements specified above, with a minimum thickness of 0.003 inch and a minimum strength of 1500 psi lengthwise, and 1250 psi crosswise, with a maximum 350 percent elongation.

2.3.2 Detectable Warning Tape for Non-Metallic Piping

Provide polyethylene plastic tape conforming to the width, color, and printing requirements specified above, with a minimum thickness of 0.004 inch, and a minimum strength of 1500 psi lengthwise and 1250 psi crosswise. Manufacture tape 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.

2.3.3 Detection Wire for Non-Metallic Piping

Insulate a single strand, solid copper detection wire with a minimum of 12 AWG.

2.4 MATERIAL FOR RIP-RAP

Provide bedding material grout filter fabric and rock conforming to these requirements for construction indicated.

2.4.1 Bedding Material

Provide bedding material consisting of sand, gravel, or crushed rock, well graded, or poorly graded with a maximum particle size of 2 inches. Compose material of tough, durable particles. Allow fines passing the No. 200 standard sieve with a plasticity index less than 6 .

2.4.2 Grout

Provide durable grout composed of cement, water, an air-entraining admixture, and sand mixed in proportions of one-part Portland cement to two parts of sand, sufficient water to produce a workable mixture, and an amount of admixture which will entrain sufficient air, as determined by the Contracting Officer. Mix grout in a concrete mixer. Allow a sufficient mixing time to produce a mixture having a consistency permitting gravity flow into the interstices of the riprap with limited spading and brooming.

2.4.3 Rock

Provide rock fragments which ensure permanence in the structure and the environment in which it is to be used. Use rock fragments free from cracks, seams, and other defects that would increase the risk of deterioration from natural causes. Provide fragments sized 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. Provide rock with a minimum specific gravity of 2.50 . Do not permit the inclusion of more than trace 1 percent quantities of dirt, sand, clay and rock fines.

2.5 BORROW

Provide borrow materials from sources located within and/or outside of Government property meeting the requirements of paragraph STRUCTURAL FILL EMBANKMENT FILL TOPSOIL.

PART 3 EXECUTION

3.1 PROTECTION

Perform all work specified in accordance with applicable requirements of the Corps of Engineers publication EM 385-1-1 Safety and Health Requirements Manual. Provide a Geotechnical Engineer to monitor construction activities and to prepare necessary work plans and reports; see paragraph QUALITY CONTROL.

Use equipment of type and size appropriate for the site conditions (soil character and moisture content). Maintenance of exposed subgrades and fills is the responsibility of the Contractor. The Contractor is required to prevent damage by ineffective drainage, dewatering, and heavy loads and equipment by implementing precautionary measures. Repair or replace any defects or damage.

3.1.1 Underground Utilities

Location of the existing utilities indicated is approximate. Physically verify the location and elevation of the existing utilities indicated prior to starting construction. The Contractor is responsible for protecting utilities from damage during construction.

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

Provide for the collection and disposal of surface and subsurface water encountered during construction. Construct storm drainage features (ponds/basins) 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 provide temporary ditches, swales, and other drainage features and equipment as required to keep soils from becoming unstable, prevent erosion, or undermining of foundations. Remove unstable material from working platforms for equipment operation and soil support for subsequent construction features and provide new material as specified herein. It is the responsibility of the Contractor to assess the site conditions to employ necessary measures to permit construction to proceed.

3.2 SURFACE PREPARATION

3.2.1 Clearing and Grubbing

[Clear and grub as specified in Section 31 11 00 CLEARING AND GRUBBING.

] Remove trees, stumps, logs, shrubs, brush and vegetation and other items that would interfere with construction operations. Remove stumps entirely. Grub out matted roots and roots over 3 inches in diameter to at least 18 inches below existing surface.

3.2.2 Stripping

Strip site where indicated on the plans. Strip existing surface materials to a depth of [4] [_____] inches below the existing ground surface in areas designated as Clear and Grub on the plans. Strip existing surficial soils to a depth of [_____] inches in all other areas. Strip in all areas within the planned limits of disturbance. All stripped materials not suitable for reuse as topsoil will be wasted in specified disposal area. Screen all stripped soils to remove roots and organic materials prior disposal.

[Strip suitable soil from the site where excavation or grading is indicated and stockpile separately from other excavated material. Protect topsoil and keep in segregated piles until needed.

]3.2.3 Proof Rolling

Perform proof rolling on exposed subgrade that is unfrozen and free of surface water (wet conditions resulting from rainfall).[Notify the Contracting Officer a minimum of three days prior to proof rolling.][Perform proof rolling in the presence of the Contracting Officer.]

[After stripping, excavating, and rough grading to the planned elevation,]proof roll the existing subgrade of all building, pavement and embankment locations with six passes of a [loaded tandem axle dump truck] [15 ton, pneumatic-tired or smooth drum roller]. Operate the [roller] [truck] in a systematic manner to ensure the number of passes over all areas, and at speeds between 2.5 to 3.5 miles per hour. Subgrade materials that exhibit excessive deflection and/or rutting during proof rolling need to be scarified, aerated, and re-compacted to specified density at [plus or minus] [2][_____] percent of optimum moisture content prior to being considered for remedial action by the Contracting Officer. When proof rolling under buildings, the building subgrade is considered to extend 5 feet beyond the building lines, and make one-half of the passes with the roller in a direction perpendicular to the other passes.

3.2.4 Stockpiling Operations

Place and grade stockpiles of satisfactory and unsatisfactory and wasted materials as specified. Keep stockpiles in a neat and well drained condition, giving due consideration to drainage at all times. Clear, grub, and seal by rubber-tired equipment, the ground surface at stockpile locations; separately stockpile excavated satisfactory and unsatisfactory materials. Protect stockpiles of satisfactory materials from contamination which may destroy the quality and fitness of the stockpiled material. Do not create stockpiles that could obstruct the flow of any stream, endanger a partly finished structure, impair the efficiency or appearance of any structure, or be detrimental to the completed work in any way. If the Contractor fails to protect the stockpiles, and any material becomes unsatisfactory, remove and replace such material with satisfactory material from approved sources.

3.3 EXCAVATION

Excavate to contours, elevation, and dimensions indicated. Excavate soil disturbed or weakened by Contractor's operations, and soils softened or made unstable for subsequent construction due to exposure to weather. Use material removed from excavations meeting the specified requirements in the construction of fills, embankments, subgrades, shoulders, bedding (as backfill), and for similar purposes to minimize surplus material and to minimize additional material to brought on site. Do not excavate below indicated depths except to remove unstable material as determined by the Government Geotechnical Engineer and confirmed by the Contracting Officer. Remove and replace excavations below the grades shown with appropriate materials as directed by the Contracting Officer.

If at any time during excavation, including excavation from borrow areas, the Contractor encounters material that may be classified as rock or as hard/unyielding material, uncover such material, and notify the Contracting Officer. Do not proceed with the excavation of this material until the Contracting Officer has classified the materials as common excavation or rock excavation. Failure on the part of the Contractor to uncover such material, notify the Contracting Officer, and allow sufficient time for classification and delineation of the undisturbed surface of such material will cause the forfeiture of the Contractor's right of claim to any classification or volume of material to be paid for other than that allowed by the Contracting Officer for the areas of work in which such deposits occur.

3.3.1 Ditches, Gutters, and Channel Changes

Finish excavation of ditches, gutters, and channel changes by cutting accurately to the cross sections, grades, and elevations shown. Do not excavate below grades shown. Backfill excessive excavation as directed by the Contracting Officer, with satisfactory, compacted, material or with suitable stone or cobble to grades shown. Dispose excavated material as shown or as directed. Do not allow material to be deposited within 4 feet from edge of a ditch. Maintain excavations free from detrimental quantities of leaves, brush, sticks, trash, and other debris until final acceptance of the work.

3.3.2 Trench Excavation Requirements

Excavate the trench as recommended by the manufacturer of the pipe to be installed. Slope trench walls below the top of the pipe, or make vertical, and of such width as recommended by the manufacturer. Provide vertical trench walls where no manufacturer installation instructions are available. Do not exceed the trench width of 24 inches below the top pipe plus pipe outside diameter (O.D.) for pipes of less than 24 inches inside diameter, and do not exceed 36 inches plus pipe outside diameter for pipe sizes larger than 24 inches inside diameter. Where recommended trench widths are exceeded, provide redesign, stronger pipe, or special installation procedures. The Contractor is responsible for the cost of redesign, stronger pipe, or special installation procedures without any additional cost to the Government.

3.3.2.1 Bottom Preparation

Grade the bottoms of trenches accurately to provide uniform bearing and support for the bottom quadrant of each section of the pipe. Excavate bell holes to the necessary size at each joint or coupling to eliminate point bearing. Remove stones of 3 inch or greater in any dimension, or as recommended by the pipe manufacturer, whichever is smaller, to avoid point bearing.

3.3.2.2 Removal of Unyielding Material

Where overdepth is not indicated and unyielding material is encountered in the bottom of the trench, notify the Contracting Officer. Following approval, remove such material 3 inch below the required grade and replaced with suitable materials as provided in paragraph FILLING AND COMPACTION.

3.3.2.3 Removal of Unstable Material

Where unstable material is encountered in the bottom of the trench, remove such material to the depth directed and replace it to the proper grade with suitable material as provided in paragraph FILLING AND COMPACTION. When removal of unstable material is required due to the Contractor's fault or neglect in performing the work, the Contractor is responsible for excavating the resulting material and replacing it without additional cost to the Government.

3.3.2.4 Excavation for Appurtenances

Provide excavation for manholes, catch-basins, inlets, or similar structures sufficient to leave at least 12 inches clear between the outer structure surfaces and the face of the excavation or support members. of

sufficient size to permit the placement and removal of forms for the full length and width of structure footings and foundations as shown.

3.3.2.5 Gas Distribution

Excavate trenches to a depth that will provide a minimum 18 inches of cover in rock excavation and a minimum 24 inches of cover in other excavation.

3.3.2.6 Water Lines

Excavate trenches to a depth that provides a minimum cover of 1.5 feet from the existing ground surface, or from the indicated finished grade, whichever is lower, to the top of the pipe. For fire protection yard mains or piping, an additional 12 inch of cover is required.

3.3.3 Jacking, Boring, and Tunneling

Unless otherwise indicated, provide excavation by open cut except those sections requested and if, in the opinion of the Contracting Officer, can be safely and properly installed and backfill. Provide a Jacking, Boring, and Tunneling Plan, signed and sealed by a licensed Professional Engineer that includes a work site layout, methods and procedures, equipment, alignment control, monitoring, and contingency for responding to unplanned movements.

3.3.3.1 Pipeline Casing

Provide new smooth wall steel pipeline casing under new . Provide each new pipeline casing, where indicated and to the lengths and dimensions shown, complete and suitable for use with the new piped utility as indicated. Install pipeline casing by dry boring and jacking method as follows:

3.3.3.2 Bore Holes

Mechanically bore holes and case through the soil with a cutting head on a continuous auger mounted inside the casing pipe. Weld lengths of pipe together in accordance with AWS D1.1/D1.1M. Do not use water or other fluids in connection with the boring operation.

3.3.3.3 Cleaning

Clean inside of the pipeline casing of dirt, weld splatters, and other foreign matter which would interfere with insertion of the piped utilities by attaching a pipe cleaning plug to the boring rig and passing it through the pipe.

3.3.3.4 End Seals

After installation of piped utilities in pipeline casing, provide watertight end seals at each end of pipeline casing between pipeline casing and piping utilities. Provide watertight end seals as indicated.

3.3.4 Underground Utilities

Perform work adjacent to utilities as indicated . Excavation made with power-driven equipment is not permitted within 2 feet of known 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.

3.3.5 Structural Excavation

Following general excavation and rough grading activities, excavate the entire building footprint area and at least 5 feet beyond, to the deeper of 4 feet below existing grade or 2 feet below bottom of footings. Scarify the exposed surface to a depth of 6 to 8 inches, moisture-condition, and compact to at least 95 percent of laboratory maximum dry density. Do not excavate to final grade until just before concrete is to be placed. Roughen level surfaces. Cut sloped surfaces as indicated into rough steps or benches to provide a satisfactory bond for compacting materials. For new pavement areas including exterior concrete pads, over-excavate to a minimum of 12 inches below bottom of new pavement/pad base course, scarify, moisture-condition, and compact to at least 95 percent.

Make excavations to the lines, grades, and elevations shown, or as directed. Provide trenches and foundation pits of sufficient size to permit the placement and removal of forms for the full length and width of structure footings and foundations as shown. Clean rock or other hard foundation material of loose debris and cut to a firm, level, stepped, or serrated surface. Remove loose disintegrated rock and thin strata.

Concrete placement is not allowed until footing subgrades have been inspected and approved by the Contracting Officer.

3.3.6 Pile Cap Excavation

Stop the excavation at an elevation 6 to 12 inches above the bottom of the footing before driving piles. After pile driving has been completed, complete the remainder of the excavation to the elevations shown. Excavate to bottom of pile cap prior to placing or driving piles, unless authorized otherwise by the Contracting Officer. After the pile driving has been completed, remove loose and displaced material and complete excavation, leaving a smooth, solid, undisturbed surface to receive the concrete or masonry. Backfill and compact over-excavations and changes in grade due to pile driving operations to 95 percent of ASTM D698 ASTM D1557 maximum dry density.

3.3.7 Rock Excavation and Blasting

Excavate rock encountered in the cut section to a depth of 6 inches below finished grade and replace with satisfactory material . Submit a Rock Excavation Plan, prepared and sealed by a registered professional engineer. Perform blasting in accordance with EM 385-1-1 and in conformance with Federal, State, and local safety regulations. Submit notice 15 days prior to starting work. Submit a Blasting Plan, prepared and sealed by a registered professional engineer that includes calculations for overpressure and debris hazard. Provide blasting mats and use the non-electric blasting caps. Obtain written approval prior to performing any blasting and notify the Contracting Officer 24 hours prior to blasting. Include provisions for storing, handling and transporting explosives as well as for the blasting operations in the plan. The

Contractor is responsible for damage caused by blasting operations. Blasting will not be permitted.

3.4 SUBGRADE PREPARATION

3.4.1 General Requirements

Shape subgrade to line, grade, and cross section as indicated. Remove unsatisfactory and unstable material in surfaces to receive fill or in excavated areas, as determined by proof rolling, and replaced with satisfactory materials . Do not place material on surfaces that are muddy, frozen, contain frost, or otherwise containing unstable material. Scarify the surface to a depth of 4 inches prior to placing fill. Step or bench sloped surfaces steeper than 1 vertical to 4 horizontal prior to scarifying. Place 4 inches of loose fill and blend with scarified material. When subgrade is part fill and part excavation or natural ground, scarify to a depth of 8 inches.

3.4.2 Subgrade for Structures, Spread Footings, and Concrete Slabs

Do not excavate below depth shown for structures, spread footings, and concrete slabs. If over excavation occurs, notify the Contracting Officer and remove, replace, and compact as directed. compact disturbed material to 95 percent of ASTM D698 ASTM D1557. After final rolling, the surface of the subgrade for buildings and pavements must not show deviations greater than 0.05 foot when tested with a 12-foot straightedge applied both parallel and at right angles to the centerline of the area.

3.4.3 Subgrade for Railroads

Compact subgrade for railroads to at least 90 percent laboratory maximum dry density for cohesive materials or 95 percent laboratory maximum dry density for cohesionless materials.

3.4.4 Subgrade for Pavements

Compact top 12 inches of subgrade for pavements to at least 95 percent of ASTM D698 ASTM D1557. After final rolling, the surface of the subgrade for buildings and pavements must not show deviations greater than 0.05 foot when tested with a 12-foot straightedge applied both parallel and at right angles to the centerline of the area.

3.4.5 Subgrade for Shoulders

Compact the upper 6 inches of subgrade for shoulders to at least 95 percent of ASTM D698 ASTM D1557 for the depth below the surface of shoulder shown full depth of the shoulder.

3.4.6 Subgrade for Airfield Pavements

Compact top 12 inches of subgrade, to 95 percent of ASTM D1557. After final rolling, the surface of the subgrade for buildings and pavements must not show deviations greater than 0.05 foot when tested with a 12-foot straightedge applied both parallel and at right angles to the centerline of the area.

3.4.7 Subgrade Filter Fabric

Place filter fabric as indicated directly on prepared subgrade free of

vegetation, stumps, rocks larger than 2 inch diameter and other debris which may puncture or otherwise damage the fabric. Repair damaged fabric by placing an additional layer of fabric to cover the damaged area a minimum of 3 feet overlap in all directions. Overlap fabric at joints a minimum of 3 feet. Obtain approval of filter fabric installation before placing fill or backfill. Place fill or backfill on fabric in the direction of overlaps and compact as specified herein. Follow manufacturer's recommended installation procedures.

3.5 FILLING AND COMPACTION

Prepare ground surface on which backfill is to be placed and provide compaction requirements for backfill materials in conformance with the applicable portions of paragraphs for SUBGRADE PREPARATION. Do not place material on surfaces that are muddy, frozen, or contain frost. Finish compaction by sheepsfoot rollers, pneumatic-tired rollers, steel-wheeled rollers, or other approved equipment well suited to the soil being compacted. Moisten material as necessary to plus or minus 20 percent of optimum moisture to provide the moisture content that will readily facilitate obtaining the specified compaction with the equipment used. Fill and backfill to contours, elevations, and dimensions indicated. Compact and test each lift before placing overlaying lift.

3.5.1 Trench Backfill

Backfill trenches to the grade shown. Backfill the trench to 3 feet above the top of pipe prior to performing the required pressure tests. Leave the joints and couplings uncovered during the pressure test. Do not backfill the trench until all specified tests are performed.

3.5.1.1 Replacement of Unyielding Material

Replace unyielding material removed from the bottom of the trench with satisfactory material or initial backfill material.

3.5.1.2 Replacement of Unstable Material

Replace unstable material removed from the bottom of the trench or excavation with satisfactory material placed in layers not exceeding 6 inches loose thickness.

3.5.1.3 Bedding and Initial Backfill

[Provide bedding of the type and thickness shown.]Place initial backfill material and compact it with approved tampers to a height of at least one foot above the utility pipe or conduit. Bring up the backfill evenly on both sides of the pipe for the full length of the pipe. Take care to ensure thorough compaction of the fill under the haunches of the pipe. Except where shown or when specified otherwise in the individual piping section, provide bedding for buried piping in accordance with PART 2 paragraph UTILITY BEDDING MATERIAL. Compact backfill to top of pipe to [95 percent of ASTM D698 maximum dry density] [85 percent of ASTM D1557]. Provide plastic piping with bedding to spring line of pipe.

3.5.1.4 Final Backfill

Do not begin backfill until construction below finish grade has been approved, underground utilities systems have been inspected, tested and approved, forms removed, and the excavation cleaned of trash and debris.

Bring backfill to indicated finish grade. Where pipe is coated or wrapped for protection against corrosion, the backfill material up to an elevation 2 feet above sewer lines and one foot above other utility lines need to be free from stones larger than one inch in any dimension. Heavy equipment for spreading and compacting backfill are not to be operated closer to foundation or retaining walls than a distance equal to the height of backfill above the top of footing; compact remaining area in layers not more than 4 inches in compacted thickness with power-driven hand tampers suitable for the material being compacted. Place backfill carefully around pipes or tanks to avoid damage to coatings, wrappings, or tanks. Do not place backfill against foundation walls prior to 7 days after completion of the walls. As far as practicable, bring backfill up evenly on each side of the wall and sloped to drain away from the wall.

Fill the remainder of the trench, except for special materials for buildings[, railroads][, airfields] and pavements with satisfactory material. Place backfill material and compact as follows:

3.5.1.4.1 Buildings[, Railroads][, Airfields] and Pavements

Place backfill up to the required elevation as specified. Do not permit water flooding or jetting methods of compaction. Compact as specified for Structural Fill.

3.5.1.4.2 Turfed or Seeded Areas and Miscellaneous Areas

Deposit backfill in layers of a maximum of 12 inches loose thickness, and compact it to 85 percent maximum dry density for cohesive soils and 90 percent maximum dry density for cohesionless soils.[Allow water flooding or jetting methods of compaction for granular noncohesive backfill material. Do not allow water jetting to penetrate the initial backfill.][Do not permit compaction by water flooding or jetting.] Apply this requirement to all other areas not specifically designated above.

3.5.1.5 Sewage Absorption Trenches or Pits

3.5.1.5.1 Porous Fill

Provide backfill consisting of porous fill material in the locations and thickness as shown on the drawings. No compaction is required.

3.5.1.5.2 Cover

[Filter fabric][Concrete][Kraft paper conforming to CID A-A-203, Grade B, No. 2, 50 pound weight][or a layer of straw at least 2 inches thick]as indicated.

3.6 DISPOSITION OF SURPLUS MATERIAL

Remove from Government property all surplus or other soil material not required or not suitable for filling or backfilling, along with brush, refuse, stumps, roots, and timber. Properly disposed of in accordance with all applicable laws and regulations. Prepare plan for Disposition of Surplus Materials to include permissions document to dispose of nonsalable products.

3.7 TESTING

Perform testing as indicated in Table 1. Submit Material Test Reports within [24 hours] [7 days] of tests being completed.[In addition, submit test data in accordance with Section 01 31 20 PROJECT TECHNICAL DATA MANAGEMENT AND VISUALIZATION.]

Material Type [list materials to be tested as identified in paragraph DEFINITIONS]	Location of Material	Test Method	Test Frequency
		Density - [ASTM D1556/D1556M] [ASTM D2167] [ASTM D6938] [ASTM D8167/D8167M]. [When ASTM D6938 or ASTM D8167/D8167M is used, check the calibration curves and adjust using only the sand cone method as described in ASTM D1556/D1556M.	One test per [2000] [_____] square feet, or fraction thereof, of each lift of fill or backfill areas compacted by other than hand-operated machines. Double testing frequency for areas compacted by hand-operated machines. [If ASTM D6938 or ASTM D8167/D8167M is used, check in-place densities by ASTM D1556/D1556M as follows: One check test per lift for every [6] [10] tests.] [Where ASTM D8167/D8167M is used, provide water content verification in accordance with ASTM D2216 for each test.]

Material Type [list materials to be tested as identified in paragraph DEFINITIONS]	Location of Material	Test Method	Test Frequency
		Moisture Content - ASTM D2216	Two tests per day for each type of fill and backfill. Sample taken immediately prior to compaction after moisture conditioning.
		Moisture Density Relationship - [ASTM D698][ASTM D1557]	One representative test per [500][_____] cubic yards of fill and backfill, or when any change in material occurs which may affect the optimum moisture content or laboratory maximum dry density. Sample to be taken from stockpile or location of placement.

Material Type [list materials to be tested as identified in paragraph DEFINITIONS]	Location of Material	Test Method	Test Frequency
		Relative Density - ASTM D4253 and ASTM D4254	One test per [2000] [_____] square feet, or fraction thereof, of each lift of fill or backfill areas compacted by other than hand-operated machines. Double testing frequency for areas compacted by hand-operated machines.
		Gradation - ASTM C136/C136M	One representative test per [500][_____] cubic yards of fill and backfill, or when any change in material occurs which may affect the optimum moisture content or laboratory maximum dry density. Sample to be taken from stockpile or location of placement.

Material Type [list materials to be tested as identified in paragraph DEFINITIONS]	Location of Material	Test Method	Test Frequency
		Atterberg Limits - ASTM D4318	One representative test per [500][_____] cubic yards of fill and backfill, or when any change in material occurs which may affect the optimum moisture content or laboratory maximum dry density. Sample to be taken from stockpile or location of placement.
		Organic Content Test - ASTM D2974, Method C	One representative test per [200] [_____] lineal [feet] of embankment.

-- End of Section --

SECTION 32 01 16.71

COLD MILLING ASPHALT PAVING
11/22

PART 1 GENERAL

1.1 Payment

1.1.1 Measurement

The quantity of milled pavement measured will be paid for at the contract unit price when completed and accepted by the Contracting Officer. Payment will be made at the contract unit price for the nearest square yard for the scheduled item at the proposed depth displayed in the Contract. Measure the width of the area to the closest inch and measure the length of the area to the closest foot. Payment will constitute full compensation for providing all equipment, labor, tools, and other incidentals necessary to complete the milling operation. Unless otherwise stated, unit price will also include cost for clean-up and disposal operations as per paragraph REMOVAL OF MILLED MATERIAL. No payment will be made for milling outside the specified area of work. The measured quantity of asphalt milling, including cost for clean-up and disposal, will be paid for and included in the lump sum Contract price.

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 ASSOCIATION OF STATE HIGHWAY AND TRANSPORTATION OFFICIALS (AASHTO)

AASHTO M 247	(2013) Standard Specification for Glass Beads Used in Pavement Markings

ASTM INTERNATIONAL (ASTM)

ASTM E965	(2015; R 2019) Standard Test Method for Measuring Pavement Macrotexture Depth Using a Volumetric Technique

1.3 DEFINITIONS

1.3.1 Scabbing/Delamination

Scabbing or delamination is defined as the debonding or raveling of material which may be caused by either the condition of the existing underlying layers of asphalt mixture or the milling operation.

1.3.2 Milling Machine

Milling machines may also be known as pavement cold planers. Throughout this specification, any references to milling machines will also apply to pavement cold planers.

1.3.3 Milling Drum

Milling drums are upward-rotating drums or rotors which are outfitted with toolholders and teeth (picks). Milling drums perform different tasks dependent on the structure and design. The main tasks are cutting particles from the composite pavement, conveying removed material to the ejector, and ejecting removed material. Any reference to milling drum also applies to milling rotors.

1.4 TRAFFIC CONTROL

Provide all necessary traffic control during milling operations.

1.5 SCHEDULING

After completion of the preconstruction submittals, provide notice to the Contracting Officer a minimum of seven days prior to starting milling operations.

1.6 SUBMITTALS

Government approval is required for submittals with a "G" or "S" classification. Submittals not having a "G" or "S" classification are for Contractor Quality Control approval. Submittals not having a "G" or "S" classification are for information only. When used, a code following the "G" classification identifies the office that will review the submittal for the Government. When used, a code following the "G" classification identifies the office that will review the submittal for the Government. Submit the following in accordance with Section 01 33 00 SUBMITTAL PROCEDURES:

SD-01 Preconstruction Submittals

Equipment; G,

Proposed Techniques; G,

Quality Control Plan; G,

Qualifications; G,

SD-06 Test Reports

QC Monitoring

Grade-Conformance Tests; G,

Test Section Results; G,

Macrosurface Texture Acceptance; G,

1.7 QUALITY CONTROL

1.7.1 Qualifications

Provide documentation of at least five successful projects utilzing profile and performance milling. Documentation will include project references, equipment used (including scanning/sensing equipment), and company personnel associated with the project. Project documentation will also

include if any equipment was owned or rented in the execution of the project.

1.8 PROJECT/SITE CONDITIONS

1.8.1 Environmental Requirements

Do not perform milling when there is accumulation of snow or ice on the pavement surface.

PART 2 PRODUCTS

2.1 EQUIPMENT

Maintain in a satisfactory working condition equipment, tools, and machines used in the performance of this work.

2.1.1 Cold Milling Machine

Use a self-propelled unit capable of removing the existing asphalt pavement to the depths and widths shown in the Contract. Milling machines will have a minimum cutting width of 6.5 feet. Use milling machines designed and built exclusively for pavement milling operations and with sufficient power, traction and stability to accurately maintain depth of cut and slope. The equipment will be capable of operating the machine speed independently from the cutting equipment speed. Use milling machines capable of being equipped with dual longitudinal controls (operated from both sides of the machine). Use electronic control systems that will automatically control the longitudinal profile and cross slope of the milled surface. Accomplish this through the use of a mobile grade reference, an erected string line, joint matching shoe, slope control systems, or a combination of approved methods. When using a mobile grade reference, use systems capable of averaging the existing grade or pavement profile over at least 30 foot. Use a machine capable of leaving a uniform surface suitable for handling traffic without damage to the underlying pavement structure. Provide additional equipment necessary to satisfactorily remove the pavement in the area of manholes, water valves, curb, gutter and other obstructions. Provide milling machines with a means of effectively limiting the amount of dust escaping from the removal operations. If milling operations result in excessive fugitive dust, a silica dust suppressant is required at no additional cost to the Government. Milling equipment is not allowed to damage any part of the pavement structure that is not to be removed. Equip the milling machine with a lighting system for night work as required by the Contract. Smaller width milling machines may be necessary for use around structures or other penetrations. Produce the same surface texture with small milling machines as with the large milling machines.

2.1.2 Milling Drums

2.1.2.1 Rough/Coarse Milling Drum

Provide a Rough/Coarse milling drum having a tool spacing between 11/16 inch - 1 inch.

2.1.2.2 Standard Milling Drum

Provide a standard milling drum having a tool spacing between 1/2 - 3/4 inch.

2.1.2.3 Fine Milling Drum

Provide a fine milling drum having a tool spacing between 5/16 - 3/8 inch.

2.1.2.4 Micro Milling Drum

Provide a micro milling drum having a tool spacing between 1/8 - 1/4 inch.

2.1.3 Sensors and Scanning Components

Provide sensors and scanners as necessary to produce the grade and smoothness as specified. Submit all sensors and scanning components for Government approval. G

2.1.4 Cleaning Equipment

Provide cleaning equipment suitable for removing and cleaning loose material from the pavement surface. If using street sweeper type equipment, equip the street sweeper with a water tank, dust control spray assembly, both a pick-up and gutter broom, and a debris hopper.

2.1.5 Straightedge

Furnish and maintain at the site, in good condition, at least one 12 foot straightedge for each milling machine, for testing the finished surface. Make the straightedge available for Government use. Use straightedges constructed of aluminum or other lightweight metal, with blades of box or box-girder cross section with flat bottom reinforced to insure rigidity and accuracy. Use straightedges with handles to facilitate movement on the milled surface.

PART 3 EXECUTION

3.1 CONTRACTOR QUALITY CONTROL

3.1.1 General Quality Control Requirements

Submit the Quality Control Plan a minimum of 30 days in advance of starting milling operations. The Quality Control Plan is specific to this specification and supplements the overall Quality Control Plan required by the project. Do not start milling operations until the Quality Control Plan has been approved. In the Quality Control Plan, address all elements which affect the quality of the milling operation including, but not limited to:

a. Type of cutting teeth and schedule for replacement.

b. The daily preventative maintenance schedule and checklist.

c. The proposed use of grade and slope controls (longitudinal and transverse).

d. The frequency of smoothness testing.

e. The process for milling distressed areas (scabbing/delamination).

f. Corrective procedures if the milling operation does not meet the

specified texture or grade requirements.

g. Corrective procedures if the milled surface does not meet the specified minimum transverse or longitudinal smoothness when measured with a 12 foot straightedge.

h. The frequency of macrotexture testing.

3.2 PROPOSED TECHNIQUES

Submit the proposed techniques a minimum of 30 days in advance of starting milling operations. The proposed techniques will be project specific and address the following items:

a. The number, type(s) and size(s) of milling machines to be used.

b. The width and location of each cutting pass.

c. The number and types of brooms to be used with their location with respect to milling machines.

d. The proposed method for milling around existing structures such as manholes, valve boxes, and inlets.

e. The longitudinal and transverse typical sections for tie-ins at the end of the work day.

3.3 MILLING OPERATION

Make sufficient passes so that the designated area is milled to the profile, cross-slope, grade and elevations as indicated. Mill the pavement in depth increments that will not damage the pavement below the designated finished grade. If scabbing or delamination occurs, the milled surface is unlikely to meet smoothness requirements. Notify the Contracting Officer for further direction when delamination or scabbing occurs. Repair or replace items damaged during milling operations such as manholes, valve boxes, utility lines, pavement that is torn, cracked, gouged, broken, or undercut, at no additional cost to the Government. Windrow the milled material. Remove the milled material from the pavement and load into trucks.

3.3.1 Milling Machine and Drum Speed

Operate the milling machine and drum speed at appropriate speeds required to produce a uniform and acceptable surface texture per paragraph ACCEPTABLE SURFACE TEXTURE.

3.4 TEST SECTION

The test section will be considered the first half-day of milling production. The test section will be a minimum of 1,000 feet long and one milling lanes wide. Evaluate the milled surface texture, grade, and smoothness as part of the test section. Make any changes necessary, including the speed of the milling machine, to produce the desired milled surface texture and smoothness. Any adjustments in grade should be approved by the Contracting Officer. Perform macrosurface texture acceptance testing at two random locations no closer than 500 feet. At a minimum, provide the following in the Test Section Results:

a. Overall visual appearance of the milled surface texture noting any scabbing or delamination concerns. Provide five or more photos of the cleaned surface texture with a scale showing the line spacing.

b. Speed of milling machine and drum (rpm).

c. Approximate station and offset of straightedge testing and measurements.

d. Interpolated grade of milled surface reported as a comparison from the spot elevations provided in the Contract.

e. Macrosurface mean texture depth results.

3.5 MILLING TO PLAN GRADE

3.5.1 Grade Reference

If string-line is utilized as a grade reference, place grade reference points at maximum intervals of 25 feet. Use reliable control points to set the grade reference. Support the grade reference so the maximum deflection does not exceed 1/16 inch between supports. If utilzing a surface model, ensure the model is reviewed and accepted by the Government prior to execution of the work.

3.5.2 Grade

Mill pavement such that the finished milled surface conforms to the lines, grades, and cross sections indicated in the contract. The maximum allowable deviation of the finished milled pavement surfaces from the established plan grade line and elevation is plus 0 inch minus 1/4 inch.

3.5.3 Grade-Conformance Tests

After clean-up, test the finished milled surface of the pavement for conformance with the plan-grade requirements and for acceptance by the Contracting Officer by running lines of levels at maximum intervals of 25 feet longitudinally and 25 feet transversely to determine the elevation of the completed milled surface. Correct variations from the designated grade line and elevation in excess of the plan-grade requirements as directed. Skin patching for correcting low areas will not be permitted. If it is determined that Contractor operations resulted in deficient low areas, remove and replace area with a minimum 1 inch of asphalt leveling course as approved by the Government.

3.6 SURFACE SMOOTHNESS

3.6.1 Straightedge Testing

After completion of the final milling and clean-up, test the finished milled surface with the straightedge. Correct surface irregularities that depart from the testing edge by more than 1/4 inch. Straightedge testing will be performed continuously throughout production as a Quality Control check for the milled surface on a frequency longitudinally and transversely as approved in the Quality Control Plan. Skin patching for correcting low areas will not be permitted. If it is determined that Contractor operations resulted in deficient low areas, remove and replace area with a minimum 1 inch of asphalt leveling course as approved by the Government. Report approximate station and individual measurements taken

and submit QC Monitoring to the Contracting Officer on a daily basis.

3.7 ACCEPTABLE SURFACE TEXTURE

Produce a milled surface texture with continuous, longitudinal milling striations with no gaps in the longitudinal striations. Gaps in the milling striations and cases where gaps create a diagonal pattern or chevron appearance are required to be milled again such that continuous, longitudinal striations are achieved.

3.7.1 Macrosurface Texture Acceptance

Conduct macrosurface texture acceptance testing in accordance with ASTM E965 to determine the average macrotexture circular diameter for the day's production. Provide four randomly selected locations from each day's production which are randomly selected using ASTM D3995. Change location of test area by moving upstation 10 feet if any test area has unique, localized features such as cracks or joints. Provide a minimum circle diameter of 6 when tested in accordance with ASTM E965 with the following revisions:

a. Use12 $inch^3$ of material (glass spheres) meeting AASHTO M 247.

b. Use a flat, stiff hard disk made from methyl methacrylate (plexiglass) with a thickness of 0.5 inch plus or minus 0.1 inch, diameter of 8 inches plus or mins 2 inches.

c. Measure and record the diameter of the circular area four times, at intervals of 45 degrees and to the nearest 0.25 inch. Measure the diameter of the circular area from the extent of the glass beads on one side, through the center, and to the extent of the glass beads on the other side of the circular area. Report the average diameter of the circle for acceptance using the following equation:

$$D_a = (D_1 + D_2 + D_3 + D_4)/4$$

If surface texture does not meet the minimum circle diameter specified, evaluate the cause and provide adjustment procedures detailing methods to the Government to meet specified macrosurface texture.

3.8 TRAFFIC ON MILLED SURFACE

Mill the entire pavement width to a flush surface at the end of each work day when the pavement is open to traffic. If uncompleted operations result in a vertical or near vertical longitudinal face, re-slope the longitudinal face to provide a taper, construct a temporary bituminous taper or provide protective measures, as approved by the Contracting Officer. Taper transverse cutting faces at the end of each work day where pavement is open to traffic. Taper transverse edges to a minimum 10:1 taper. Provide taper over a distance of 10feet. Construct temporary bituminous tapers (paper joint) at intersecting streets, around utility appurtenances, and drainage structures during the milling operation. Maintain adequate drainage on the milled surface.

3.8.1 Taper Material

Use the same quality of asphalt mixture used elsewhere on the project or as detailed in the Contract.

3.9 CLEAN-UP OPERATIONS

After milling to the depth shown in the Contract, sweep or vacuum clean the milled area with the approved equipment.

3.10 REMOVAL OF MILLED MATERIAL

Place material that is removed in the disposal area as specified into traveling mixing plant for cold-mix recycling. Transport material that is removed to central plant for hot-mix or cold-mix recycling. Stockpile material that is removed as specified and in such a manner to prevent segregation or contamination. Dress the reclaimed asphalt area to drain rainwater from the material. Material that is removed will become the property of the Contractor and removed from the site.

-- End of Section --

SECTION 32 11 13.13

LIME TREATED SUBGRADE
11/19

PART 1 GENERAL

1.1 SUMMARY

The work specified consists of the construction of a lime-stabilized modified subgrade course. Perform the work conforming to the lines, grades, notes, and typical sections shown in the drawings. Select sources of materials well in advance of the time when materials are required in the work.

1.2 UNIT PRICES

1.2.1 Measurement for Payment

1.2.1.1 Lime Stabilization

Perform measurement by the square yd of work completed and accepted.

1.2.1.2 Lime

Perform measurement by the number of 2000 lb tons of lime used in the completed and accepted work. Do not permit measurement for wasted lime or lime used in work determined defective.

1.2.1.3 Bituminous Material

Measure bituminous material in terms of the number of gal of the material used in the completed and accepted work, corrected to gal at 60 degrees F in accordance with ASTM D633 ASTM D1250. Use a coefficient of 0.00025 per degree F for asphalt emulsion. 2000 lb tons of the material used in the completed accepted work.

1.2.2 Basis for Payment

Pay for the lime stabilization , constructed and accepted, including lime, bituminous material and other materials, labor and equipment required to provide a product meeting the requirements at the respective Contract unit prices in the bidding schedule. Do not permit payment for material wasted, used for the convenience of the Contractor, unused or rejected, or for water used. Do not permit separate payment for sanding or dusting the bituminous prime-coated surfaces, as the costs for sanding or dusting are included in the Contract unit price for bituminous material.

1.2.3 Waybills and Delivery Tickets

Submit certified waybills and delivery tickets for materials used. Submit copies of waybills or delivery tickets during the progress of the work. Before the final payment is allowed, provide waybills and certified delivery tickets for lime and bituminous materials used in the construction.

1.3 REFERENCES

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

AMERICAN ASSOCIATION OF STATE HIGHWAY AND TRANSPORTATION OFFICIALS (AASHTO)

AASHTO M 81	(1992; R 2025) Standard Specification for Cutback Asphalt (Rapid-Curing Type)
AASHTO M 82	(2017; R 2025) Standard Specification for Cutback Asphalt (Medium-Curing Type)
AASHTO T 102	(2009; R 2013) Standard Method of Test for Spot Test of Asphaltic Materials
AASHTO T 135	(2013; R 2017) Standard Method of Test for Wetting-and-Drying Test of Compacted Soil-Cement Mixtures
AASHTO T 136	(2013; R 2017) Standard Method of Test for Freezing-and-Thawing Tests of Compacted Soil-Cement Mixtures

ASTM INTERNATIONAL (ASTM)

ASTM C25	(2024) Standard Test Methods for Chemical Analysis of Limestone, Quicklime, and Hydrated Lime
ASTM C50/C50M	(2013; R 2025) Standard Practice for Sampling, Sample Preparation, Packaging, and Marking of Lime and Limestone Products
ASTM C136/C136M	(2025) Standard Test Method for Sieve Analysis of Fine and Coarse Aggregates
ASTM C977	(2018; R 2024) Quicklime and Hydrated Lime for Soil Stabilization
ASTM C1602/C1602M	(2022) Standard Specification for Mixing Water Used in Production of Hydraulic Cement Concrete
ASTM D75/D75M	(2019) Standard Practice for Sampling Aggregates
ASTM D633	(2011; R 2016) Standard Volume Correction Table for Road Tar
ASTM D977	(2020) Standard Specification for Emulsified Asphalt
ASTM D1250	(2025) Standard Guide for Use of the Joint API and ASTM Adjunct for Temperature and Pressure Volume Correction Factors for Generalized Crude Oils, Refined Products,

	and Lubricating Oils: API MPMS Chapter 11.1
ASTM D1556/D1556M	(2015; E 2016) Standard Test Method for Density and Unit Weight of Soil in Place by Sand-Cone Method
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 D1632	(2007) Standard Practice for Making and Curing Soil-Cement Compression and Flexure Test Specimens in the Laboratory
ASTM D2027/D2027M	(2019) Cutback Asphalt (Medium-Curing Type)
ASTM D2028/D2028M	(2015; R 2021) Cutback Asphalt (Rapid-Curing Type)
ASTM D2167	(2015) Density and Unit Weight of Soil in Place by the Rubber Balloon Method
ASTM D2397/D2397M	(2025) Standard Specification for Cationic Emulsified Asphalt
ASTM D3551	(2008) Laboratory Preparation of Soil-Lime Mixtures Using a Mechanical Mixer
ASTM D3740	(2019) Minimum Requirements for Agencies Engaged in the Testing and/or Inspection of Soil and Rock as Used in Engineering Design and Construction
ASTM D4318	(2017; E 2018) Standard Test Methods for Liquid Limit, Plastic Limit, and Plasticity Index of Soils
ASTM D5102	(2009) Standard Test Method for Unconfined Compressive Strength of Compacted Soil-Lime Mixtures
ASTM D6938	(2017a) Standard Test Method for In-Place Density and Water Content of Soil and Soil-Aggregate by Nuclear Methods (Shallow Depth)
ASTM E11	(2024) Standard Specification for Woven Wire Test Sieve Cloth and Test Sieves

NATIONAL LIME ASSOCIATION (NLA)

NLA BUL 326	(2004) Lime-Treated Soil Construction Manual: Lime Stabilization and Lime Modification

1.4 DEFINITIONS

1.4.1 Lime-Stabilized Course

Lime-stabilized course is a mixture of lime and in-place or borrow material uniformly blended, wetted, and compacted to produce a pavement layer course that meets the criteria set forth in the plans.

1.4.2 Degree of Compaction

Degree of compaction required is expressed as a percentage of the maximum density obtained by the test procedure presented in ASTM D1557, abbreviated as percent laboratory maximum density.

1.5 SUBMITTALS

Government approval is required for submittals with a "G" or "S" classification. Submittals not having a "G" or "S" classification are for Contractor Quality Control approval. Submittals not having a "G" or "S" classification are for information only. When used, a code following the "G" classification identifies the office that will review the submittal for the Government. Submit the following in accordance with Section 01 33 00 SUBMITTAL PROCEDURES:

SD-03 Product Data

Plant, Equipment, Machines, and Tools; G,

Submit a list of construction equipment 7 days prior to bringing equipment on the job.

Mix Design; G,

Waybills and Delivery Tickets

Contractor's Plans; G,

SD-04 Samples

Lime

Submit a typical cured sample of on-site material with the required percent of lime content. Refer to ASTM C50/C50M for sample size requirements.

SD-05 Design Data

Job-Mix Formula; G,

SD-06 Test Reports

Sampling and Testing

Field Density

SD-07 Certificates

Bituminous Material

Lime

Laboratory

1.6 WEATHER LIMITATIONS

Do not construct subgrade when weather conditions detrimentally affect the quality of the materials. Do not apply lime unless the air temperature is at least 35 degrees F in the shade and rising. Protect the completed stabilized materials against freezing by a sufficient covering of straw, or by other approved methods, until the course has dried out. Bring areas of completed stabilized materials that are damaged by freezing, rainfall, or other weather conditions to a satisfactory condition without additional cost to the Government.

1.6.1 Freeze Protection Method(s)

Submit Contractor's plans for freeze protection for approval.

1.7 DELIVERY AND STORAGE

Deliver lime, bituminous materials in containers showing or including designated trade name, product identification, specification number, manufacturer's name, and source. Store in a manner that prevents moisture damage, overexposure, and contamination.

1.8 QUALITY ASSURANCE

1.8.1 Required Data

Ten days prior to the commencement of the work, submit a job-mix formula (JMF) showing the amount of lime and water required per cubic yd, and procedures for blending the lime/subgrade mixture for each type of existing soil or for blended soil, as applicable. Include process type and number of: lime applications, stages of mixing, slurry injection depths, mixing depths and depths of compaction lifts. Also, include a list of equipment to be used and their relation to method of mixing proportioning, spreading, pulverizing and compacting subgrade, slurry injection, jet slurry mixing and other related work. The formula contains the amount of lime, either in sacks or lbs per cubic yd and the amount of water to be used, if slurry method is used. Use ASTM D3551 laboratory test method.

PART 2 PRODUCTS

2.1 PLANT, EQUIPMENT, MACHINES, AND TOOLS

Submit list of proposed equipment to be used in performance of construction work including descriptive data for Government approval.

2.1.1 General Requisites

Plant, equipment, machines, and tools used in the work are subject to approval and maintained in satisfactory working condition. Allow use of other compacting equipment in lieu of that specified, where it can be demonstrated that the results are equivalent. Provide protective equipment, apparel, and barriers to protect the eyes, respiratory system, and the skin of workers exposed to contact with lime dust or slurry.

2.1.2 Steel-Wheeled Rollers

Use self-propelled steel wheeled rollers . Use tandem or 3-wheel self-propelled non-vibratory steel-wheel rollers or steel-wheel trailer not weighing less than 5 tons. When drive rolls or trailer rolls produce a compressive force of not less than 200 lbs per linear in of contact area, allow a roller weighing less than 5 tons to be used. Equip wheels of the rollers with adjustable scrapers. The use of vibratory rollers is optional.

2.1.3 Pneumatic-Tired Rollers

Use pneumatic-tired rollers having 4 or more tires, inflated to a minimum pressure of 90 psi. Equally distribute the loading to the wheels, and uniformly inflate the tires. Also provide pneumatic-tired towing equipment.

2.1.4 Tamping-Type Roller

Use a tamping type roller, under working conditions, having a minimum weight of 90 lbs per linear in of length of drum and a minimum load on each sheeps-foot of 100 psi of cross sectional area of the sheeps-foot in contact with the ground. Do not allow the maximum area of the face of each sheeps-foot to be more than 12 square in. Do not allow the feet on the sheeps-foot roller to project less than 7 in from the face of the drum, and equip the roller with teeth-cleaning devices. Space the feet in adjacent rows so that the distance from center to center of adjacent parallel rows is not less than 6 in nor more than 11 in. Do not allow individual drums of the roller to exceed 5 ft in width. Use drums that oscillate independently. Operate the and tractor for pulling at a speed of approximately 3 to 6 mph.

2.1.5 Mechanical Spreader

Use a self-propelled mechanical spreader or attached to a propelling unit capable of moving the spreader and material truck. Use a steerable device having variable forward and reverse speeds. Carry the spreader and propelling unit on tracks, rubber tires, or drum-type steel rollers that do not disturb the underlying material. Provide a spreader that conforms to the following:

a. Containing a hopper, an adjustable screed, and outboard bumper rolls;

b. Designed to have a uniform, steady flow of material from the hopper; and

c. Capable of laying material without segregation, across the full width of the lane, to a uniform thickness and to a uniform loose density so that when compacted, the layer or layers conform to thickness and grade requirements indicated.

Provide a demonstration of the spreader prior to use in performance of the work.

2.1.6 Pulvimixer

Use self-propelled, four-wheel drive pulverizing and mixing equipment capable of pulverizing the soil in a single pass for the full depth to be stabilized. Use mixing action capable of uniformly blending and mixing

the required lime content with the subgrade soil. Use a rotor capable of up or down cutting.

2.1.7 Slurry Mixer/Distributor

Mix the lime with water in trucks with approved distributors and applied as a thin water suspension or slurry. Apply commercial lime slurry with a lime percentage not less than that applicable for the grade used. Attain the distribution of lime by successive passes over a measured section of subgrade until the proper amount of lime has been spread. Use the amount of lime spread required for mixing to the specified depth that results in the percentage determined in the JMF. Use a distributor truck that continually agitates the slurry to keep the mixture uniform.

2.1.8 Central Mixing Plant

Use a lime-slurry central mixing plant consisting of a lime storage silo, water supply tank, lime and water metering devices, and a lime-water mixer. Provide storage tanks for lime-water slurry with mechanical agitation to maintain the lime-water slurry in suspension.

2.1.9 Sprinkling Equipment

Provide sprinkling equipment consisting of tank trucks, pressure distributors, or other approved equipment designed to apply controlled quantities of water uniformly over variable widths of surface.

2.1.10 Tampers

Provide tampers of an approved mechanical type, having sufficient weight and striking power to produce the compaction required.

2.1.11 Straightedge

Provide and maintain at the site one 12 ft straightedge for use in the testing of the finished surface. Make available a straightedge for Government use. Use straightedges constructed of aluminum or other lightweight metal with blades of box or box-girder cross section with flat bottom reinforced to insure rigidity and accuracy. Use straightedges with handles to facilitate movement on pavement.

2.2 MATERIALS

2.2.1 Lime

Submit copies of certified test data. Use a standard brand of quicklime hydrated lime conforming to ASTM C977 and the following physical and chemical requirements. Sample lime in accordance with ASTM C50/C50M.

a. Gradation that 97 percent passes a No. 30 sieve and a minimum of 75 percent passes a No. 200 sieve.

b. Combined calcium oxide and magnesium oxide not less than 90 percent.

c. Quicklime Hydrated Lime does not exceed 5 percent Carbon Dioxide or 2 percent free moisture (taken at the point of manufacture).

The percent of hydrated lime quicklime by weight of dry soil material is: 6 percent.

2.2.2 Bituminous Material

Submit copies of certified test data. Material conforming to one of the following:

2.2.2.1 Cutback Asphalt

AASHTO M 82 ASTM D2027/D2027M, Grade MC-30 MC-70 MC-250 MC-800; AASHTO M 81 ASTM D2028/D2028M, Grade RC-70 RC-250 RC-800 .

2.2.2.2 Emulsified Asphalt

ASTM D977, Type RS-1 RS-2 SS-1 CSS-1 .

Conform to ASTM D977, Type RS-1 Type RS-2 Type SS-1; ASTM D2397/D2397M, Type CSS-1. Use a base asphalt to manufacture the emulsion that shows a negative spot when tested in accordance with AASHTO T 102 using standard naphtha.

2.2.2.3 Material to be Stabilized

Use material to be stabilized consisting of in situ, borrow, or compacted fill material if preliminary earthwork is required: See Section 31 00 00 EARTHWORK. Provide material free of deleterious substances such as sticks, debris, organic matter, and stones greater than 3 in in any dimension. Confirm at least 10 percent of the material passes the No. 40 sieve. Confirm the plasticity index is greater than 18.

2.2.2.4 Water

Use water clean, fresh, and free from injurious amounts of oil, acid, salt, alkali, organic matter, and other substances deleterious to the lime or soil-lime mixture and subject to approval. Test water for conformance to the requirements of ASTM C1602/C1602M including the optional requirements of Table 2. Allow potable water sources to be used without testing.

2.2.3 Stockpiling Materials

Stockpile borrow material, including approved material available from excavation and grading, in the manner and at the locations designated. Before stockpiling material, clear storage sites and slope to drain. Separately stockpile materials obtained from different sources.

2.2.4 Mix Design

Submit certification of testing laboratory compliance. Develop and submit for approval a proposed mix design for each material type to be stabilized at least 14 days before it is to be used. Obtain approval of the proposed mix designs from the Government prior to starting the work. Develop mix designs by an approved commercial laboratory which meets the requirements of ASTM D3740 and which has been approved by the Corps of Engineers Materials Testing Center. Develop the mix design using representative samples of each soil to be stabilized and using the proposed project lime. Conduct three trials for each mix design tested. Prepare samples in accordance with ASTM D3551. Allow the prepared samples to mellow for 48 hours for stabilized materials before testing is performed. For soil stabilization, vary the lime content to produce a maximum plasticity index

of 10 when tested in accordance with ASTM D4318. Provide the results in a graph of plasticity index versus lime content. Determine the maximum dry density and optimum moisture content for the proposed lime-soil mixture in accordance with ASTM D1557. Cure samples at a constant moisture content and temperature for 7 28 days. Provide a soil stabilization mix design capable of producing an unconfined compressive strength of 150 psi at 28-days age (average of three specimens) when compacted to the design percent of laboratory maximum density and tested in accordance with ASTM D5102, Method A. Prepare three specimens per test evaluation for durability testing for each mix design tested. Do not allow samples to exceed loss indicated in Table 2 after 12 cycles of the wet-dry test in accordance with AASHTO T 135. Conduct freeze thaw tests in accordance with AASHTO T 136 (but omitting wire brushing) for projects susceptible to freeze/thaw conditions. Provide the mix design submittal information including the following:

a. Material type
b. Material classification including plasticity test data
c. Laboratory maximum density
d. Percent of lime and rate of application
e. Optimum water content during mixing, curing, and compaction
f. Gradation of material before and after treatment
g. Compressive strength
h. Durability Wet-Dry test data
i. Mixing or equipment requirements
j. Mellowing time requirements
k. Water quality test data, if non-potable source used

Table 2

Type of Soil Stabilized	Maximum Allowable Weight Loss After 12 Wet-Dry or Freeze-Thaw Cycles, as a Percent of Initial Specimen Weight
Silt	8
Clays	6

Modify the in situ soil or compacted fill with lime at a rate of 6 percent to 10 percent per dry unit weight of soil.

PART 3 EXECUTION

3.1 LIME STABILIZATION MIXTURE

Pulverize the subgrade material to be stabilized and, when lime is applied in the dry state, blend the mix at a moisture content below optimum. Confirm the proportions of the mixture are in accordance with the approved mix design after blending is completed. After blending, add water into the dry mix in amounts to bring the moisture content to a minimum of 5 percent above optimum. After mixing, control field moisture content within plus 2 or minus 1 percent of optimum. When the stabilized course is constructed in more than one layer, clean the previously constructed layer of loose and foreign matter by sweeping with power sweepers or power brooms. Allow

hand brooms to be used in areas where power cleaning is not practicable. Provide adequate drainage during the entire construction period to prevent water from collecting or standing on the area to be stabilized or on pulverized, mixed, or partially mixed material. Provide line and grade stakes for control. Place grade stakes in lines parallel to the centerline of the area under construction and suitably spaced for string lining.

3.2 OPERATION OF BORROW PITS

Clear, strip and excavate borrow pits in a manner that exposes vertical faces of the deposit for suitable working depths. Waste strata of unsuitable materials overlying or occurring in the deposit. Allow methods of operating pits and the processing and blending of materials to be changed or modified to obtain material conforming to the specified requirements. Upon completion of the work, condition pits to drain readily and be left in a satisfactory condition as determined by the Government. Obtain borrow material from offsite sources.

3.3 PREPARATION OF AREA TO BE STABILIZED

Clean the area of debris, roots, thrash, organic and other deleterious materials. Perform clearing and grubbing to a depth of 16 in as specified in Section 31 11 00 CLEARING AND GRUBBING 31 00 00 EARTHWORK as required. Remove rocks larger than 3 in. Inspect original ground for adequacy for the forthcoming compactive effort of lime treatment work. Inspect the area for adequate compaction and that it is capable of withstanding, without displacement, the compaction specified for the soil-lime mixture. Dispose of debris and removed unsatisfactory in-place material as specified. Rough grade and shape the area to be stabilized to conform to the lines, grades, and cross-sections indicated. Comply with subgrade requirements of Section 31 00 00 EARTHWORK.

3.3.1 In-Place Material to be Stabilized

Grade the entire area to conform to the lines, grades, and cross sections shown in the drawings prior to being processed. Make soft or yielding subgrade areas stable before construction is begun. Remove and replace unsatisfactory material as directed by the Government.

3.3.2 In-Place Material to Receive Stabilized Course

Correct soft, yielding areas and ruts or other irregularities in the surface. Loosen the material in the affected areas and remove unsatisfactory material. Add approved material where directed. Shape the area to line, grade, and cross section, and compact to the specified density. Use subgrade conforming to Section 31 00 00 EARTHWORK.

3.3.3 Grade Control

Excavate underlying material to sufficient depth for the required stabilized-course thickness so that the finished stabilized course with the subsequent surface course meets the fixed grade. When stabilized course is to be constructed to meet a fixed grade, provide adequate line and grade stakes for control. Locate grade stakes in lanes parallel to center line of areas under construction, and suitably placed for string lining. Maintain line and grade. Confirm finished and completed stabilized area conform to the lines, grades, cross section, and dimensions indicated.

3.3.4 Soil Testing

Test original ground prior to scarification in accordance with ASTM D1557.

3.4 INSTALLATION

3.4.1 Mixed In-Place Method

3.4.1.1 Application Requirements

Comply with NLA BUL 326 and sequence of construction operations, unless specified otherwise.

After site preparation, scarify subgrade and spread lime. Blend lime into subgrade to required depth as indicated. Apply lime and water only to those areas where mixing operations can be completed during the same working day. Accomplish application and mixing of lime by either the dry placing method or the slurry method. Use same method during a single day's operation. Double application of lime is required; use between 2 and 3 percent of lime for the initial application. Apply curing seal as specified and allow 6 to 7 days curing.

3.4.1.2 Scarifying and Pulverizing of Soil

Prior to application of lime, scarify and pulverize the soil to the depth shown in the drawings. Control scarification so that the layer beneath the layer to be treated is not disturbed. Do not exceed the depth of scarification with pulverizing. Remove organic materials such as stumps and roots. Remove rocks larger than 3 in.

3.4.1.3 Application of Lime

Shape pulverized material to approximately the cross section indicated. Apply lime so that when uniformly mixed with the soil, the specified lime content is obtained, and a sufficient quantity of lime-treated soil is produced to construct a compacted lime-treated course conforming to the lines, grades, and cross section indicated. Spread lime only on areas where the mixing operations can be completed during the same work shift or day. Use mechanical spreaders in applying bulk lime. Apply lime as a slurry, and use distributors in applying slurry. If lime is spread by hand, spot the bags accurately on the area being stabilized so that when the bags are opened the lime is dumped and spread uniformly on the area being processed. Limit hand spreading to areas inaccessible to mechanical spreaders. Do not permit equipment, except that used in spreading and mixing, to pass over the freshly applied lime.

a. Dry Placing: Spread and distribute lime at a uniform rate with protection from wind as an important distribution and timing criteria. Prevent dry lime from blowing by adding water to lime or by other suitable means. Do not apply lime when wind conditions are objectionable.

b. Slurry Method: Apply or inject mixture of lime and water into the existing soil. Maintain the water content at 5 percent above optimum during application to lime/soil mixture. Prepare hydrate slurry either in a central mixing tank or tank trucks, with agitation provided for mixing or using a jet slurry maker. Prepare quicklime slurry using a

portable batch slaking unit. Accurately weigh or meter lime and water. Use standard water or asphalt trucks, properly cleaned, with or without pressure distributors, to apply lime treatment. Spread or inject lime slurry evenly to yield uniform distribution of lime throughout soil. Distribute lime in successive passes over subgrade materials until proper amount of lime has been spread or injected to proper depth. Continually agitate slurry to keep mixture uniform. Keep pumps, distribution spray bars, slurry injection equipment and other equipment clean of excessive lime slurry. Verify the specified amount and rate of application of lime for the various materials encountered.

3.4.1.4 Initial Mixing

Distribute lime uniformly by mixing and pulverizing subgrade. Mix the lime and soil immediately after the lime has been distributed. Use sufficient initial mixing to alleviate dusting or wetting of the lime that might occur in the event of wind or rainstorms. During mixing, add water to subgrade to provide a moisture content of material and to insure chemical action of lime and subgrade materials. Make passes with the mixer until it has produced a homogenous, uniform mixture of lime, soil, and water. After initial mixing, control field moisture content within plus 2 or minus 1 percent of optimum. Continue mixing or remixing operations, until material is free of streaks or pockets of lime and mixture is uniform as indicated by testing. After initial mixing, shape and roll subgrade lightly to seal surface in order to reduce evaporation of moisture and lime carbonation. Allow this to be accomplished several days in advance of the final application and mixing.

3.4.1.5 Water Application and Moist Mixing

Determine moisture content of the mixture in preparation for final mixing. Do not allow moisture in the mixture following final mixing to be less than the water content determined to be optimum based on dry weight of soil and or to exceed the optimum water content by more than 2 percentage points. Add water in increments as large as the equipment permits; however, partially incorporate such increments of water in the mix to avoid concentration of water near the surface. After the last increment of water has been added, continue mixing until the water is uniformly distributed throughout the full depth of the mixture, including satisfactory moisture distribution along the edges of the section. Mix soil in two stages, allowing for an intervening 24 to 48 hour mellowing period. Allow the stabilized mixture to mellow to allow the chemical reaction to alter (break down) the material. Identify the duration of this mellowing period in the mix design and base on soil type. After mellowing, remix the soil before compaction.

3.4.1.6 Two-Stage Pulverization and Mixing

After curing, pulverize lime treated material until soil particles pass a 1 in sieve and 60 percent pass the No. 4 sieve. If resultant mixture contains clods, reduce their size by scarifying, remixing, or pulverization to meet specified gradation. Compact lime-treated material immediately after final mixing and testing. Aerate or sprinkle to provide moisture content within plus 2 or minus 1 percent of optimum moisture content during compaction.

3.4.1.7 Preliminary Curing

Moisture cure lime-soil mixture up to 48 hours until adhesive quality of clay is reduced to almost normal soil consistency. Allow 7 days or more for curing heavy clays.

3.4.1.8 Confined Areas

In areas inaccessible to machinery, excavate soils to be stabilized and move to an area to perform machine mixing, process, and place back in the original location. Place material in its final location within 24 hours of initial mixing, and prior to final mixing and compaction.

3.4.2 Edges of Stabilized Course

Place approved material along the edges of the stabilized course in a quantity to compact to the thickness of the course being constructed, or to the thickness of each layer in a multiple-layer course, allowing at least a 1 ft width of the shoulder to be rolled and compacted simultaneously with the rolling and compacting of each layer of the stabilized course.

3.4.3 Central-Plant Method

Provide a plant capable of producing a uniform lime-treated mixture at the specified lime and moisture contents. Haul the mixture to the job in trucks equipped with protective covers. Moisten underlying course, and place the mixture on the prepared area in a uniform layer with mechanical spreaders. Confirm the layer is uniform in thickness and surface contour; and confirm the completed layer, after compaction, conforms to the required grade and cross section.

3.4.4 Traveling-Plant Method

Move the traveling plant at a uniform rate of speed and accomplish mixing of the materials in one pass. Deliver water and lime from supply trucks or bins at a predetermined rate. Use windrows of prepared soil-lime mixture covering a predetermined width to the indicated compacted thickness.

3.4.5 Layer Thickness

Confirm the compacted thickness of the stabilized course is as indicated . Do not allow layers more than 8 in or less than 3 in in compacted thickness.

3.4.6 Compaction

Before compaction operations are started and as a continuation of the mixing operation, loosen and pulverize the mixture to the full depth. Start compaction immediately after final mixing is completed. During final compaction moisten the surface and shape it to the required lines, grades, and cross section. Confirm the density of compacted mixture is at least 95 percent of laboratory maximum density. Base density value on a representative soil sample obtained from site and treated with required proportion of lime. Begin rolling at the outside edge of the surface and proceed to the center, overlapping on successive trips at least one-half the width of the roller. Make alternate trips of the roller slightly different lengths. Do not permit the speed of the roller to cause

displacement of the mixture to occur. Compact areas inaccessible to the rollers with mechanical tampers; shape and finish the areas by hand methods. As compaction progresses, maintain the shape of the lifts by blading. Check that the surface upon completion is smooth and conforms to indicated section and established lines and grades. Perform initial compaction with sheeps-foot roller or other suitable roller. Perform final rolling by means of sheeps-foot, steel-tired, or pneumatic rollers.

3.4.7 Finishing

Finish the surface of the top layer to the grade and cross section shown in the drawings. Confirm the surface is of uniform texture. Allow light blading during rolling for the finished surface to conform to the lines, grades, and cross sections. Do not permit the surface to vary more than 0.6 in above or below established grade. Finish completed section by rolling with a pneumatic or suitable roller sufficiently light to prevent hairline cracking. If the surface becomes rough, corrugated, uneven in texture, or traffic-marked prior to completion, scarify, rework, relay, or replace the unsatisfactory portions. If the course, when laid, becomes watersoaked, remove that portion immediately, and the mix placed in a windrow and aerated until a moisture content within the limits specified is obtained; and then spread, shaped, and rolled. Keep surface of each compacted layer or lime-treated material moist until covered by a subsequent layer of lime-treated material or curing seal.

3.4.8 Construction Joints

At the end of each working day, prepare a temporary joint in fully compacted material normal to paved surface centerline. Form a straight transverse construction joint by cutting back into the completed work to form a true vertical face free of loose or shattered material. Construct a longitudinal temporary joint for partial width sections against which future material is to be placed. Remove temporary joints during next work period by trimming 3 in into treated material for continuity. Allow trimmed material to be incorporated in subsequent work. Do not allow temporary joints to coincide with longitudinal or transverse temporary joint location of previous or subsequent construction. Allow remixing 4 in into the previous day's work to be substituted for joints providing the method and equipment is acceptable. Remove and replace material along construction joints not properly compacted with soil-lime mixture that is mixed, moistened, and compacted as specified.

3.4.9 Final Curing

Immediately after the soil-lime area has been finished as specified above, protect the surface against rapid drying for 7 days by the application of a bituminous material.

Uniformly apply bituminous material by means of a bituminous distributor within a temperature range of to degrees F. Apply bituminous material in quantities of not less than 0.1 gal/square yd nor more than 0.25 gal/square yd. Properly treat areas inaccessible to or missed by the distributor using the manually operated hose attachmentt. Apply bituminous material only to the top layer. At the time the bituminous material is applied, check that the surface of the area is free of loose or foreign matter and contains sufficient moisture to prevent excessive penetration of the bituminous material. Sprinkle the area immediately before the

bituminous material is applied. Sand the treated surface to prevent the bituminous material from being picked up by traffic.

3.5 SAMPLING AND TESTING

Submit calibration curves and related test results prior to using the device or equipment being calibrated. Provide copies of field test results within 24 hours after the tests are performed. Submit certified copies of test results of materials and sources not less than 30 days before material is required for the work.

3.5.1 General Requirements

Perform sampling and testing using an approved commercial testing laboratory or facilities which have been inspected by the Cement and Concrete Reference Laboratory (of ASTM/CCRL) within the past 3 years or by a Government approved independent commercial testing laboratory provided by the Contractor. The first inspection and subsequent inspections required because of failure of the facilities to pass the first inspection is at the expense of the Contractor. Perform sampling and testing using a laboratory frequency of sampling and testing of materials for conformance and quality control as specified and to be performed at such other times to document contract compliance. Provide certified copies of the test results within 24 hours of completion.

3.5.2 Results

Verify that results comply with the material specification. When the source of materials is changed deficiencies are found, repeat the initial analysis including mix design studies if the material source is changed, and retest the material already placed to determine the extent of unacceptable material. Replace unacceptable in-place material.

3.5.3 Sampling

Take aggregate samples for laboratory testing in accordance with ASTM D75/D75M. Take samples of lime in accordance with ASTM C50/C50M. Prepare specimens for the unconfined compression tests in accordance with ASTM D1632.

3.5.4 Sieve Analysis

Before starting work, test one sample of material to be stabilized in accordance with ASTM C136/C136M on sieves conforming to ASTM E11. After the initial test, perform a minimum of one analysis for each 1000 tons of material placed, with a minimum of three analyses for each day's run until the course is completed.

3.5.5 Liquid Limit and Plasticity Index

Perform one liquid limit and plasticity index for each sieve analysis. Confirm the liquid limit and plasticity index are in accordance with ASTM D4318.

3.5.6 Chemical Analysis

Test lime for the specified chemical requirements in accordance with ASTM C25.

3.5.7 Optimum Moisture, Maximum Density

Perform optimum moisture, maximum density test on lime-treated material sampled after final mixing and prior to final compaction. Laboratory compact soil mixture within 3 hours of sampling and then moist-cure for 24 hours prior to optimum moisture-maximum density determination. Perform testing in accordance with ASTM D1557, Method D and the JMF.

3.5.8 Uniformity Tests

After placement and mixing of each lift perform a series of uniformity tests. Excavate a hole 10 in in diameter through full depth of lift and impregnate sides of hole with a standard phenolphthalein alcohol indicator. Non-conformity of color reaction, when material is treated as above, is considered evidence of inadequate mixing.

3.5.9 Compaction

Perform in-place density test to determine degree of compaction between 24 and 72 hours after final compaction and 24 hour moist cure period. Test in accordance with ASTM D1556/D1556M. Allow use of ASTM D6938 and compatible meter methods providing one ASTM D1556/D1556M check test is made after every four nuclear tests.

3.5.10 Thickness and Smoothness

Do not allow the thickness of the final lime treated subgrade to be less than thickness shown. Do not allow the final grade smoothness to deviate by more than 3/8 in, when tested with a 10 ft straightedge.

3.5.11 Field Application Rate Test

Test for initial lime spreading rate.

3.5.12 Frequency of Tests

Use the minimum number and type of quality control tests as follows:

a. Optimum moisture, maximum density. Two of each type or change of material with in-place density requirements.

b. Thickness, smoothness and uniformity. Two tests each day for every 1000 square yd or less mixed and placed.

c. Field density. One set of 3 tests for each lift for every 2000 square yd or less.

d. Field application rate test. One test for each lime spreading vehicle to be used on site.

3.6 FIELD QUALITY CONTROL

Provide a moisture-density relationship for the lime-soil mixture from the tests. Verify that the material complies based on results of field quality control testing. When a material source is changed, test the new material for compliance . Repeat the initial analysis when deficiencies are found. Retest material already placed to determine the extent of unacceptable material. Replace and repair unacceptable in-place material

at no additional cost to the Government.

3.6.1 Treatment Depth Checks

Measure the depth of stabilization at an interval for each of 300 square yd of stabilized course. Make measurements in test holes in soil by spraying with a pH indicator such as phenolphthalein. Phenolphthalein changes from clear to red between pH 8.3 and 10. The color change indicates the location of the bottom of the mixing zone. Other pH indicators can measure higher pH levels if there is reason to suspect that inadequate lime has been mixed into the soil.

3.6.2 Thickness Control

Complete thicknesses of the stabilized course within 1/2 1/4 in of the thickness indicated. Where the measured thickness of the stabilized course is more than 1/2 1/4 in deficient, correct such areas by scarifying, adding mixture of proper gradation, reblading, and recompacting as directed. Where the measured thickness of the stabilized course is more than 1/2 in thicker than indicated, it consider it as conforming to the specified thickness requirement. Average the thickness measuremets taken for the job to be the job thickness within 1/4 in of the thickness indicated. Measure the thickness of the stabilized course at intervals which ensure one measurement for each 250 square yd of stabilized course. Make measurements in 3 in diameter test holes penetrating the stabilized course.

3.6.3 Field Density

Determine field in-place density in accordance with ASTM D1556/D1556M ASTM D2167 ASTM D6938. When ASTM D6938 is used, check the calibration curves, and adjust, using the sand cone method as described in paragraph Calibration of the ASTM publication. Allow ASTM D6938 to be used to determine both the wet unit weight and the moisture content of the soil. Check calibration curves provided with the moisture gauges along with density calibration checks as described in ASTM D6938. If ASTM D6938 is used, check in-place densities by ASTM D1556/D1556M at least once per lift and at a frequency not to exceed one test under ASTM D1556/D1556M per 8 tests performed under ASTM D6938. Provide calibration curves and calibration tests results within 24 hours of conclusion of the tests. Perform at least one field density test for each 250 square yd of each layer of stabilized material.

3.6.4 Smoothness Test

Do not permit the surface of a stabilized layer to show deviations in excess of 1/2 in when tested with the 10- 12- ft straightedge. Correct deviations exceeding this amount by removing material and replacing with new material, or by reworking existing material and compacting, as directed. Take measurements for deviation from grade and cross section shown in successive positions parallel to the pavement centerline with a 10- 12- ft straightedge. Take measurements perpendicular to the pavement centerline at 50- ft intervals.

3.7 TRAFFIC CONTROL, CURING MAINTENANCE, AND DRAINAGE PROTECTION

Allow completed portions of the lime-treated soil area to be opened to light traffic after a period of 3 days if cured with a bituminous material provided the curing is not damaged. Provide warning signs and barricades

so that traffic does not travel over freshly treated surfaces. After the curing period has elapsed, open completed areas to traffic, provided the stabilized course has hardened sufficiently to prevent marring or distorting of the surface by equipment or traffic. Do not permit heavy equipment on the area during the curing period. Allow lime and water to be hauled over the completed area with pneumatic-tired equipment if approved. Protect finished portions of lime-stabilized soil, that are traveled on by equipment used in constructing an adjoining section, in a manner to prevent equipment from marring or damaging completed work. Provide drainage during entire period of construction to prevent water from collecting or standing on area to be stabilized.

3.8 EQUIPMENT LIMITATIONS

3.8.1 General

Use the type of equipment for each category of work conforming to the NLA BUL 326 unless specified otherwise. Maintain equipment in satisfactory and safe operating condition.

3.8.2 Spreading Equipment

At windy locations, use an approved screw type spreader box, mixer, or other semi-enclosed equipment which offers protection from wind. Spreading hydrated lime by aggregate spreaders, dump trucks or agricultural spreaders is not allowed. Spreading by end-dumping or tailgate control methods are not allowed. Change or alter equipment to be used in the event of non-uniform spreading of lime.

3.8.3 Additional Mixing Equipment Limitations

a. Do not allow motor graders to mix lime with clays.

b. Allow use of deep-lift rotary mixers to facilitate changes in specified depths of operation, providing equipment and method of operation sustains uniform distribution of lime with required compacted density throughout the deeper layer, with approval of Contracting Officer.

3.8.4 Additional Compaction Equipment Limitations

Do not allow unauthorized equipment, hauling or transportation vehicles for compaction purposes.

3.9 SAFETY REQUIREMENTS

In addition to the Contract Clause entitled "Accident Prevention," prevent employee eye or skin contact with quicklime during transport or application. Provide and require employees use the following:

a. Protective clothing, high top boots, gauntlet-type gloves and protective headwear.

b. Splash-proof safety goggles and face shields.

c. Protective cream.

3.10 MAINTENANCE

Maintain stabilized area in a satisfactory condition until the completed work is accepted. Include immediate repairs of defects in maintenance and repeat to keep the area intact. Correct defects as specified.

3.11 DISPOSAL OF UNSATISFACTORY MATERIALS

Dispose of removed in-place materials that are unsuitable for stabilization, material that is removed for the required correction of defective areas, waste material, and debris as directed .

-- End of Section --

SECTION 32 11 20

BASE COURSE FOR RIGID AND SUBBASE SELECT-MATERIAL FOR FLEXIBLE PAVING
05/22

PART 1 GENERAL

1.1 UNIT PRICES

1.1.1 Measurement

1.1.1.1 Area

Measure the quantity of 8 inch thick subbase and select-material course completed and accepted in square yards.

1.1.1.2 Volume

Measure the quantity of subbase and select-material course completed and accepted in cubic yards. Determine the volume of material in-place and accepted by the average job thickness obtained in accordance with paragraph LAYER THICKNESS and the dimensions shown on the drawings.

1.1.2 Payment

1.1.2.1 Course Material

Quantities of subbase and select-material course, determined as specified above, will be paid for at the respective contract unit prices, which will constitute full compensation for the construction and completion of the subbase and select-material course.

1.1.2.2 Stabilization

Cohesionless subgrade or underlying courses to be stabilized, as specified in paragraph PREPARATION OF UNDERLYING COURSE OR SUBGRADE, will be paid for as a special item on a tonnage basis including extra manipulation as required.

1.1.3 Waybills and Delivery Tickets

Submit copies of waybills and delivery tickets during progress of the work. Before the final payment is allowed, file certified waybills and certified delivery tickets for all aggregates actually used.

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.

ASTM INTERNATIONAL (ASTM)

ASTM C29/C29M	(2023) Standard Test Method for Bulk Density ("Unit Weight") and Voids in Aggregate
ASTM C117	(2023) Standard Test Method for Materials

	Finer than 75-um (No. 200) Sieve in Mineral Aggregates by Washing
ASTM C131/C131M	(2020) Standard Test Method for Resistance to Degradation of Small-Size Coarse Aggregate by Abrasion and Impact in the Los Angeles Machine
ASTM C136/C136M	(2025) Standard Test Method for Sieve Analysis of Fine and Coarse Aggregates
ASTM D75/D75M	(2019) Standard Practice for Sampling Aggregates
ASTM D1556/D1556M	(2015; E 2016) Standard Test Method for Density and Unit Weight of Soil in Place by Sand-Cone Method
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 D2487	(2017; R 2025) Standard Practice for Classification of Soils for Engineering Purposes (Unified Soil Classification System)
ASTM D3665	(2012; R 2017) Standard Practice for Random Sampling of Construction Materials
ASTM D4318	(2017; E 2018) Standard Test Methods for Liquid Limit, Plastic Limit, and Plasticity Index of Soils
ASTM D4718/D4718M	(2015) Standard Practice for Correction of Unit Weight and Water Content for Soils Containing Oversize Particles
ASTM D6938	(2017a) Standard Test Method for In-Place Density and Water Content of Soil and Soil-Aggregate by Nuclear Methods (Shallow Depth)
ASTM D7928	(2017) Standard Test Method for Particle-Size Distribution (Gradation) of Fine-Grained Soils Using the Sedimentation (Hydrometer) Analysis
ASTM E11	(2024) Standard Specification for Woven Wire Test Sieve Cloth and Test Sieves

1.3 DEGREE OF COMPACTION

Degree of compaction required, except as noted in the second sentence, is expressed as a percentage of the maximum laboratory dry density obtained by the test procedure presented in ASTM D1557.. Since ASTM D1557 applies only to soils that have 30 percent or less by weight of their particles retained on the 3/4 inch sieve, express the degree of compaction for

material having more than 30 percent by weight of their particles retained on the 3/4 inch sieve as a percentage of the laboratory maximum dry density in accordance with ASTM D1557 Method C and corrected with ASTM D4718/D4718M.

1.4 SUBMITTALS

Government approval is required for submittals with a "G" or "S" classification. Submittals not having a "G" or "S" classification are for Contractor Quality Control approval. Submittals not having a "G" or "S" classification are for information only. When used, a code following the "G" classification identifies the office that will review the submittal for the Government. Submit the following in accordance with Section 01 33 00 SUBMITTAL PROCEDURES:

SD-03 Product Data

Plant, Equipment, and Tools; G

Waybills and Delivery Tickets

SD-06 Test Reports

Initial Tests; G

In-Place Tests; G

Test Section Report; G

1.5 QUALITY ASSURANCE

Perform sampling and testing using a laboratory approved in accordance with Section 01 45 00 QUALITY CONTROL. Do not start work requiring testing until the testing laboratory has been inspected and approved. All contractor quality control testing laboratories performing acceptance testing require USACE validation by the Material Testing Center (MTC) for both parent laboratory and on-site laboratory. Validation on all laboratories is required to remain current throughout the duration of the paving project. Contact the MTC manager listed at https://mtc.erdc.dren.mil/requestvalidation.aspx# for costs and scheduling. Test the materials to establish compliance with the specified requirements and perform testing at the specified frequency. Furnish copies of test results within 24 hours of completion of the tests.

1.5.1 Sampling

Take samples for laboratory testing in conformance with ASTM D75/D75M.

1.5.2 Tests

1.5.2.1 Gradation

Perform gradation in conformance with ASTM C117 and ASTM C136/C136M using sieves conforming to ASTM E11. Perform particle-size analysis of the soils in conformance with ASTM D7928.

1.5.2.2 Liquid Limit and Plasticity Index

Determine liquid limit and plasticity index in accordance with ASTM D4318.

1.5.2.3 Moisture-Density Determinations

Determine the laboratory maximum dry density and optimum moisture in accordance with paragraph DEGREE OF COMPACTION.

1.5.2.4 Field Density Tests

Measure field density in accordance with ASTM D1556/D1556M, or ASTM D6938. For the method presented in ASTM D1556/D1556M, use the base plate, as shown in the drawing. For the method presented in ASTM D6938, check the calibration curves and adjust them, if necessary, using only the sand cone method as described in Annex A2, of the ASTM publication. Use ASTM D6938 to determine the moisture content of the soil. Check the calibration curves furnished with the moisture gauges along with density calibration checks as described in ASTM D6938. Make the calibration checks of both the density and moisture gauges using the prepared containers of material method, as described in Annex A2, in ASTM D6938, on each different type of material to be tested at the beginning of a job and at intervals as directed. Submit calibration curves and related test results prior to using the device or equipment being calibrated.

1.5.2.5 Wear Test

Perform wear tests on subbase course and material in conformance with ASTM C131/C131M.

1.5.2.6 Weight of Slag

Determine weight per cubic foot of slag in accordance with ASTM C29/C29M.

1.6 ENVIRONMENTAL REQUIREMENTS

Perform construction when the atmospheric temperature is above 35 degrees F. When the temperature falls below 35 degrees F, protect all completed areas by approved methods against detrimental effects of freezing. Correct completed areas damaged by freezing, rainfall, or other weather conditions to meet specified requirements.

1.7 ACCEPTANCE

1.7.1 Tolerances

Acceptance of subbase course select-material is based on compliance with the tolerances presented in Table 1. Remove and replace any course identified by the failing tests.

TABLE 1

Measurement	Tolerance
Grade	Plus 0, Minus 1/2 inch

TABLE 1	
Smoothness	Plus/Minus 1/2 inch
Total Thickness	Plus/Minus 1/2 inch
Average Job Thickness	Plus/Minus 1/4 inch
Compaction	
Subbase	Mimimum 100 percent
	Mimimum percent
Select-Material	100 percent

1.7.2 Test Section

Construct a test section consisting of 1000 square yards of subbase select-material to demonstrate the materials, equipment, and construction processes meet the requirements of this specification. Acceptance of the test section is based on compliance with the tolerances listed in Table 1. Rework, re-compact, or remove and replace test sections that do not meet specification requirements. Do not commence full operations until the test section report has been approved. Use the same equipment, materials, and construction methods for the remainder of construction, unless adjustments are approved in advance. A test section is not required.

PART 2 PRODUCTS

2.1 MATERIALS

2.1.1 Subbase Course

Provide aggregates consisting of crushed stone or slag, gravel, shell, sand, on-site recycled concrete aggregate (RCA), or other sound, durable, approved materials processed and blended or naturally combined. Provide aggregates which are free from lumps and balls of clay, organic matter, objectionable coatings, and other foreign material. Limit the percentage of loss to a maximum of 50 percent after 500 revolutions when tested in accordance with ASTM C131/C131M. Provide aggregate that is reasonably uniform in density and quality. Provide slag that is an air-cooled, blast-furnace product having a dry weight of not less than 70 pcf. Provide aggregates with a maximum size of inch, a minimum of 70 percent passing the 3/4 inch sieve, and within the limits specified as follows:

Table 2			
Maximum Allowable Percentage by Weight Passing Square-Mesh Sieve			
Sieve Designation	No. 1	No. 2	No. 3
No. 10	50	80	100
No. 200	8	8	8

Provide a gradation for the separation layer meeting the gradation requirements of Table 2 Gradation No. 1 and the additional requirement

that the 15 percent particle size (D15) of the separation layer is less than or equal to 5 times the 85 percent particle size (D85) of the underlying layer.

Limit particles having diameters less than 0.02 mm to a maximum of 3 percent by weight of the total sample tested as determined in accordance with ASTM D7928. Limit the portion of any blended component and of the completed course passing the No. 40 sieve to be either nonplastic or have a Liquid Limit not greater than 25 and a Plasticity Index not greater than 5.

2.1.2 Select-Material Course

Provide materials consisting of selected soil or other materials from field excavation, stockpiles, or other sources and free from lumps and balls of clay and from organic and other objectionable matter. Provide materials with not more than 25 percent by weight passing the No. 200 sieve. Limit the portion of material passing the No. 40 sieve to a Liquid Limit less than 35 and a Plasticity Index less than 12. Provide materials having a maximum particle size not exceeding 3 inches. Limit particles having diameters less than 0.02 mm to a maximum of 3 percent by weight of the total sample tested as determined in accordance with ASTM D7928.

2.1.3 Rigid Pavement Base Course

Provide aggregates consisting of crushed stone or slag, gravel, shell, sand, or other sound, durable, approved materials processed and blended or naturally combined. Provide aggregates which are durable and sound, free from lumps and balls of clay, organic matter, objectionable coatings, and other foreign material. Limit the percentage of loss to a maximum of 50 percent after 500 revolutions when tested in accordance with ASTM C131/C131M. Provide aggregates with at least 75 percent by weight retained on each sieve having one freshly fractured face with the area at least equal to 75 percent of the smallest midsectional area of the piece. Provide aggregate that is reasonably uniform in density and quality. Provide slag that is an air-cooled, blast-furnace product having a dry weight of not less than 70 pcf. Provide aggregates having a maximum size of 2 inches, a minimum of 70 percent passing the 3/4 inch sieve, and within the limits specified as follows:

TABLE 3	
Maximum Allowable Percentage by Weight Passing Square-Mesh Sieve	
Sieve Designation	Rigid Pavement Base Course
No. 10	85
No. 200	15

Limit particles having diameters less than 0.02 mm to a maximum of 3 percent by weight of the total sample tested as determined in accordance with ASTM D7928. Limit the portion of any blended component and of the completed course passing the No. 40 sieve to be either nonplastic or have a liquid limit not greater than 25 and a plasticity index not greater than 6. Provide any additional stability required to maintain a working platform for construction equipment. If a test section can demonstrate that a material has adequate stability to support construction equipment,

the fractured face requirement can be deleted, subject to approval by the Government.

2.2 TESTS, INSPECTIONS, AND VERIFICATIONS

2.2.1 Initial Tests

Perform one of each of the following Initial Tests on the proposed material prior to commencing construction to demonstrate that the proposed material meets all specified requirements prior to installation. Complete this testing for each source if materials from more than one source are proposed.

a. Gradation including 0.02 mm size material.

b. Liquid limit and plasticity index.

c. Moisture-density relationship.

d. Wear.

e. Weight per cubic foot of Slag
f.

Submit certified copies of test results for approval not less than 30 days before material is required for the work.

2.2.2 Approval of Material

Tentative approval of material will be based on initial test results.

2.3 EQUIPMENT, TOOLS, AND MACHINES

All plant, equipment, and tools used in the performance of the work are subject to approval by the Government before the work is started. Maintain all plant, equipment, and tools in satisfactory working condition at all times. Submit a list of proposed equipment, including descriptive data. Use equipment capable of minimizing segregation, producing the required compaction, meeting grade controls, thickness control, and smoothness requirements as set forth herein.

PART 3 EXECUTION

3.1 GENERAL REQUIREMENTS

Provide adequate drainage during the entire period of construction to prevent water from collecting or standing on the working area.

3.2 OPERATION OF AGGREGATE SOURCES

Condition aggregate sources on private lands in accordance with local laws and authorities. Clear, strip and excavate as required. Condition aggregate sources on Government property to readily drain and leave in a satisfactory condition upon completion of the work.

3.3 STOCKPILING MATERIAL

Clear and level storage sites prior to stockpiling of material. Stockpile all materials, including approved material available from excavation and

grading, in the manner and at the locations designated. Stockpile aggregates on the cleared and leveled areas designated to prevent segregation. Stockpile materials obtained from different sources separately.

3.4 PREPARATION OF UNDERLYING COURSE OR SUBGRADE

Clean the underlying course or subgrade of all foreign substances prior to constructing the subbase course. Do not construct subbase course on underlying course or subgrade that is frozen. Construct the surface of the underlying course or subgrade to meet specified compaction and surface tolerances. Correct ruts or soft yielding spots in the underlying courses, areas having inadequate compaction, and deviations of the surface from the specified requirements set forth herein by loosening and removing soft or unsatisfactory material and adding approved material, reshaping to line and grade, and recompacting to specified density requirements. For cohesionless underlying courses or subgrades containing sands or gravels, as defined in ASTM D2487, stabilize the surface prior to placement of the overlying course. Stabilize by mixing the overlying course material into the underlying course and compacting by approved methods. Consider the stabilized material as part of the underlying course and meet all requirements of the underlying course. Do not allow traffic or other operations to disturb the finished underlying course and maintain in a satisfactory condition until the overlying course is placed.

3.5 GRADE CONTROL

Provide a finished and completed subbase select-material courses conforming to the lines, grades, and cross sections shown. Place line and grade stakes as necessary for control.

3.6 MIXING AND PLACING MATERIALS

Mix and place the materials to obtain uniformity of the material at the water content specified. Make such adjustments in mixing or placing procedures or in equipment as directed to obtain the true grades, to minimize segregation and degradation, to reduce or accelerate loss or increase of water, and to provide a satisfactory course.

3.7 LAYER THICKNESS

Compact the completed course to the thickness indicated. Limit individual compacted lifts to a maximum thickness of 6 inches and a minimum thickness of 3 inches. Compact the course(s) to a total thickness that is within the tolerances of paragraph ACCEPTANCE. Where the measured thickness is more than 1/2 inch deficient, correct such areas by scarifying, adding new material of proper gradation, reblading, and recompacting as directed. Where the measured thickness is more than 1/2 inch thicker than indicated, the course will be considered as conforming to the specified thickness requirements. However, the requirements for the overlying course thickness and plan grade are still applicable. The average job thickness will be the average of all thickness measurements taken for the job and within the tolerances of paragraph ACCEPTANCE.

3.8 COMPACTION

Compact each lift of the material, as specified, with approved compaction equipment. For cohesive soils, maintain water content during the compaction procedure to within plus or minus 2 percent of optimum water

content determined from laboratory tests as specified in this Section and for cohesionless soils, maintain a water content to facilitate compaction without bulking. Begin rolling at the outside edge of the surface and proceed to the center, overlapping on successive trips at least one-half the width of the roller. Slightly vary the length of alternate trips of the roller. Adjust speed of the roller as needed so that displacement of the aggregate does not occur. Compact mixture with hand-operated power tampers in all places not accessible to the rollers. Continue compaction of the subbase until each lift is compacted through the full depth to meet the compaction requirements of Table 1. Make such adjustments in compacting or finishing procedures to obtain true grades, to minimize segregation and degradation, to reduce or increase water content, and to ensure a compliant subbase course. Remove any materials that are found to be non-compliant and replace with compliant material or rework, as directed, to meet the requirements of this specification.

3.9 PROOF ROLLING

In addition to the compaction specified, proof roll subbase course in areas designated on the drawings by application of coverages of a heavy pneumatic-tired roller having four or more tires abreast, each tire loaded to a minimum of 30,000 pounds and inflated to a minimum of 125 psi. A coverage is defined as the application of one tire print over the designated area. In the areas designated, apply proof rolling to the top lift of the completed subbase course. Maintain water content of the top lift of the subbase course as specified in paragraph COMPACTION from start of compaction to completion of proof rolling. Remove any subbase course materials that produce permanent deformation exceeding 1/2 inch and replace with satisfactory materials. Then recompact and proof roll to meet specifications.

3.10 EDGES OF SUBBASE AND SELECT-MATERIAL

Place approved material along the outer edges of the subbase and select-material course in sufficient quantity to compact to the thickness of the course being constructed. When the course is being constructed in two or more lifts, simultaneously roll and compact at least a 2 foot width of this shoulder material with the rolling and compacting of each lift of the subbase and select-material course, as directed.

3.11 FINISHING

Finish the surface of the top lift of rigid pavement base course after final compaction and proof rolling by cutting any overbuild to grade and rolling with a steel-wheeled roller. Do not add thin lifts of material to the top lift of rigid pavement base course to meet grade. If the elevation of the top lift of rigid pavement base course exceeds the tolerances of paragraph ACCEPTANCE, scarify the top lift to a depth of at least 3 inches and blend new material in and compact to bring to grade. Make adjustments to rolling and finishing procedures to minimize segregation and degradation, obtain grades, maintain moisture content, and insure an acceptable rigid pavement base course. If the surface becomes rough, corrugated, uneven in texture, or traffic marked prior to completion, scarify the non-compliant portion and rework and recompact it or replace as directed.

3.12 SMOOTHNESS TEST

Construct the top lift so that the surface shows no deviations exceeding

the tolerances of paragraph ACCEPTANCE when tested with a 12 foot straightedge. Test the entire area in both a longitudinal and a transverse direction on parallel lines. Perform the transverse lines 15 feet or less apart, as directed. Perform the longitudinal lines at the centerline of each placement lane and at the 1/8th point in from each side of the lane. Hold the straightedge in contact with the surface and move ahead one-half the length of the straightedge for each successive measurement. Determine the amount of surface irregularity by placing the freestanding (unleveled) straightedge on the surface and measuring the maximum gap between the straightedge and the surface. Determine measurements along the entire length of the straight edge. Correct deviations exceeding the tolerances of Table 1 by removing material and replacing with new material, or by reworking existing material and compacting it to meet these specifications.

3.13 FIELD QUALITY CONTROL

3.13.1 In-Place Tests

Perform one of each of the following In-Place Tests on samples taken from the placed and compacted subbase and select-material course. Determine sample locations using random sampling in accordance with ASTM D3665. Take samples and test at the rates indicated.

a. Perform density tests on every lift of material placed and at a frequency of one set of tests for every 500 square yards, or portion thereof, of completed area.

b. Perform gradation including 0.02 mm size material on every lift of material placed and at a frequency of one gradation for every 1,000 square yards, or portion thereof, of material placed.

c. Perform liquid limit and plasticity index tests at the same frequency as the gradation.

d. Measure the thickness of each course at intervals providing at least one measurement for each 500 square yards or part thereof. Measure the thickness using test holes, at least 3 inches in diameter through the course.

3.13.2 Approval of Material

Final approval of the materials will be based on tests for gradation, liquid limit, and plasticity index performed on samples taken from the completed and fully compacted course(s).

3.14 TRAFFIC

Completed portions of the rigid pavement base course can be opened to limited traffic, provided there is no marring or distorting of the surface by the traffic. Do not allow heavy equipment on the completed rigid pavement base course except when necessary for construction. When it is necessary for heavy equipment to travel on the completed rigid pavement base course, protect the area against marring or damage to the completed work. Repair damage to meet these specifications.

3.15 MAINTENANCE

Maintain the completed course in a satisfactory condition until the full

pavement section is completed and accepted. Immediately repair any defects and repeat repairs as often as necessary to keep the area intact. Retest any course that was not paved over prior to the onset of winter to verify that it still complies with the requirements of this specification. Rework or replace any area that is damaged as necessary to comply with this specification.

3.16 DISPOSAL OF UNSATISFACTORY MATERIALS

Dispose of any unsuitable materials that have been removed outside the limits of Government-controlled land as directed in waste disposal areas indicated. No additional payments will be made for materials that have to be replaced.

-- End of Section --

SECTION 32 11 23

AGGREGATE BASE COURSE AND/ORGRADED CRUSHED AGGREGATE BASE COURSE FOR FLEXIBLE PAVING
05/22

PART 1 GENERAL

1.1 UNIT PRICES

1.1.1 Measurement

1.1.1.1 Area

Measure the quantity of 12 inch thick ABC and GCA completed and accepted, in square yards.

1.1.1.2 Volume

Measure the quantity of ABC and GCA completed and accepted, in cubic yards. Determine the volume of material in-place and accepted by the average job thickness obtained in accordance with paragraph LAYER THICKNESS and the dimensions shown on the drawings.

1.1.2 Payment

1.1.2.1 Base Course Material

Quantities of ABC and GCA, determined as specified above, will be paid for at the respective contract unit prices, which will constitute full compensation for the construction and completion of the ABC and GCA.

1.1.2.2 Stabilization

Cohesionless subgrade or subbase courses to be stabilized, as specified in paragraph PREPARATION OF UNDERLYING COURSE OR SUBGRADE, will be paid for as a special item on a tonnage basis including extra manipulation as required.

1.1.3 Waybills and Delivery Tickets

Submit copies of waybills and delivery tickets during progress of the work. Before the final payment is allowed, file certified waybills and certified delivery tickets for all aggregates actually used.

1.2 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.

ASTM INTERNATIONAL (ASTM)

ASTM C29/C29M	(2023) Standard Test Method for Bulk Density ("Unit Weight") and Voids in Aggregate
ASTM C88	(2018) Standard Test Method for Soundness

	of Aggregates by Use of Sodium Sulfate or Magnesium Sulfate
ASTM C117	(2023) Standard Test Method for Materials Finer than 75-um (No. 200) Sieve in Mineral Aggregates by Washing
ASTM C127	(2025) Standard Test Method for Density, Relative Density (Specific Gravity), and Absorption of Coarse Aggregate
ASTM C128	(2025) Standard Test Method for Density, Relative Density (Specific Gravity), and Absorption of Fine Aggregate
ASTM C131/C131M	(2020) Standard Test Method for Resistance to Degradation of Small-Size Coarse Aggregate by Abrasion and Impact in the Los Angeles Machine
ASTM C136/C136M	(2025) Standard Test Method for Sieve Analysis of Fine and Coarse Aggregates
ASTM C1252	(2017) Standard Test Methods for Uncompacted Void Content of Fine Aggregate (as Influenced by Particle Shape, Surface Texture, and Grading)
ASTM D75/D75M	(2019) Standard Practice for Sampling Aggregates
ASTM D1556/D1556M	(2015; E 2016) Standard Test Method for Density and Unit Weight of Soil in Place by Sand-Cone Method
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 D2487	(2017; R 2025) Standard Practice for Classification of Soils for Engineering Purposes (Unified Soil Classification System)
ASTM D3665	(2012; R 2017) Standard Practice for Random Sampling of Construction Materials
ASTM D4318	(2017; E 2018) Standard Test Methods for Liquid Limit, Plastic Limit, and Plasticity Index of Soils
ASTM D4718/D4718M	(2015) Standard Practice for Correction of Unit Weight and Water Content for Soils Containing Oversize Particles
ASTM D4791	(2019) Flat Particles, Elongated Particles, or Flat and Elongated Particles in Coarse Aggregate

ASTM D5821	(2013; R 2017) Standard Test Method for Determining the Percentage of Fractured Particles in Coarse Aggregate
ASTM D6938	(2017a) Standard Test Method for In-Place Density and Water Content of Soil and Soil-Aggregate by Nuclear Methods (Shallow Depth)
ASTM D7928	(2017) Standard Test Method for Particle-Size Distribution (Gradation) of Fine-Grained Soils Using the Sedimentation (Hydrometer) Analysis
ASTM E11	(2024) Standard Specification for Woven Wire Test Sieve Cloth and Test Sieves

1.3 DEFINITIONS

For the purposes of this specification, the following definitions apply.

1.3.1 Aggregate Base Course

Aggregate base course (ABC) is well graded, durable aggregate uniformly moistened and mechanically stabilized by compaction.

1.3.2 Graded-Crushed Aggregate Base Course

Graded-crushed aggregate (GCA) base course is well graded, crushed, durable aggregate uniformly moistened and mechanically stabilized by compaction.

1.3.3 Degree of Compaction

Degree of compaction required, except as noted in the second sentence, is expressed as a percentage of the maximum laboratory dry density obtained by the test procedure presented in ASTM D1557 abbreviated as a percent of laboratory maximum dry density. Since ASTM D1557 applies only to soils that have 30 percent or less by weight of their particles retained on the 3/4 inch sieve, express the degree of compaction for material having more than 30 percent by weight of their particles retained on the 3/4 inch sieve as a percentage of the laboratory maximum dry density in accordance with ASTM D1557 Method C and corrected with ASTM D4718/D4718M.

1.4 SUBMITTALS

Government approval is required for submittals with a "G" or "S" classification. Submittals not having a "G" or "S" classification are for Contractor Quality Control approval. Submittals not having a "G" or "S" classification are for information only. When used, a code following the "G" classification identifies the office that will review the submittal for the Government. Submit the following in accordance with Section 01 33 00 SUBMITTAL PROCEDURES:

SD-03 Product Data

Plant, Equipment, and Tools; G,

Waybills and Delivery Tickets

SD-06 Test Reports

Initial Tests; G,

In-Place Tests; G,

Test Section Report; G,

1.5 QUALITY ASSURANCE

Perform sampling and testing using a laboratory approved in accordance with Section 01 45 00 QUALITY CONTROL. Do not start work requiring testing until the testing laboratory has been inspected and approved. All contractor quality control testing laboratories performing acceptance testing require USACE validation by the Material Testing Center (MTC) for both parent laboratory and on-site laboratory. Validation on all laboratories is required to remain current throughout the duration of the paving project. Contact the MTC manager listed at https://mtc.erdc.dren.mil/requestvalidation.aspx# for costs and scheduling. Test the materials to establish compliance with the specified requirements and perform testing at the specified frequency. Furnish copies of test results within 24 hours of completion of the tests.

1.5.1 Sampling

Take samples for laboratory testing in conformance with ASTM D75/D75M.

1.5.2 Tests

1.5.2.1 Gradation Analysis

Perform gradation analysis in conformance with ASTM C117 and ASTM C136/C136M using sieves conforming to ASTM E11.Perform particle-size analysis of the soils in conformance with ASTM D7928.

1.5.2.2 Liquid Limit and Plasticity Index

Determine liquid limit and plasticity index in accordance with ASTM D4318.

1.5.2.3 Moisture-Density Determinations

Determine the laboratory maximum dry density and optimum moisture content in accordance with paragraph DEGREE OF COMPACTION.

1.5.2.4 Field Density Tests

Measure field density in accordance with ASTM D1556/D1556M, or ASTM D6938. For the method presented in ASTM D1556/D1556M use the base plate as shown in the drawing. For the method presented in ASTM D6938 check the calibration curves and adjust them, if necessary, using only the sand cone method as described in Annex A2 of ASTM D6938. Use ASTM D6938 to determine the moisture content of the soil. Check the calibration curves furnished with the moisture gauges along with density calibration checks as described in ASTM D6938. Make the calibration checks of both the density and moisture gauges using the prepared containers of material method, as described in Annex A2 of ASTM D6938, on each different type of material being tested at the beginning of a job and at intervals as directed.

Submit calibration curves and related test results prior to using the device or equipment being calibrated.

1.5.2.5 Wear Test

Perform wear tests on ABC and GCA course material in conformance with ASTM C131/C131M.

1.5.2.6 Flat and Elongated Pieces

Determine flat and elongated pieces on ABC and GCA course material in conformance with ASTM D4791, Method A.

1.5.2.7 Soundness

Perform soundness tests on GCA in accordance with ASTM C88.

1.5.2.8 Fractured Faces

Perform fractured faces test on ABC GCA coarse aggregate in comformance with ASTM D5821. Determine uncompacted void content of the GCA fine aggregate in accordance with ASTM C1252, Method A.

1.5.2.9 Weight of Slag

Determine weight per cubic foot of slag in accordance with ASTM C29/C29M on the ABC and GCA course material.

1.6 ENVIRONMENTAL REQUIREMENTS

Perform construction when the atmospheric temperature is above 35 degrees F. When the temperature falls below 35 degrees F, protect all completed areas by approved methods against detrimental effects of freezing. Correct completed areas damaged by freezing, rainfall, or other weather conditions to meet specified requirements.

1.7 ACCEPTANCE

1.7.1 Tolerances

Acceptance of ABC GCA is based on compliance with the tolerances presented in Table 1. Remove any materials found to be non-compliant and replace with compliant material or rework, as directed, to meet the requirements of this specification

TABLE 1

Measurement	Tolerance
Grade	Plus 1/4 inch, Minus 1/2 inch
Smoothness	Plus/Minus 3/8 inch
Individual Test Total Thickness	Plus/Minus 1/2 inch
Average Job Thickness	Plus/Minus 1/4 inch

TABLE 1	
Compaction	Minimum 100 percent

1.7.2 Test Section

Construct a test section consisting of 1000 square yards to demonstrate the materials, equipment, and construction processes meet the requirements of this specification. Acceptance of the test section is based on compliance with the tolerances listed in Table 1. Rework, re-compact, or remove and replace test sections that do not meet specification requirements. Do not commence full operations until a test section report has been approved. Use the same equipment, materials, and construction methods for the remainder of construction, unless adjustments are approved in advance. A test section is not required.

PART 2 PRODUCTS

2.1 AGGREGATES

Provide ABC and GCA consisting of clean, sound, durable particles of crushed stone, crushed gravel, angular sand, or other approved material. Provide ABC that is free of lumps of clay, organic matter, and other objectionable materials or coatings. Provide GCA that is free of silt and clay as defined by ASTM D2487, organic matter, and other objectionable materials or coatings. The portion retained on the No. 4 sieve is known as coarse aggregate; that portion passing the No. 4 sieve is known as fine aggregate. When the coarse and fine aggregate is supplied from more than one source, provide aggregate from each source that meets the specified requirements.

2.1.1 Coarse Aggregate

Provide coarse aggregates with angular particles of uniform density. Separately stockpile coarse aggregate supplied from more than one source.

a. Crushed Gravel: Provide crushed gravel that has been manufactured by crushing gravels and that meets all the requirements specified below.

b. Crushed Stone: Provide crushed stone consisting of freshly mined quarry rock, meeting all the requirements specified below.

c. Crushed Recycled Concrete: Provide crushed recycled concrete (RCA) consisting of previously hardened portland cement concrete or other concrete containing pozzolanic binder material. Provide RCA of a consistent gradation and properties obtained from on-base stockpiles or concrete pavement demolished under this contract. Provide recycled concrete that is free of all reinforcing steel, bituminous concrete surfacing, and any other foreign material and that has been crushed and processed to meet the required gradations for coarse aggregate. Reject recycled concrete aggregate exceeding this value. Provide crushed recycled concrete that meets all other applicable requirements specified below.

d. d. Crushed Slag: Provide crushed slag that is an air-cooled blast-furnace product having a minimum air dry unit weight of 70 pcf as determined by ASTM C29/C29M, and meets all the requirements specified below.

2.1.1.1 Aggregate Base Course

Limit the percentage of loss of ABC coarse aggregate to a maximum of 50 percent when tested in accordance with ASTM C131/C131M. Provide aggregate that contains a maximum of 30 percent flat and elongated particles when tested in accordance with ASTM D4791, Method A. A flat particle is one having a ratio of width to thickness greater than 3; an elongated particle is one having a ratio of length to width greater than 3. In the portion retained on each sieve specified, provide crushed aggregates containing a minimum of 50 percent by weight of crushed pieces having two or more freshly fractured faces determined in accordance with ASTM D5821. When two fractures are contiguous, the angle between planes of the fractures is required to be a minimum of 30 degrees in order to count as two fractured faces. Manufacture crushed gravel from gravel particles 50 percent of which, by weight, are retained on the maximum size sieve listed in TABLE 2.

2.1.1.2 Graded-Crushed Aggregate Base Course

Limit the percentage of loss of GCA coarse aggregate to a maximum of 40 percent when tested in accordance with ASTM C131/C131M. Provide GCA coarse aggregate that does not exhibit a loss greater than 18 percent weighted average, at five cycles, when tested for soundness in magnesium sulfate, or 12 percent weighted average, at five cycles, when tested in sodium sulfate in accordance with ASTM C88. Soundness tests are not required for RCA sources. Provide aggregate that contains a maximum of 20 percent flat and elongated particles for the fraction retained on the 1/2 inch sieve nor 20 percent for the fraction passing the 1/2 inch sieve when tested in accordance with ASTM D4791, Method A. A flat particle is one having a ratio of width to thickness greater than 3; an elongated particle is one having a ratio of length to width greater than 3. In the portion retained on each sieve specified, provide crushed aggregate containing a minimum of 90 percent by weight of crushed pieces having two or more freshly fractured faces determined in accordance with ASTM D5821. When two fractures are contiguous, the angle between planes of the fractures is required to be a minimum of 30 degrees in order to count as two fractured faces. Manufacture crushed gravel from gravel particles 90 percent of which by weight are retained on the maximum size sieve listed in TABLE 2.

2.1.2 Fine Aggregate

Provide fine aggregates consisting of angular particles of uniform density.

2.1.2.1 Aggregate Base Course

Provide ABC fine aggregate that consists of screenings, angular sand, crushed recycled concrete fines, or other finely divided mineral matter processed or naturally combined with the coarse aggregate.

2.1.2.2 Graded-Crushed Aggregate Base Course

Provide GCA fine aggregate consisting of angular particles produced by crushing stone, slag, or gravel that meets the requirements for wear and soundness specified for GCA coarse aggregate. Provide fine aggregate that contains a minimum of 45 percent by weight of uncompacted voids when tested in accordance with ASTM C1252, Method A.

2.1.3 Gradation Requirements

Apply the specified gradation requirements to the completed base course. Provide aggregates that are continuously well graded within the limits specified in TABLE 2. Use sieves that conform to ASTM E11.

TABLE 2. GRADATION OF AGGREGATES			
Percentage By Weight Passsing Square-Mesh Sieve			
Sieve Designation	No. 1	No. 2	No.3
2 inch	100	---	---
1-1/2 inch	70-100	100	---
1 inch	45-80	60-100	100
1/2 inch	30-60	30-65	40-70
No. 4	20-50	20-50	20-50
No. 10	15-40	15-40	15-40
No. 40	5-25	5-25	5-25
No. 200	0-8	0-8	0-8

NOTE 1: Limit particles having diameters less than 0.02 mm to a maximum of 3 percent by weight of the total sample tested as determined in accordance with ASTM D7928.

NOTE 2: The values are based on aggregates of uniform specific gravity. If materials from different sources are used for the coarse and fine aggregates, test the materials in accordance with ASTM C127 and ASTM C128 to determine their specific gravities. Correct the percentages passing the various sieves as directed if the specific gravities vary by more than 10 percent.

NOTE 3: Gradations containing more than 30 percent retained on the ¾ inch sieve can produce inconsistent compacted density values when tested in accordance with paragraph DEGREE OF COMPACTION.

2.2 LIQUID LIMIT AND PLASTICITY INDEX

Apply liquid limit and plasticity index requirements to the completed course and to any component that is blended to meet the required gradation. Limit the portion of any component or of the completed course passing the No. 40 sieve to be either nonplastic or have a maximum liquid limit of 25 and a maximum plasticity index of 5.

2.3 TESTS, INSPECTIONS, AND VERIFICATIONS

2.3.1 Initial Tests

Perform one of each of the following initial tests on the proposed material prior to commencing construction to demonstrate that the proposed material meets all specified requirements when furnished. Complete this testing for each source if materials from more than one source are proposed. Submit certified copies of test results for approval a mimimum of 30 days before material is required for the work.

a. Gradation Analysis including 0.02 mm material.

b. Liquid limit and plasticity index.

c. Moisture-density relationship.

d. Wear.

e. Flat and Elongated Pieces.

f. Soundness.

g. Fractured Faces and Uncompacted Voids.

h. Weight per cubic foot of Slag.

i. .

2.3.2 Approval of Material

Tentative approval of material will be based on initial test results.

2.4 EQUIPMENT, TOOLS, AND MACHINES

All plant, equipment, and tools used in the performance of the work are subject to approval by the Government before the work is started. Maintain all plant, equipment, and tools in satisfactory working condition at all times. Submit a list of proposed equipment, including descriptive data. Use equipment capable of minimizing segregation, producing the required compaction, meeting grade controls, thickness control, and smoothness requirements as set forth herein.

PART 3 EXECUTION

3.1 GENERAL REQUIREMENTS

When the ABC or GCA is constructed in more than one lift, clean the previously constructed lift of loose and foreign matter by sweeping with power sweepers or power brooms. Use hand brooms in areas where power cleaning is not practicable. Provide adequate drainage during the entire period of construction to prevent water from collecting or standing on the working area.

3.2 OPERATION OF AGGREGATE SOURCES

Condition aggregate sources on private lands in accordance with local laws or authorities. Clear, strip, and excavate as required. Condition aggregate sources on Government property to readily drain and leave in a

satisfactory condition upon completion of the work.

3.3 STOCKPILING MATERIAL

Clear and level storage sites prior to stockpiling of material. Stockpile all materials, including approved material available from excavation and grading, in the manner and at the locations designated. Stockpile aggregates on the cleared and leveled areas designated to prevent segregation. Stockpile materials obtained from different sources separately.

3.4 PREPARATION OF UNDERLYING COURSE OR SUBGRADE

Clean the underlying course or subgrade of all foreign substances prior to constructing the base course(s). Do not construct base course(s) on underlying course or subgrade that is frozen. Construct the surface of the underlying course or subgrade to meet specified compaction and surface tolerances. Correct ruts or soft yielding spots in the underlying courses, areas having inadequate compaction, and deviations of the surface from the specified requirements set forth herein by loosening and removing soft or unsatisfactory material and adding approved material, reshaping to line and grade, and recompacting to specified density requirements. For cohesionless underlying courses or subgrades containing sands or gravels, as defined in ASTM D2487, stabilize the surface prior to placement of the base course(s). Stabilize by mixing ABC or GCA into the underlying course and compacting by approved methods. Proof roll in accordance with paragraph PROOF ROLLING. Consider the stabilized material as part of the underlying course and meet all requirements of the underlying course. Do not allow traffic or other operations to disturb the finished underlying course and maintain in a compliant condition until the base course is placed.

3.5 GRADE CONTROL

Provide a finished and completed base course conforming to the lines, grades, and cross sections shown. Place line and grade stakes as necessary for control.

3.6 MIXING AND PLACING MATERIALS

3.6.1 Mixing

Mix the coarse and fine aggregates in a stationary plant, or in a traveling plant. Make adjustments in mixing procedures or in equipment to obtain true grades, to minimize segregation or degradation, to obtain the required water content, and to produce a satisfactory base course meeting all requirements of this specification.

3.6.2 Placing

Place the mixed material on the prepared subgrade or subbase in lifts of uniform thickness with an approved spreader. Place the lifts so that when compacted they are true to the grades or levels required with the least possible surface disturbance. Where the base course is placed in more than one lift, clean the previously constructed lift of loose and foreign matter by sweeping with power sweepers, power brooms, or hand brooms. Make adjustments in placing procedures or equipment to obtain true grades, to minimize segregation and degradation, to adjust the water content, and to produce an acceptable base course.

3.7 LAYER THICKNESS

Compact the completed base course to the thickness indicated. Limit individual compacted lifts to a maximum thickness of 6 inches and a minimum thickness of 3 inches. Compact the base course(s) to a total thickness that is within the tolerances of paragraph ACCEPTANCE of the thickness indicated. Where the measured thickness is more than 1/2 inch deficient, correct such areas by scarifying, adding new material of proper gradation, reblading, and recompacting as directed. Where the measured thickness is more than 1/2 inch thicker than indicated, the course will be considered as conforming to the specified thickness requirements. However, the requirements for wearing course thickness and plan grade are still applicable. The average job thickness will be the average of all thickness measurements taken for the job and within the tolerances of paragraph ACCEPTANCE of the thickness indicated.

3.8 COMPACTION

Compact each lift of the base course, as specified, with approved compaction equipment. For cohesive soils, maintain water content during the compaction procedure to within plus or minus 2 percent of the optimum water content determined from laboratory tests as specified and for cohesionless soils, maintain the water content to facilitate compaction without bulking. Begin rolling at the outside edge of the surface and proceed to the center, overlapping on successive trips at least one-half the width of the roller. Slightly vary the length of alternate trips of the roller. Adjust speed of the roller as needed so that displacement of the aggregate does not occur. Compact mixture with hand-operated power tampers in all places not accessible to the rollers. Continue compaction until each lift is compacted through the full depth to meet the compaction requirements of Table 1. Make such adjustments in compacting or finishing procedures to obtain true grades, to minimize segregation and degradation, to reduce or increase water content, and to produce a compliant base course. Remove any materials found to be non-compliant and replace with compliant material or rework, as directed, to meet the requirements of this specification.

3.9 PROOF ROLLING

In addition to the compaction specified, proof roll areas designated on the drawings by application of coverages of a heavy pneumatic-tired roller having four or more tires abreast, each tire loaded to a minimum of 30,000 pounds and inflated to a minimum of 125 psi. A coverage is defined as the application of one tire print over the designated area. In the areas designated, apply proof rolling to the top of the underlying material on which the base course is laid and to the top of each lift of the completed base course. Maintain water content of the underlying material and each lift of the base course as specified in Paragraph COMPACTION from start of compaction to completion of proof rolling of that lift. Remove any base course materials or any underlying materials that produce permanent deformation exceeding 3/8 inch by proof rolling and replace with satisfactory materials. Then recompact and proof roll to meet these specifications.

3.10 EDGES OF BASE COURSE

Place the base course(s) so that the completed section is a minimum of 2 feet wider, on all sides, than the next lift that will be placed above it.

Place approved material along the outer edges of the base course in sufficient quantity to compact to the thickness of the course being constructed. When the course is being constructed in two or more lifts, simultaneously roll and compact at least a 2 foot width of this shoulder material with the rolling and compacting of each lift of the base course.

3.11 FINISHING

Finish the surface of the top lift of base course after final compaction and proof rolling by cutting any overbuild to grade and rolling with a steel-wheeled roller. Do not add thin lifts of material to the top lift of base course to meet grade. If the elevation of the top lift of base course exceeds the tolerances of paragraph ACCEPTANCE, scarify the top lift to a depth of at least 3 inches and blend new material in and compact and proof roll to bring to grade. Make adjustments to rolling and finishing procedures to minimize segregation and degradation, obtain grades, maintain moisture content, and produce an acceptable base course. If the surface become rough, corrugated, uneven in texture, or traffic marked prior to completion, scarify the non-compliant portion and rework and recompact it or replace as directed.

3.12 SMOOTHNESS TEST

Construct the top lift so that the surface shows no deviations exceeding the tolerances of paragraph ACCEPTANCE when tested with a 12 foot straightedge. Test the entire area in both a longitudinal and a transverse direction on parallel lines. Perform the transverse lines at a maximum spacing of 15 feet or less apart, as directed. Perform the longitudinal lines at the centerline of each placement lane, regardless of whether multiple lanes are allowed to be paved at the same time, and at the 1/8th point in from each side of the lane. Hold the straightedge in contact with the surface and moved ahead one-half the length of the straightedge for each successive measurement. Determine the amount of surface irregularity by placing the freestanding (unleveled) straightedge on the pavement surface and measuring the maximum gap between the straightedge and the pavement surface. Determine measurements along the entire length of the straight edge. Correct deviations exceeding this amount by removing material and replacing with new material, or by reworking existing material and compacting it to meet these specifications.

3.13 FIELD QUALITY CONTROL

3.13.1 In-Place Tests

Perform each of the following in-place tests on samples taken from the placed and compacted ABC and GCA. Determine sample locations using random sampling in accordance with ASTM D3665. Take samples and test at the rates indicated. Perform sampling and testing of recycled concrete aggregate at twice the specified frequency until the material uniformity is established.

a. Perform density tests on every lift of material placed and at a frequency of one set of tests for every 250 square yards, or portion thereof, of completed area. Gradations containing more than 30 percent retained on the ¾ inch sieve can produce inconsistent compacted density values when tested in accordance with paragraph DEGREE OF COMPACTION.

b. Perform gradation analysis including 0.02 mm size material on every lift of material placed and at a frequency of one sieve analysis for

every 500 square yards, or portion thereof, of material placed.

c. Perform liquid limit and plasticity index tests at the same frequency as the sieve analysis.

d. Measure the thickness of the base course at intervals providing at least one measurement for each 500 square yards of base course or part thereof. Measure the thickness using test holes, at least 3 inch in diameter through the base course.

3.13.2 Approval of Material

Final approval of the materials will be based on tests for gradation, liquid limit, and plasticity index performed on samples taken from the completed and fully compacted course(s).

3.14 TRAFFIC

Completed portions of the base course can be opened to limited traffic, provided there is no marring or distorting of the surface by the traffic. Do not allow heavy equipment on the completed base course except when necessary for construction. When it is necessary for heavy equipment to travel on the completed base course, protect the area against marring or damage to the completed work. Repair damage to meet these specifications.

3.15 MAINTENANCE

Maintain the base course in a satisfactory condition until the full pavement section is completed and accepted. Immediately repair any defects and repeat repairs as often as necessary to keep the area intact. Retest any base course that was not paved over prior to the onset of winter to verify that it still complies with the requirements of this specification. Rework or replace any area of base course that is damaged as necessary to comply with this specification.

3.16 DISPOSAL OF UNSATISFACTORY MATERIALS

Dispose of any unsuitable materials that have been removed outside the limits of Government-controlled land as directed in waste disposal areas indicated. No additional payments will be made for materials that have to be replaced.

-- End of Section --

SECTION 32 12 13

BITUMINOUS TACK AND PRIME COATS
05/24

PART 1 GENERAL

1.1 UNIT PRICES

1.1.1 Measurement

Payment for the bituminous material is to be paid from measured quantities of residual bituminous material used in the accepted work, provided that the measured quantities are not 10 percent over the specified quantities. Accepted work and measured quantities will be determined by the Government. Deductions from the measured quantities are applicable for any amount of bituminous material more than 10 percent over the specified quantity. For bituminous materials, express measured quantities in 2000 pound tons gallons at 60 degrees F. Correct volumes measured at temperatures other than 60 degrees F in accordance with ASTM D1250 using a coefficient of expansion of 0.00025 per degree F for asphalt emulsion. Dilution water added to emulsified asphalt will not be measured for payment.

1.1.2 Payment

The quantities of bituminous material, determined as specified above, will be paid for at the respective contract unit prices. Payment will constitute full compensation for all operations necessary to complete the work as specified herein.

1.1.3 Waybills and Delivery Tickets

Submit waybills and delivery tickets, during progress of the work. Before the final payment is allowed, file with the Contracting Officer certified waybills and certified delivery tickets for all bituminous materials used in the construction of the pavement covered by the Contract.

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.

ASTM INTERNATIONAL (ASTM)

ASTM D8	(2022a) Standard Terminology Relating to Materials for Roads and Pavements
ASTM D88/D88M	(2007; R 2009; E 2019) Standard Test Method for Saybolt Viscosity
ASTM D140/D140M	(2016) Standard Practice for Sampling Asphalt Materials
ASTM D946/D946M	(2020) Standard Specification for Penetration-Graded Asphalt Cement for Use in Pavement Construction

ASTM D977	(2020) Standard Specification for Emulsified Asphalt
ASTM D1250	(2025) Standard Guide for Use of the Joint API and ASTM Adjunct for Temperature and Pressure Volume Correction Factors for Generalized Crude Oils, Refined Products, and Lubricating Oils: API MPMS Chapter 11.1
ASTM D2027/D2027M	(2019) Cutback Asphalt (Medium-Curing Type)
ASTM D2028/D2028M	(2015; R 2021) Cutback Asphalt (Rapid-Curing Type)
ASTM D2170/D2170M	(2018) Standard Test Method for Kinematic Viscosity of Asphalts (Bitumens)
ASTM D2397/D2397M	(2025) Standard Specification for Cationic Emulsified Asphalt
ASTM D2995	(2023) Determining Application Rate of Bituminous Distributors
ASTM D6373	(2023) Standard Specification for Performance Graded Asphalt Binder

1.3 DEFINITIONS

See ASTM D8 for more definitions relating to this specification.

1.3.1 Prime Coat

Application of a low-viscosity asphalt material to an absorptive surface, such as an unbound granular layer, designed to penetrate, bond, temporarily weatherproof, and stabilize this existing surface and to promote adhesion between it and construction course that follows.

1.3.2 Tack Coat

Tack Coat is also referred to as bond coat. Tack coat is an application of bituminous material to an existing relatively nonabsorptive surface, such as existing densely graded asphalt mixture (milled or new), to provide a thorough bond between old and new surfacing.

1.3.3 Emulsion

Emulsion is also known as emulsified asphalt or asphalt emulsion. Mostly made of paving grade asphalt binder and water containing a small amount of emulsifying agent. Emulsifying agent may also be referred to as a surfactant. The purpose of the surfactant is to prevent the coalescence of the asphalt droplets and to keep them suspended independently in the water. Surfactants used in the emulsions can be produced with positive or negative charges resulting in anionic or cationic emulsions.

1.3.4 Diluted Emulsion

An emulsion that has been diluted by adding an additional amount of water

equal to or less than the total volume of emulsion.

1.3.5 Residual Asphalt

The amount of asphalt binder remaining after all water has evaporated from an asphalt emulsion.

1.3.6 Shot Rate

Shot rate, also referred to as bar rate, is the application rate set by the computerized control system in the bituminous distributor for the cutback asphalt, asphalt binder, or the asphalt emulsion. This value is typically represented by units of g/yd^2.

1.3.7 Emulsion Break

Emulsion break, also referred to as break or breaking, is the initiation of asphalt binder droplets coalescing and water separating within the emulsion, at which point color begins to change from brown to black.

1.3.8 Emulsion Set

Emulsion set, also referred to as cure or curing, is the completion of emulsion breaking when water has evaporated, leaving behind a thin film of asphalt binder residue.

1.3.9 Certificate of Analysis (COA)

The COA is the manufacturer’s Certificate of Compliance (COC) including all applicable test results required by the specifications.

1.3.10 Certificate of Compliance (COC)

The manufacturer’s certification stating that materials or assemblies furnished fully comply with the requirements of the contract. Provide signed COC by the manufacturer’s authorized representative. The COC may also be referred to as the Bill of Lading.

1.3.11 Screenings

Screenings are a uniformly sized, fine, sandy material with some silt particles. The term screening is used to designate the finer fraction of crushed stone that accumulates after primary and secondary crushing and separation on a No. 4 sieve. Screenings commonly range in particle size from 1/8 in down to finer than No. 200 sieve. The size distribution, particle shape, and other physical properties can be somewhat different from one quarry location to another, depending on the geological source of the rock quarried, the crushing equipment used, and the method used for coarse aggregate separation. Screenings generally contain freshly fractured faces, have a fairly uniform gradation, and do not usually contain large quantities of plastic fines.

1.4 SUBMITTALS

Government approval is required for submittals with a "G" or "S" classification. Submittals not having a "G" or "S" classification are for Contractor Quality Control approval. Submittals not having a "G" or "S" classification are for information only. When used, a code following the "G" classification identifies the office that will review the submittal

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

SD-01 Preconstruction Submittals

Equipment; G,

Distributor Radar or Distance Measurement Instrument (DMI) Calibration; G,

SD-03 Product Data

Waybills and Delivery Tickets

Prime Coat Certificate Of Analysis (COA); G,

Tack Coat Certificate Of Analysis (COA); G,

SD-06 Test Reports

Sampling and Testing

Application Rate Calibration; G,

Daily Application Rate Verification

SD-07 Certificates

Certificates Of Compliance (COC)

1.5 DELIVERY, STORAGE, AND HANDLING

Inspect the materials delivered to the site for contamination and damage. Unload and store the materials with minimal handling. Do not allow asphalt emulsions to freeze or boil during transport or storage. Asphalt emulsions, if allowed to freeze or boil, may cause the asphalt emulsion to break. Remove this material from site if allowed to freeze or boil.

1.6 ENVIRONMENTAL REQUIREMENTS

Apply bituminous coat only when the surface to receive the bituminous coat is dry. A limited amount of moisture (approximately 0.03 gallon/square yard) can be sprayed on the surface of unbound material when prime coat is used to improve coverage and penetration of asphalt material. Apply bituminous coat only when the atmospheric temperature in the shade is 40 degrees F or above and when the temperature has not been below 35 degrees F for the 12 hours prior to application, unless otherwise directed.

PART 2 PRODUCTS

2.1 EQUIPMENT

Submit equipment, tools and machines used in the work. Maintain the equipment in satisfactory working condition at all times.

2.1.1 Bituminous Distributor

Provide a self propelled pressure distributor with pneumatic tires of such size and number to prevent rutting, shoving or otherwise damaging the

surface being sprayed. Provide a bituminous distributor capable of circulating and agitating the bituminous material during the heating process. The distributor truck is required to have a ground speed control device (radar or contact-wheel: DMI) interconnected with the asphalt pump such that the desired application rate will be supplied at any speed. Include with the distributor equipment a tachometer, pressure gauges, volume-measuring devices, adequate heaters for heating of materials to the proper application temperature, a thermometer for reading the temperature of tank contents, and a hand hose or wand attachment suitable for applying bituminous material manually to areas inaccessible to the distributor. A uniform double or triple overlap is required to be produced by the equipped spray bar. Equip the distributor and spray bar with an instantaneous shutoff. No dripping of material from the spray bar is allowed after shutoff.

Design and equip the distributor to spray the bituminous material in a uniform coverage at the specified temperature, at readily determined and controlled total liquid rates from 0.03 to 1.0 gallon per square yard, with a pressure range of 25 to 75 psi and with an allowable variation from the specified rate of not more than plus or minus 5 percent, and at variable widths.

2.1.1.1 Distributor Radar or Distance Measurement Instrument (DMI) Calibration

The radar or DMI mounted on the distributor truck, which monitors the travel speed and distance traveled, will be calibrated within 6-months of performing the. Provide certification of radar or DMI calibration with date of calibration by an officer of the company that operates the distributor truck stating the radar or DMI has been calibrated per the distributor manufacture's instructions.

2.1.1.2 Sampling Device

Equip the bituminous distributor and transport tanks with a spigot-type sampling device.

2.1.1.3 Temperature Sensing Device

Equip the bituminous distributor and transport tanks with a minimum of 2-inch dial type thermometer with a temperature range of50 degrees F to 500 degrees F, with increments having resolution of 25 degree F or finer. Locate the thermometer near the midpoint of the tank's length and within the middle third of the tank's height, or as specified by the manufacturer. Enclose the thermometer in a well with a protective window or by other means as necessary to keep the instrument clean and in the proper working condition.

2.1.2 Spray Bar Nozzles

On the spray bar, each nozzle is required to be a fan nozzle and be at the same spray angle as all other nozzles except for the outermost left and outermost right nozzle which will be a end nozzle (half-fan) such that the spray stays to the inside of the spray bar, unless otherwise approved by the Government. Orient the nozzles of the spray bar approximately 30-degrees from the axis of the spray bar, unless otherwise directed by the the equipment manufacturer. Provide nozzles on the spray bar that produce the same flow rate, at the same distance above the pavement. Change the nozzles on the spray bar, as appropriate, for the material

being applied and when substantial adjustments are required to the application rate.

2.1.3 Heating Equipment for Storage Tanks

Use steam, electric, or hot oil heaters for heating the bituminous material. Fix an armored thermometer to the tank with a temperature range from50 degrees F to 500 degrees F, with increments having resolution of 25 degree F or finer so that the temperature of the bituminous material may be determined at all times.

2.1.4 Cleaning Equipment

Provide cleaning equipment suitable for removing and cleaning loose material from the pavement surface. If using street sweeper type equipment, equip the street sweeper with a water tank, dust control spray assembly, both a pick-up and gutter broom, and a debris hopper.

2.2 PRIME COAT MATERIAL

Provide the prime coat Certificate of Analysis (COA), including specific gravity, for the product specified below. COA's should be provided at preconstruction, prior to Application Rate Calibration, and any other COA's during production:

2.2.1 Cutback Asphalt

Provide cutback asphalt conforming to ASTM D2027/D2027M, Grade MC-30 MC-70 MC-250 ASTM D2028/D2028M, Grade RC-70 RC-250.

2.2.2 Emulsified Asphalt

Provide emulsified asphalt conforming to ASTM D977, Type SS-1 SS-1h ASTM D2397/D2397M, Type CSS-1 CSS-1hEA-P. Asphalt emulsion can be diluted up to 1 part water to 1 part emulsion for prime coat use. Where prime coats are to be diluted, certify the dilution was done in accordance with the specific dilution requirements for each product and for each load of material used.

2.3 TACK COAT MATERIAL

Provide the tack coat Certificate of Analysis (COA), including specific gravity, for the product specified below. No dilution is allowed for tack coat applications.

2.3.1 Asphalt Binder

Provide asphalt binder conforming to ASTM D946/D946M Penetration Grade , Table 2ASTM D6373 PG , Table 1.

2.3.2 Emulsified Asphalt

Provide emulsified asphalt conforming to ASTM D977, Type MS-1 HFMS-1 SS-1 SS1h ASTM D2397/D2397M, Type CRS-1 CSS-1 CSS-1h.

2.3.3 Reduced-Tracking Tack Coat

Provide emulsified asphalt conforming to .

2.4 Blotter Aggregate

Provide an aggregate gradation that conforms to gradations specified in Table 1. Obtain material used as blotter aggregate from an approved state agency or Department of Transportation (DOT) source.

Table 1		
Blotter Aggregate Gradation		
	Sand(1)	Screenings
Sieve Size, inch	Percent Passing by Mass	Percent Passing by Mass
3/8	100	100
No. 4	95 - 100	75 - 100
No. 8	85 - 100	---
No. 16	65 - 97	---
No. 30	25 - 70	---
No. 50	5 - 35	---
No. 100	0 - 7	---
No. 200	0.0 - 4.0	0.0 - 15.0

PART 3 EXECUTION

3.1 PREPARATION OF ASPHALT STORAGE AND BITUMINOUS DISTRIBUTOR

Most anionic and cationic emulsions are not compatible. Thoroughly clean the asphalt emulsion storage and bituminous distributor if previous asphalt emulsion used is non-compatible with the specified emulsion. As an example, if CSS-1h (cationic) was utilized in the distributor previously, and the specified emulsion is a SS-1h (anionic), this would require the storage to be thoroughly cleaned prior to receiving the material and the bituminous distributor storage tanker to be thoroughly cleaned prior to depositing into the bituminous distributor storage tanker.

Ensure bituminous material is at the recommended application temperature and it has been thoroughly cycled through the distributor bar. Test the bituminous distributor under pressure by means of a test shot area (outside the project limits) to ensure there are no leaks or dripping for the nozzles after shut-off.

3.2 PREPARATION OF SURFACE

Immediately before applying the bituminous coat, remove all loose material, dirt, clay, or other objectionable material from the surface to be treated by means of a power broom or blower supplemented with hand brooms. Apply treatment only when the surface is dry and clean.

3.3 TRIAL APPLICATIONS AND CALIBRATIONS

3.3.1 Trial Applications

Trial applications below are for the initial settings of the bituminous distributor computer controlled application rate settings prior to performing the APPLICATION RATE CALIBRATION.

3.3.2 Prime Coat Trial Application Rate

Unless otherwise authorized, apply the trial application rate of bituminous materials in the amount of 0.15 gallon per square yard (shot rate). For emulsions, make other trial applications using various amounts of material or adjusting other setting as may be deemed necessary to meet the residual application rate and uniform coverage.

3.3.3 Tack Coat Trial Application Rate

Unless otherwise authorized, apply the trial application rate of bituminous tack coat materials in the amount of 0.06 gallons per square yard. Make other trial applications using various amounts of material or adjusting other setting as may be deemed necessary to meet the residual application rate and uniform coverage.

3.3.4 Application Rate Calibration

Provide all equipment, materials, and labor necessary to calibrate the application rate produced from the bituminous distributor per the following guidance. Each distributor truck proposed for use on the project will have the application rate calibrated for each material type proposed for use. Perform the application rate calibration after the distributor arrives on the project, after the test shot, and at least 24 hours prior to use for application of prime coat and tack coat. Calibrate the application rate in accordance with ASTM D2995. If utilizing a cutback or asphalt binder, utilize ASTM D2995 Option A. If utilizing an emulsified asphalt, utilize ASTM D2995 Option B. Provide pads made from berber carpet (or other approved durable absorbent pad) with rubber or waterproof backing measuring 12 inches by 12 inches. For transverse testing, stack pads end-to-end that spans the maximum width of the spray bar. For longitudinal testing, stack three sets of six pads end-to-end longitudinally with 100 foot separation between sets.

Measure the transverse and longitudinal application rates with all nozzles inserted in the distributor bar. Submit the results for the application rate calibration in the longitudinal direction and the transverse direction to the Government identifying, at a minimum, the following items:

a. Project name, Contract number, testing date.

b. Emulsified, cutback, or asphalt binder material.

c. Distributor make, model and serial number.

d. Distributor setup at time of calibration including target application rate (shot rate as shown on the computer control system), spray bar height, and distributor truck speed or motor RPM.

e. Dry weight of each pad prior to application.

f. Wet weight of each pad immediately after application.

g. For emulsions, oven dry each pad until constant mass. Record oven dry mass of each pad in 20 minute increments. Mass at the end of a 60 minute oven dry period is considered constant mass.

h. For emulsions, residual asphalt rate for each pad and average residual asphalt rate. For cutbacks, shot rate for each pad and average shot rate.

For the Application Rate Calibration to be acceptable, provide the average residual asphalt rate for emulsions or the average shot rate for cutbacks and asphalt binder in compliance with Table 3a or Table 3b and no individual pad rate is to vary more than 20 percent from the average. Perform the Estimating Application Rate of Bituminous Distributors in the presence of the project QC staff and the Government. Reference ATTACHMENT 1. If the application rate calibration fails to meet the requirements of this section, make adjustments to the distributor setup, shot rate or other settings as appropriate, and re-perform the application rate calibration until the results are within an acceptable range. Do not modify the distributor setup, or shot rate after application rate calibration is accepted without approval by the Government. Use ASTM D2995 to determine the estimation of application rate of bituminous distributors every 14 days of production, or as determined necessary by the Government.

3.3.5 Daily Application Rate Verification

Following acceptable results as outlined in paragraph APPLICATION RATE CALIBRATION, perform daily application rate verification each day when the distributor is in use and provide results daily during execution. The production application rates will utilize the volume method of determination as follows:

a. Determine the total distance to be sprayed.

b. Calculate the area sprayed.

c. Calculate the gallons of material applied by subtracting the beginning volume by the ending volume. Utilizing the dipstick which has been provided with the distributor truck or the onboard meter.

d. Correct for temperature back to 60 degrees F by applying correction factor as provided in ASTM D1250.

e. Calculate and report the temperature corrected shot rate by dividing the corrected gallons per item d. by the total area sprayed.

3.4 APPLICATION RATE CORRECTION

If the daily application rate verification varies by more than 0.015 gallon per square yard from the shot rate established during application rate calibration that met the rates in Table 3a or Table 3b, immediately re-perform the application rate calibration in accordance with paragraph APPLICATION RATE CALIBRATION and ensure results are in compliance with the rates specified in Table 3a or Table 3b prior to applying additional prime coat or tack coat.

3.5 APPLICATION TEMPERATURE

3.5.1 Viscosity Relationship

Apply bituminous material at a temperature that will provide a viscosity between 10.0 and 60.0 seconds, Saybolt Furol in accordance with ASTM D88/D88M or between 20 and 120 centistokes in accordance with ASTM D2170/D2170M. Furnish the temperature viscosity relation to the Contracting Officer.

3.5.2 Temperature Ranges

The viscosity requirements determine the application temperature to be used. Table 2 presents a normal range of application temperatures. If Table 2 is different than the manufacturer's recommendation, use the manufacturer's recommendation.

Table 2	
Tack Coat or Prime Coat Application Temperatures	
Cutback Asphalt	
MC-70, RC-70(1)	120-225 degrees F
MC-250, RC-250(1)	165-270 degrees F
Asphalt Emulsion	
Cationic Emulsified Asphalt	130-170 degrees F
Anionic Emulsified Asphalt	150-180 degrees F
Non-Ionic Emulsified Asphalt	150-180 degrees F
Asphalt Binder	
All Grades	275-350 degrees F(2)
(1) Some temperatures within these ranges provided may exceed the flash point for certain rapid cure cutbacks. Care should be taken in their heating.	
(2) Max temperature may be increased to 375 degrees F if recommended by the manufacturer to facilitate uniform application free of equipment clogging issues when hard base asphalt is used.	

3.6 APPLICATION

3.6.1 General

Following preparation and subsequent inspection of the surface, apply the prime coat or tack coat with the distributor at the specified rate with uniform distribution over the surface to be treated. Properly treat all areas and spots, not capable of being sprayed with the distributor, with the hand spray. Until the succeeding layer of pavement is placed, maintain the surface by protecting the surface against damage and by repairing deficient areas at no additional cost to the Government. If required, spread clean dry sand to effectively blot up any excess bituminous material. No smoking, fires, or flames other than those from the heaters that are a part of the equipment are permitted within 25 feet of heating, distributing, and transferring operations of cutback

materials. Prevent all traffic, except for paving equipment used in constructing the surfacing, from using the underlying material, whether primed or not, until the surfacing is completed.

3.6.2 Prime Coat

Apply the prime coat at locations shown on the Drawings only when the underlying material meets the specified material density requirements, and the moisture content is within 2 percent of optimum moisture. Application should be achieved within the limits of the temperature described in paragraph ENVIRONMENTAL REQUIREMENTS and quantities to achieve the rate of residual asphalt shown in Table 3a. At the time of priming, ensure that the base is firm, unyielding and in such condition that no undue distortion will occur. Ensure the prime coat adheres to the underlying material. Apply the prime coat material using a bituminous distributor. To obtain uniform application of the prime coat on the surface treated at the junction of previous and subsequent applications, spread building paper on the surface for a sufficient distance back from the ends of each application to start and stop the prime coat on the paper and to ensure that all sprayers will operate at full force on the surface to be treated. Immediately after application, remove and discard the building paper. If blotter aggregate is used, lightly sweep the area with a power broom, or other approved means, to remove any excess blotter aggregate.

Table 3a

Prime Coat Application Rates

Surface Type	Product Type	Rate (gal/yd^2)
Unbound Layers	Emulsion(1)	0.05 - 0.12 (residual rate)
	Cutback Asphalt	0.08 - 0.18 (shot rate)

(1) Emulsion prime coats may be diluted up-to a 1 to 1 dilution rate.

3.6.3 Tack Coat

Immediately following the preparation of the surface for treatment, apply the tack coat by means of the distributor, within the limits of the temperature described in paragraph ENVIRONMENTAL REQUIREMENTS and in quantities to achieve the rate of residual application rates shown in Table 3b. Ensure the surface is clean and dry. Apply tack coat at the locations shown on the Drawings sufficiently in advance of placing the asphalt mixture to permit breaking and initial stages of curing. Do not apply tack coat so far in advance that it might lose its adhesiveness as a result of being covered with dust or other foreign material. When using a spray paver with appropriate tack coat products, tack coat breaking requirements do not apply. Dilution of tack coat is prohibited. A tack coat should be applied to every bound surface (asphalt or concrete pavement) that is being overlaid with asphalt mixture and at transverse and longitudinal joints. Apply the bituminous material so that uniform distribution is obtained over the entire surface to be treated. Treat lightly coated areas and spots missed by the distributor by spraying with

a hand wand or using other approved method. To obtain uniform application of the tack coat, at the junction of previous and subsequent applications, spread building paper on the surface for a sufficient distance back from the ends of each application to start and stop the tack coat on the paper and to ensure that all sprayers will operate at full force on the surface to be treated. Immediately after application, remove and discard the building paper. If blotter aggregate is used, lightly sweep with a power broom, or other approved means, to remove any excess blotter aggregate. Maintain and protect the treated surface from damage until the succeeding course of pavement is placed.

Table 3b		
Tack Coat Application Rates(1,3,4)		
Surface Type	Residual Rate (gal/yd^2)	Approximate Bar Rate Undiluted(2) (gal/yd^2)
New Asphalt (between layers)	0.02 - 0.05	0.03 - 0.07
Existing Asphalt	0.04 - 0.07	0.06 - 0.11
Milled Surface	0.04 - 0.08	0.06 - 0.12
Portland Cement Concrete	0.03 - 0.05	0.05 - 0.08
(1) Dilution of tack coat is not allowed		
(2) Assumes emulsion is 33 percent water and 67 percent asphalt		
(3) Emulsified asphalt is prohibited to be applied at application rates over 0.12 gal/yd^2		
(4) Residual rate is the same as bar rate when using hot-applied asphalt binders. Use residual rate tolerances as shown above for target when using hot-applied asphalt binders.		

3.7 FIELD QUALITY CONTROL

Certificates of compliance (COC) for asphalt materials delivered will be obtained and checked to ensure that specification requirements are met. Quantities of applied material will be determined. Payment will be for amount of residual asphalt applied. Prime coat materials when emulsions are used can be diluted on site with potable water up to 1 part water to 1 part emulsion, as long as the residual rate is still being met. Do not dilute tack coat materials. If requested by the Government, obtain samples of the bituminous material under the supervision of the Government per paragraph SAMPLING and send for analysis.

3.7.1 Sampling and Testing

Furnish certified copies of the manufacturer's test reports indicating temperature-viscosity relationship for asphalt materials and compliance with applicable specified requirements, not less than 5 days before the

material is required in the work.

3.7.2 Sampling

Unless otherwise specified, sample bituminous material in accordance with ASTM D140/D140M.

3.8 PRIME COAT SET PERIOD

Allow the prime coat to set without being disturbed for a period of at least 48 hours or longer, as may be necessary to attain penetration into the treated course. Furnish and spread enough blotter aggregate to effectively blot up excess bituminous material.

3.9 TACK COAT BREAKING PERIOD

Following application of an emulsified asphalt tack coat and prior to application of the succeeding layer of asphalt mixture, allow emulsified asphalt tack coats to break. No break period is required for cutback or hot-applied asphalt binder tack coat products.

3.10 TRAFFIC CONTROLS

Maintain the primed surface and tacked surface in good condition until the succeeding layer of pavement is placed, by protecting the surface against damage and by repairing and recoating deficient areas. Keep traffic off surfaces freshly treated with bituminous material. Provide sufficient warning signs and barricades so that traffic will not travel over freshly treated surfaces.

3.11 ATTACHMENT

ATTACHMENT 1: Estimating Application Rate of Bituminous Distributors

-- End of Section --

SECTION 32 12 16.16

ROAD-MIX ASPHALT PAVING
11/20

PART 1 GENERAL

1.1 PERCENT PAYMENT

1.1.1 Method of Measurement

The amount paid for will be the number of tons of hot-mix warm-mix asphalt pavement mixture used in the accepted work. Weigh the hot-mix warm-mix asphalt pavement mixture after mixing. No separate payment will be made for weight of asphalt cement material incorporated herein. Measurement of the quantity of hot-mix warm-mix asphalt pavement, per ton placed and accepted, will be made for the purposes of assessing the pay factors stipulated below.

1.1.2 Basis of Payment

Quantities of hot-mix warm-mix asphalt pavement, determined as specified above, will be paid for at respective contract unit prices or at reduced prices adjusted in accordance with paragraphs PERCENT PAYMENT and ACCEPTANCE. Payment will constitute full compensation for furnishing all materials, equipment, plant, and tools; and for all labor and other incidentals necessary to complete work required by this section of the specification. The measured quantity of hot-mixed warm-mixed asphalt pavement will be paid for and included in the lump sum contract price. If less than 100 percent payment is due based on the pay factors stipulated in paragraph PERCENT PAYMENT, a unit price of per ton will be used for purposes of calculating the payment reduction.

1.1.3 Lot Pay Factor

The lot pay factor is determined by taking the lowest computed pay factor based on either laboratory air voids, in-place density, smoothness, or grade (each discussed below). Remove and replace lots when the lowest computed pay factor requires rejection. At the end of the project calculate the average pay factor for all lots. If this average lot pay factor exceeds 95.0 percent and no individual lot has a pay factor less than 75.0 percent, then the percent payment for the entire project will be 100 percent of the unit bid price. If the average lot pay factor is less than 95.0 percent, then each lot will be paid for at the unit price multiplied by the lot's pay factor. For any lots which are less than 2,000 tons, a weighted lot pay factor will be used to calculate the average lot pay factor. When work on a lot is required to be terminated before all four sublots are completed, the results from the completed sublots will be analyzed to determine the percent payment for the lot following the same procedures and requirements for full lots but with fewer or more test results as determined in paragraph PAVEMENT LOTS.

1.1.4 Payment Adjustment for Laboratory Air Voids

Laboratory air void calculations for each lot will use the average theoretical maximum density values obtained for the lot. Determine the average TMD in accordance with paragraph THEORETICAL MAXIMUM DENSITY (TMD). The mean absolute deviation of the laboratory air void contents

(one from each sublot) from the JMF air void content will be evaluated as shown in the example below and a pay factor will be determined from Table 1. When 0 percent payment is determined, remove and replace the rejected lot at least 4 inches into the cold (existing) lane adjacent to the longitudinal joint.

Table 1. Pay Factor Based on Laboratory Air Voids

Mean Absolute Deviation of Lab Air Voids from JMF	Pay Factor, percent
0.60 or less	100
0.61 - 0.80	98
0.81 - 1.00	95
1.01 - 1.20	90
Above 1.20	reject (0)

1.1.4.1 Pay Factor Example for Laboratory Air Voids

An example of the computation of mean absolute deviation for laboratory air voids is as follows: Assume that the laboratory air voids are determined from 4 sublots where one set of laboratory compacted specimens is from a single sublot. The laboratory air voids for the 4 sublots are determined to be 3.5, 3.0, 4.0, and 3.7. Assume that the target air voids from the JMF is 4.0. The mean absolute deviation is then:

Mean Absolute Deviation = (|3.5 - 4.0| + |3.0 - 4.0| + |4.0 - 4.0| + |3.7 - 4.0|)/4

Mean Absolute Deviation = (0.5 + 1.0 + 0.0 + 0.3)/4 = (1.8)/4 = 0.45

The mean absolute deviation for laboratory air voids is determined to be 0.45. It can be seen from Table 1 that the lot's pay factor based on laboratory air voids is 100 percent.

1.1.5 Payment Adjustment for In-place Densities

The average in-place mat and joint densities are expressed as a percentage of the average theoretical maximum density (TMD) for the lot. Determine the average TMD in accordance with paragraph THEORETICAL MAXIMUM DENSITY (TMD). The average in-place mat density and joint density for a lot are determined and compared with Table 2 to calculate a single pay factor per lot. Use the following process to determine the single pay factor for in-place density:

a. Step 1: Determine the pay factors for mat density and joint density using Table 2.

b. Step 2: Determine ratio of joint area to mat area. The area associated with the joint is considered to be 10 feet wide times the length of completed longitudinal construction joint in the lot. This joint area will not exceed the total lot size. The length of joint to be considered will be that length where a new lane has been placed against an adjacent lane of asphalt pavement, either an adjacent

freshly paved lane or one paved at any time previously.

c. Step 3: Compute the weighted pay factor for the joint using the formula in the example below.

d. Step 4: Compare weighted pay factor for joint density to pay factor for mat density and select the smaller. This selected pay factor is the pay factor based on density for the lot.

When 0 percent payment is determined for mat density, remove and replace the rejected lot at least 4 inches into the cold (existing) lane adjacent to the longitudinal joint. When 0 percent payment is determined for joint density, remove and replace the rejected longitudinal joint with a 10 feet wide paving lane that is centered over the joint.

Table 2. Pay Factor Based on In-place Density

Average Mat Density (4 Cores) (Percent of TMD)	Pay Factor, Percent	Average Joint Density (4 Cores) (Percent of TMD)
93.0 - 96.0	100.0	91.5 or above
92.9	100.0	91.4
92.8 or 96.1	99.9	91.3
92.7	99.8	91.2
92.6 or 96.2	99.6	91.1
92.5	99.4	91.0
92.4 or 96.3	99.1	90.9
92.3	98.7	90.8
92.2 or 96.4	98.3	90.7
92.1	97.8	90.6
92.0 or 96.5	97.3	90.5
91.9	96.3	90.4
91.8 or 96.6	94.1	90.3
91.7	92.2	90.2
91.6 or 96.7	90.3	90.1
91.5	87.9	90.0
91.4 or 96.8	85.7	89.9
91.3	83.3	89.8
91.2 or 96.9	80.6	89.7
91.1	78.0	89.6
91.0 or 97.0	75.0	89.5
below 91.0, above 97.0	0.0 (reject)	below 89.5

1.1.5.1 Pay Factor Example for In-place Density

An example of the computation of a pay factor (in I-P units only) based on in-place density, is as follows: Assume the following test results for field density made on the lot: (1) Average mat density = 92.2 percent (of

lab TMD). (2) Average joint density = 90.5 percent (of lab TMD). (3) Total area of lot = 30,000 square feet. (4) Length of completed longitudinal construction joint = 2,000 feet.

a. Step 1: Determine pay factor based on mat density and on joint density, using Table 2:

(1) Mat density of 92.2 percent = 98.3 pay factor.

(2) Joint density of 90.5 percent = 97.3 pay factor.

b. Step 2: Determine ratio of joint area to mat area. Multiply the length of completed longitudinal construction joint by the specified 10 foot width and divide by the mat area (total paved area in the lot).

(1) Ratio = Ratio of joint area to mat area

(2) Ratio = (2,000 feet x 10 feet)/30,000 square feet

(3) Ratio = 0.6667

c. Step 3: Weighted pay factor (wpf) for joint is determined as indicated below:

(1) wpf = joint pay factor + (100 - joint pay factor) x (1 - ratio)

(2) wpf = 97.3 + (100-97.3) x (1-0.6667) = 98.2 percent

d. Step 4: Compare weighted pay factor for joint density to pay factor for mat density and select the smaller:

(1) Pay factor for mat density: 98.3 percent.

(2) Weighted pay factor for joint density: 98.2 percent

(3) Selected pay factor: 98.2 percent

1.1.6 Payment Adjustment for Smoothness (Final Wearing Surface Only)

Profilograph Testing. Record the location and data from all profilograph measurements. When the Profile Index of a lot exceeds the tolerance specified in paragraph SMOOTHNESS REQUIREMENTS by 1.0 inch per mile, but less than 2.0 inches per mile, after any reduction of high spots or removal and replacement, the computed pay factor for that lot based on surface smoothness will be 95 percent. When the Profile Index exceeds the tolerance by 2.0 inches per mile, but less than 3.0 inches per mile, the computed pay factor will be 90 percent. When the Profile Index exceeds the tolerance by 3.0 inches per mile, but less than 4.0 inches per mile, the computed pay factor will be 75 percent. Remove and replace the lot when the Profile Index exceeds the tolerance by 4.0 inches per mile or more, at no additional cost to the Government. Regardless of the above, correct any small individual area with surface deviation which exceeds the tolerance given above by more than 5.0 inches per mile or more, by grinding to meet the specification requirements above or remove and replace at no additional cost to the Government.

1.1.7 Payment Adjustment for Plan Grade

When more than 5 percent of all measurements made within a lot are outside

the 0.05 foot tolerance, the pay factor based on grade for that lot will be 95 percent. For individual locations where the grade exceeds 0.075 foot tolerance, remove the surface lift full depth and replace the lift with asphalt pavement to meet specification requirements at no additional cost to the Government. High spots can be diamond ground as an alternative to remove and replace in order to meet grade requirements for the lot and at individual locations.

1.2 PAYMENT

1.2.1 Method of Measurement

The amount paid for will be the number of tons of hot-mix warm-mix asphalt pavement mixture used in the accepted work. Weigh the hot-mix warm-mix asphalt pavement mixture after mixing. No separate payment will be made for weight of asphalt cement material incorporated herein. Measurement of the quantity of hot-mix warm-mix asphalt pavement per lot will be made for the purposes of assessing acceptance stipulated in paragraph ACCEPTANCE.

1.2.2 Basis of Payment

Quantities of hot-mix warm-mix asphalt pavement, determined as specified above, will be paid for at respective contract unit prices. Payment will constitute full compensation for furnishing all materials, equipment, plant, and tools; and for all labor and other incidentals necessary to complete work required by this section of the specification.The measured quantity of hot-mixed warm-mixed asphalt pavement will be paid for and included in the lump sum contract price.

1.3 REFERENCES

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

AMERICAN ASSOCIATION OF STATE HIGHWAY AND TRANSPORTATION OFFICIALS (AASHTO)

AASHTO M 156	(2013; R 2025) Standard Specification for Requirements for Mixing Plants for Hot-Mixed, Hot-Laid Bituminous Paving Mixtures
AASHTO T 304	(2011; R 2015) Standard Method of Test for Uncompacted Void Content of Fine Aggregate
AASHTO T 329	(2015) Standard Test Method for Moisture Content of Hot Mix Asphalt (HMA) by Oven Method

ASPHALT INSTITUTE (AI)

AI MS-2	(2015) Asphalt Mix Design Methods

ASTM INTERNATIONAL (ASTM)

ASTM C29/C29M	(2023) Standard Test Method for Bulk Density ("Unit Weight") and Voids in Aggregate

ASTM C88	(2018) Standard Test Method for Soundness of Aggregates by Use of Sodium Sulfate or Magnesium Sulfate
ASTM C117	(2023) Standard Test Method for Materials Finer than 75-um (No. 200) Sieve in Mineral Aggregates by Washing
ASTM C127	(2025) Standard Test Method for Density, Relative Density (Specific Gravity), and Absorption of Coarse Aggregate
ASTM C128	(2025) Standard Test Method for Density, Relative Density (Specific Gravity), and Absorption of Fine Aggregate
ASTM C131/C131M	(2020) Standard Test Method for Resistance to Degradation of Small-Size Coarse Aggregate by Abrasion and Impact in the Los Angeles Machine
ASTM C136/C136M	(2025) Standard Test Method for Sieve Analysis of Fine and Coarse Aggregates
ASTM C142/C142M	(2017; R 2023) Standard Test Method for Clay Lumps and Friable Particles in Aggregates
ASTM C566	(2025) Standard Test Method for Total Evaporable Moisture Content of Aggregate by Drying
ASTM D75/D75M	(2019) Standard Practice for Sampling Aggregates
ASTM D140/D140M	(2016) Standard Practice for Sampling Asphalt Materials
ASTM D242/D242M	(2009; R 2014) Mineral Filler for Bituminous Paving Mixtures
ASTM D946/D946M	(2020) Standard Specification for Penetration-Graded Asphalt Cement for Use in Pavement Construction
ASTM D979/D979M	(2015) Sampling Bituminous Paving Mixtures
ASTM D2041/D2041M	(2011) Theoretical Maximum Specific Gravity and Density of Bituminous Paving Mixtures
ASTM D2172/D2172M	(2017; E 2018) Standard Test Methods for Quantitative Extraction of Asphalt Binder from Asphalt Mixtures
ASTM D2419	(2014) Sand Equivalent Value of Soils and Fine Aggregate

ASTM D2726/D2726M	(2019) Standard Test Method for Bulk Specific Gravity and Density of Non-Absorptive Compacted Bituminous Mixtures
ASTM D2872	(2019) Standard Test Method for Effect of Heat and Air on a Moving Film of Asphalt (Rolling Thin-Film Oven Test)
ASTM D3203/D3203M	(2017) Standard Test Method for Percent Air Voids in Compacted Asphalt Mixtures
ASTM D3665	(2012; R 2017) Standard Practice for Random Sampling of Construction Materials
ASTM D3666	(2016) Standard Specification for Minimum Requirements for Agencies Testing and Inspecting Road and Paving Materials
ASTM D4791	(2019) Flat Particles, Elongated Particles, or Flat and Elongated Particles in Coarse Aggregate
ASTM D4867/D4867M	(2009; R 2014) Effect of Moisture on Asphalt Concrete Paving Mixtures
ASTM D5361/D5361M	(2016) Standard Practice for Sampling Compacted Asphalt Mixtures for Laboratory Testing
ASTM D5444	(2015) Mechanical Size Analysis of Extracted Aggregate
ASTM D5821	(2013; R 2017) Standard Test Method for Determining the Percentage of Fractured Particles in Coarse Aggregate
ASTM D6084/D6084M	(2018) Standard Test Method for Elastic Recovery of Asphalt Materials by Ductilometer
ASTM D6307	(2019) Standard Test Method for Asphalt Content of Asphalt Mixture by Ignition Method
ASTM D6373	(2023) Standard Specification for Performance Graded Asphalt Binder
ASTM D6925	(2014) Standard Test Method for Preparation and Determination of the Relative Density of Hot Mix Asphalt (HMA) Specimens by Means of the Superpave Gyratory Compactor
ASTM D6926	(2020) Standard Practice for Preparation of Asphalt Mixture Specimens Using Marshall Apparatus
ASTM D6927	(2015) Standard Test Method for Marshall

	Stability and Flow of Bituminous Mixtures
ASTM D7405	(2020) Standard Test Method for Multiple Stress Creep and Recovery (MSCR) of Asphalt Binder Using a Dynamic Shear Rheometer
ASTM D8239	(2018) Standard Specification for Performance-Graded Asphalt Binder Using the Multiple Stress Creep and Recovery (MSCR) Test
ASTM E1274	(2018); R 2024 Standard Test Method for Measuring Pavement Roughness Using a Profilograph

1.4 SUBMITTALS

Government approval is required for submittals with a "G" or "S" classification. Submittals not having a "G" or "S" classification are for Contractor Quality Control approval. Submittals not having a "G" or "S" classification are for information only. When used, a code following the "G" classification identifies the office that will review the submittal for the Government. Submit the following in accordance with Section 01 33 00 SUBMITTAL PROCEDURES:

SD-02 Shop Drawings

Placement Plan; G,

SD-03 Product Data

Diamond Grinding Plan; G,

Mix Design; G,

Contractor Quality Control; G,

SD-04 Samples

Aggregates

Asphalt Cement Binder

Warm-mix Additive

SD-06 Test Reports

Aggregates; G,

QC Monitoring

SD-07 Certificates

Asphalt Cement Binder; G,

Laboratory Accreditation and Validation

Warm-mix Additive

1.5 ACCEPTANCE

1.5.1 Acceptability of Work

Acquire the services of an independent commercial laboratory to perform acceptance testing. Acceptance of the plant produced mix and in-place requirements will be on a lot to lot basis. The materials and the pavement itself will be accepted on the basis of production testing. The Government may make check tests from split samples to validate the results of the production testing. Testing performed by the Government does not reduce the required testing of the independent commercial laboratory. Split samples will be taken for Government testing to reduce the variability between the independent commercial laboratory and the Government's test results. When the difference between the independent commercial laboratory and the Government's test results for split samples exceed the acceptable range of two results for multilaboratory precision for the appropriate test method (i.e. ASTM) then at least one of the laboratories is determined to be in error. An evaluation of procedures and equipment in both laboratories will be made to determine the cause(s) for the differences. Develop steps to correct procedures and equipment to bring multilaboratory precision to within acceptable limits.

1.5.2 Acceptance Requirements

Provide all sampling and testing required for acceptance and payment adjustment. Where appropriate, adjustments in percent payment acceptance for individual lots of asphalt pavement will be made based on laboratory air voids, in-place density, smoothness, and grade in accordance with the following paragraphs. Surface smoothness and grade determinations will be made on the lot as a whole. Exceptions or adjustments to this will be made in situations where the mix within one lot is placed as part of both the intermediate and surface courses, thus smoothness and grade measurements for the entire lot cannot be made.

1.5.3 Pavement Lots

A standard lot for all requirements is equal to one day's production or 2,000 tons, whichever is smaller. Divide each lot into four equal sublots in order to evaluate laboratory air voids and in-place density. When operational conditions cause a lot to be terminated before the specified four sublots have been completed, use the following procedure to adjust the lot size and number of tests for the lot. Where three sublots have been completed, they constitute a lot. Where one or two sublots have been completed, incorporate them into the next lot and the total number of sublots (i.e. 5 or 6 sublots) is used for acceptance criteria. Include partial lots at the end of asphalt production into the previous lot. Complete and report all theoretical maximum density, laboratory air voids, and in-place density testing within 24 hours after construction of each lot.

1.5.4 Sublot Sampling

Take one mixture sample for each sublot in accordance with ASTM D979/D979M from a random truck or another location for determining theoretical maximum density, laboratory air voids, any additional testing the Government desires, and Contractor Quality Control. All samples will be selected randomly, using commonly recognized methods of assuring randomness conforming to ASTM D3665 and employing tables of random numbers

or computer programs.

1.5.5 Additional Sampling and Testing

The Government reserves the right to direct additional samples and tests for any area which appears to deviate from the specification requirements. The cost of any additional testing will be paid for by the Government. Testing in these areas will be treated as a separate lot. Payment Acceptance will be made for the quantity of asphalt pavement represented by these tests in accordance with the provisions of this section.

1.5.6 Theoretical Maximum Density (TMD)

Measure theoretical maximum density one time for each sublot in accordance with ASTM D2041/D2041M for purposes of calculating laboratory air voids and determining in-place density. The average TMD for each lot will be determined as the average TMD of the random sublot samples. When the TMD on both sides of a longitudinal joint is different, the average of these two TMD values will be used as the TMD needed to calculate the percent joint density.

1.5.7 Laboratory Air Voids

Prepare one set of laboratory compacted specimens for each sublot in accordance with ASTM D6926 using the hand-held hammer for the Marshall Method.Prepare one set of laboratory compacted specimens for each sublot in accordance with ASTM D6925 using the Superpave gyratory compactor. Provide three test specimens prepared from the same sample for each set of laboratory compacted specimens. Compact the specimens within 2 hours of the time the mixture was loaded into trucks at the asphalt plant. Do not reheat samples prior to compaction. Provide insulated containers as necessary to maintain the sample temperature. Measure the bulk density of laboratory compacted specimens in accordance with ASTM D2726/D2726M. Determine laboratory air voids from one set (three laboratory compacted specimens) for each sublot sample in accordance with ASTM D3203/D3203M.

1.5.7.1 Tolerance

Provide laboratory air voids with a mean absolute deviation of 1.00 percent or less from the JMF for each lot. Remove and replace lots that do not meet the laboratory air voids requirement at least 4 inches into the cold (existing) lane adjacent to the longitudinal joint, at no additional cost to the Government. The mean absolute deviation of the laboratory air void contents from the JMF air void content will be evaluated as shown in the example below.

1.5.7.2 Calculating Laboratory Air Voids

Laboratory air void calculations for each lot will use the average theoretical maximum density values obtained for the lot. Determine the average TMD in accordance with paragraph THEORETICAL MAXIMUM DENSITY (TMD). The mean absolute deviation of the laboratory air void contents (one from each sublot) from the JMF air void content will be evaluated as in the following example:

Assume that the laboratory air voids are determined from 4 sublots where one set of laboratory compacted specimens is from a single sublot. The laboratory air voids for the 4 sublots are determined to be 3.5, 3.0, 4.0,

and 3.7. Assume that the target air voids from the JMF is 4.0. The mean absolute deviation is then:

Mean Absolute Deviation = (|3.5 - 4.0| + |3.0 - 4.0| + |4.0 - 4.0| + |3.7 - 4.0|)/4

Mean Absolute Deviation = (0.5 + 1.0 + 0.0 + 0.3)/4 = (1.8)/4 = 0.45

The mean absolute deviation for laboratory air voids is determined to be 0.45. It can be seen that 0.45 is less than 1.00 percent. The lot is acceptable for laboratory air voids.

1.5.8 In-place Density

Obtain one random 4 inch or 6 inch diameter core from the mat and joint of each sublot in accordance with ASTM D5361/D5361M for determining in-place density. Cut samples neatly with a diamond core drill bit. Obtain random cores that are the full thickness of the layer being placed. Select core locations randomly using the procedures contained in ASTM D3665. Locate cores for mat density no closer than 12 inches from a transverse or longitudinal joint including the pavement edge. Center all cores for joint density on the joint. Discard samples that are clearly defective as a result of sampling and take an additional random core. When the random core is less than 1 inch thick, it will not be included in the analysis. In this case, obtain another random core sample. Clean and tack coat dry core holes before filling with asphalt mixture. Fill all core holes with asphalt mixture and compact using a standard Marshall hammer to the density specified. Provide all tools, labor, and materials for cutting samples, cleaning, and filling the cored pavement. Measure in-place density in accordance with ASTM D2726/D2726M using each core obtained from the mat and joint.

1.5.8.1 Tolerance

Provide a minimum in-place mat density of 93.0 percent and a minimum in-place joint density of 90.0 percent for each lot. The average in-place mat and joint densities are expressed as a percentage of the average theoretical maximum density (TMD) for the lot. Determine the average TMD in accordance with paragraph THEORETICAL MAXIMUM DENSITY (TMD). Remove and replace lots that do not meet the in-place mat density requirement at least 4 inches into the cold (existing) lane adjacent to the longitudinal joint, at no additional cost to the Government. Remove and replace the longitudinal joint when the lot does not meet the in-place joint density, at no additional cost to the Government. Use a 10 feet wide paving lane that is centered over the joint.

1.5.9 Surface Smoothness

Use a straightedge and profilograph for measuring surface smoothness. Use the profilograph method for all longitudinal testing, except for paving lanes less than 0.25 miles in length. Use the straightedge method for transverse testing, for longitudinal testing where the length of each pavement lane is less than 0.25 miles, and at the ends of the paving limits for the project. Smoothness requirements do not apply over crowns or grade breaks. Maintain detailed notes of the testing results and provide a copy to the Government immediately after each day's testing.

1.5.9.1 Smoothness Requirements

1.5.9.1.1 Straightedge Testing

Provide finished surfaces of the pavements with no abrupt change of 1/4 inch or more when checked with an approved 12 foot straightedge. Remove and replace surface lift lots when the surface smoothness exceeds 3/8 inch, at no additional cost to the Government. High spots can be diamond ground as an alternative to remove and replace in order to meet surface smoothness requirements at individual locations.

1.5.9.1.2 Profilograph Testing

Provide finished surfaces with a Profile Index not greater than 9 inches per mile when tested with an approved California-type profilograph. Remove and replace the lot when the Profile Index exceeds the tolerance by 4.0 inches per mile or more, at no additional cost to the Government. Correct any small individual area with surface deviation which exceeds the tolerance given above by more than 5.0 inches per mile or more by diamond grinding to meet the specification requirements above or remove and replace at no additional cost to the Government.

1.5.9.2 Testing Method

After the final rolling, but not later than 24 hours after placement, test the surface of the pavement in each entire lot in a manner to reveal surface irregularities exceeding the tolerances specified above. If any pavement areas are diamond ground, retest these areas immediately after diamond grinding. The maximum area allowed to be corrected by diamond grinding is 10 percent of the total area of the lot. Test the entire area of the pavement with a profilograph. Check a number of random locations along with any observed suspicious locations primarily at transverse and longitudinal joints with the straightedge.

1.5.9.2.1 Straightedge Testing

Use the straightedge to measure abrupt changes in surface smoothness. Hold the straightedge in contact with the pavement surface and measure the maximum distance between the straightedge and the pavement surface. Determine the amount of surface irregularity by placing the freestanding (unleveled) straightedge on the pavement surface and allowing it to rest upon the two highest spots covered by its length, and measuring the maximum gap between the straightedge and the pavement surface in the area between these two high points.

1.5.9.2.2 Profilograph Testing

Perform profilograph testing using an approved California profilograph and procedures described in ASTM E1274. Provide equipment that utilizes electronic recording and automatic computerized reduction of data to indicate "must-grind" bumps and the Profile Index for the pavement. Use a "blanking band" that is 0.2 inch wide and the "bump template" spanning 1 inch with an offset of 0.4 inch. Provide profilograph operated by an approved, factory-trained operator on the alignments specified above. Provide a copy of the reduced tapes to the Government at the end of each day's testing.

1.5.9.2.3 Bumps ("Must Grind" Areas)

Reduce any bumps ("must grind" areas) shown on the profilograph trace which exceed 0.4 inch in height by diamond grinding until they do not exceed 0.3 inch when retested. Taper diamond grinding in all directions to provide smooth transitions to areas not requiring diamond grinding. The following will not be permitted: (1) skin patching for correcting low areas, (2) planing or milling for correcting high areas. At the Contractor's option, pavement areas including diamond ground areas can be rechecked with the profilograph in order to record a lower Profile Index. Perform additional profilograph testing in all areas corrected by diamond grinding.

1.5.10 Plan Grade

Provide a final wearing surface of pavement conforming to the elevations and cross sections shown and not vary more than 0.05 foot from the plan grade established and approved at site of work. Within 5 working days after completion of a particular lot incorporating the final wearing course, test the final wearing surface of the pavement for conformance with specified plan grade requirements. Match finished surfaces at juncture with other pavements with finished surfaces of abutting pavements. Deviation from the plan elevation will not be permitted in areas of pavements where closer conformance with planned elevation is required for the proper functioning of drainage and other appurtenant structures involved. For roads, the grade will be determined by running lines of levels along the centerline at intervals of 25 feet or less longitudinally to determine the elevation of the completed pavement surface. Measure transverse grades at appropriate intervals. For parking lots, the grade will be determined by running lines of levels at intervals of 25 feet or less longitudinally and transversely to determine the elevation of the completed pavement surface. Diamond grinding can be used to remove high spots to meet grade requirements. Skin patching for correcting low areas or planing or milling for correcting high areas will not be permitted. Maintain detailed notes of the results of the testing and provide a copy to the Government immediately after each day's testing. Remove and replace surface lift lots when individual locations exceed 0.05 foot tolerance, at no additional cost to the Government. High spots can be diamond ground as an alternative to remove and replace in order to meet plan grade requirements at individual locations.

1.5.11 Laboratory Accreditation and Validation

Provide laboratories used to develop the Job Mix Formula (JMF), perform acceptance testing, and Contractor Quality Control testing that meet the requirements of ASTM D3666. Provide laboratories with a masonry saw having a diamond blade for trimming pavement cores and samples. Perform all required test methods by an accredited laboratory. Schedule and provide payment for laboratory inspections. Additional payment or a time extension due to failure to acquire the required laboratory accreditation is not allowed. The Government will inspect the laboratory equipment and test procedures prior to the start of hot-mix warm-mix operations for conformance with ASTM D3666. In addition, all testing laboratories performing acceptance testing require USACE validation by the Material Testing Center (MTC) for both parent laboratory and plant testing laboratory. Validation on all laboratories is required to remain current throughout the duration of the paving project. Contact the MTC manager listed at https://mtc.erdc.dren.mil for costs and scheduling. Submit a certificate of compliance signed by the manager of the laboratory stating

that it meets these requirements to the Government prior to the start of construction. At a minimum, include the following certifications:

a. Qualifications of personnel; laboratory manager, supervising technician, and testing technicians.

b. A listing of equipment to be used in developing the job mix.

c. A copy of the laboratory's quality control system.

1.6 ENVIRONMENTAL REQUIREMENTS

Do not place the asphalt mixture upon a wet surface or when the surface temperature of the underlying course is less than specified in Table 3 Table 1. The temperature requirements may be waived by the Government, if requested; however, meet all other requirements including compaction.

Table 3. Table 1. Surface Temperature Limitations of Underlying Course	
Mat Thickness, inches	Degrees F
3 or greater	40
Less than 3	45

PART 2 PRODUCTS

2.1 SYSTEM DESCRIPTION

Perform the work consisting of pavement courses composed of mineral aggregate and asphalt material heated and mixed in a central mixing plant and placed on a prepared course. Provide asphalt pavement designed and constructed in accordance with this section conforming to the lines, grades, thicknesses, and typical cross sections shown on the drawings. Construct each course to the depth, section, or elevation required by the drawings and rolled, finished, and approved before the placement of the next course. Submit proposed Placement Plan indicating lane widths and longitudinal joints for each course or lift.

2.1.1 Asphalt Mixing Plant

Provide plants used for the preparation of asphalt mixture conforming to the requirements of AASHTO M 156 with the following changes:

2.1.1.1 Truck Scales

Weigh the asphalt mixture on approved scales, or on certified public scales at no additional expense to the Government. Inspect and seal scales at least annually by an approved calibration laboratory.

2.1.1.2 Inspection of Plant

Provide access to the Government at all times, to all areas of the plant for checking adequacy of equipment; inspecting operation of the plant; verifying weights, proportions, and material properties; checking the temperatures maintained in the preparation of the mixtures and for taking samples. Provide assistance as requested, for the Government to procure

any desired samples.

2.1.1.3 Storage bins

The asphalt mixture can be stored in non-insulated storage bins for a period of time not exceeding 3 hours. The asphalt mixture can be stored in insulated storage bins for a period of time not exceeding 8 hours. Provide the mix drawn from bins that meets the same requirements as mix loaded directly into trucks.

2.1.2 Hauling Equipment

Provide trucks used for hauling asphalt mixture that have tight, clean, and smooth metal beds. To prevent the mixture from adhering to them, lightly coat the truck beds with a minimum amount of paraffin oil, lime solution, or other approved material. Do not use petroleum based products as a release agent. Provide each truck with a suitable cover to protect the mixture from adverse weather, contamination, and loss of material during hauling. When necessary due to long haul distance and cold weather, provide insulated truck beds with covers (tarps) that are securely fastened.

2.1.3 Material Transfer Vehicle (MTV)

Provide Material Transfer Vehicle for placement of the asphalt mixture. Transfer the material from the hauling equipment to the paver using a self-propelled, material transfer vehicle with a swing conveyor that is capable of delivering material to the paver without making contact with the paver. Provide MTV capable to move back and forth between the hauling equipment and the paver providing material transfer to the paver, while allowing the paver to operate at a constant speed. Provide Material Transfer Vehicle with remixing and storage capability to prevent physical and thermal segregation.

2.1.4 Asphalt Pavers

Provide mechanical spreading and finishing equipment consisting of a self-powered paver, capable of spreading and finishing the mixture to the specified line, grade, and cross section. Provide paver screed capable of laying a uniform mixture to meet the specified thickness, smoothness, and grade without physical or temperature segregation, the full width of the material being placed. Provide a paver with a vibrating screed to be used during all placement.

2.1.4.1 Receiving Hopper

Provide paver with a receiving hopper of sufficient capacity to permit a uniform spreading operation and a distribution system to place the mixture uniformly in front of the screed without segregation. Provide a screed that effectively produces a finished surface of the required evenness and texture without tearing, shoving, or gouging the mixture.

2.1.4.2 Automatic Grade Controls

Provide a paver equipped with a control system capable of maintaining the specified screed elevation. One of three methods can be used to control grade: stringline, laser, or computerized elevations along with GPS. For multiple layers it is acceptable to control the grade in the underlying layer and control the grade of the surface layer by applying a constant

thickness over the underlying layer which has been placed to the desired grade. Slope control can also be used to control the grade of the surface for roads, but is not acceptable for wide pavements such as parking lots. Provide transverse slope controller capable of maintaining the screed at the desired slope within plus or minus 0.1 percent. A ski-type device of not less than 30 ft can be used to provide improved smoothness. Use a shoe on one side of the paver to match an existing paved surface to provide a smooth joint.

2.1.5 Rollers

Provide rollers in good condition and operate at slow speeds to avoid displacement of the asphalt mixture. Provide sufficient number, type, and weight of rollers to compact the mixture to the required density while it is still in a workable condition. Do not use equipment which causes excessive crushing of the aggregate.

2.1.6 Diamond Grinding

Those performing diamond grinding are required to have a minimum of three years experience in diamond grinding. In areas not meeting the specified limits for surface smoothness and plan grade, reduce high areas to attain the required smoothness and grade, except as depth is limited below. Reduce high areas by diamond grinding the asphalt pavement with approved equipment. Perform diamond grinding by sawing with saw blades impregnated with an industrial diamond abrasive. Assemble the saw blades in a cutting head mounted on a machine designed specifically for diamond grinding that produces the required texture and smoothness level without damage to the asphalt pavement or joint faces. Provide diamond grinding equipment with saw blades that are 1/8-inch wide, a minimum of 60 blades per 12 inches of cutting head width, and capable of cutting a path a minimum of 3 feet wide. Diamond grinding equipment that causes raveling, fracturing of aggregate, or disturbance to the underlying material will not be allowed. The maximum area corrected by diamond grinding the surface of the asphalt pavement is 10 percent of the total area of any lot. The maximum depth of diamond grinding is 1/2 inch. Provide diamond grinding machine equipped to flush and vacuum the pavement surface. Dispose of all debris from diamond grinding operations off Government property. Prior to diamond grinding, submit a Diamond Grinding Plan for review and approval. At a minimum, include the daily reports for the deficient areas, the location and extent of deficiencies, corrective actions, and equipment. Remove and replace all pavement areas requiring plan grade or surface smoothness corrections in excess of the limits specified.

Prior to production diamond grinding operations, perform a test section at the approved location, consisting of a minimum of two adjacent passes with a minimum length of 40 feet to allow evaluation of the finish and transition between adjacent passes. Production diamond grinding operations cannot be performed prior to approval.

2.2 AGGREGATES

Notify the Government at least 7 days before sampling aggregates. Obtain samples in accordance with ASTM D75/D75M that are representative of the materials to be used for the project. Provide aggregates consisting of crushed stone, crushed gravel, crushed slag, screenings, natural sand, and mineral filler as required. The portion of material retained on the No. 4 sieve is coarse aggregate. The portion of material passing the No. 4 sieve and retained on the No. 200 sieve is fine aggregate. The portion

passing the No. 200 sieve is defined as mineral filler. Submit sufficient materials to produce 200 pounds of blended mixture for mix design verification. Submit all aggregate test results and samples to the Government at least 14 days prior to start of construction. Perform job aggregate testing no earlier than 6 months before contract award.

2.2.1 Coarse Aggregate

Provide coarse aggregate consisting of sound, tough, durable particles, free from films of material that would prevent thorough coating and bonding with the asphalt material and free from organic matter and other deleterious substances. Provide coarse aggregate particles meeting the following requirements:

a. The percentage of loss not greater than 40 percent after 500 revolutions when tested in accordance with ASTM C131/C131M.

b. The sodium sulfate soundness loss not exceeding 12 percent, or the magnesium sulfate soundness loss not exceeding 18 percent after five cycles when tested in accordance with ASTM C88.

c. At least 75 percent by weight of coarse aggregate containing two or more fractured faces when tested in accordance with ASTM D5821 with fractured faces produced by crushing.

d. The particle shape essentially cubical and the aggregate containing not more than 10 percent, by weight, of flat and elongated particles (5:1 ratio of length to thickness) when tested in accordance with ASTM D4791, Method B.

e. Slag consisting of air-cooled, blast furnace slag with a compacted weight of not less than 75 lb/cu ft when tested in accordance with ASTM C29/C29M.

f. Clay lumps and friable particles not exceeding 0.3 percent, by weight, when tested in accordance with ASTM C142/C142M.

2.2.2 Fine Aggregate

Provide fine aggregate consisting of clean, sound, tough, durable particles. Provide aggregate particles that are free from coatings of clay, silt, or any objectionable material, contain no clay balls, and meet the following requirements:

a. Quantity of natural sand (noncrushed material) added to the aggregate blend not exceeding 15 percent by weight of total aggregate.

b. Individual fine aggregate sources with a sand equivalent value greater than 45 when tested in accordance with ASTM D2419.

c. Fine aggregate portion of the blended aggregate with an uncompacted void content greater than 45.0 percent when tested in accordance with AASHTO T 304 Method A.

d. Clay lumps and friable particles not exceeding 0.3 percent, by weight, when tested in accordance with ASTM C142/C142M.

2.2.3 Mineral Filler

Provide mineral filler consisting of a nonplastic material meeting the requirements of ASTM D242/D242M.

2.2.4 Aggregate Gradation

Provide a combined aggregate gradation that conforms to gradations specified in Table 4 Table 2, when tested in accordance with ASTM C136/C136M and ASTM C117, and does not vary from the low limit on one sieve to the high limit on the adjacent sieve or vice versa, but grades uniformly from coarse to fine. Provide a JMF within the specification limits; however, the gradation can exceed the limits when the allowable deviation from the JMF shown in Tables 6 and 7 Tables 4 and 5 are applied.

Table 4. Table 2. Aggregate Gradations

Sieve Size, inch	Gradation 1 Percent Passing by Mass	Gradation 2 Percent Passing by Mass	Gradation 3 Percent Passing by Mass
1	100	---	---
3/4	90-100	100	---
1/2	68-88	90-100	100
3/8	60-82	69-89	90-100
No. 4	45-67	53-73	58-78
No. 8	32-54	38-60	40-60
No. 16	22-44	26-48	28-48
No. 30	15-35	18-38	18-38
No. 50	9-25	11-27	11-27
No. 100	6-18	6-18	6-18
No. 200	3-6	3-6	3-6

2.3 ASPHALT CEMENT BINDER

Provide asphalt cement binder that conforms to ASTM D6373 ASTM D8239 Performance Grade (PG) . As an alternate, provide ASTM D946/D946M Penetration Grade . Provide an asphalt binder with a minimum elastic recovery of 10 percent when tested at 77 degrees F plus or minus 0.9 degrees F in accordance with ASTM D6084/D6084M. Condition the specimen for elastic recovery in accordance with ASTM D2872.Provide an asphalt binder with an average recovery of 10 percent at 675 psi when tested in accordance with ASTM D7405. Condition the specimen for elastic recovery in accordance with ASTM D2872.Provide an asphalt binder with a minimum elastic recovery of 75 percent in accordance with ASTM D6084/D6084M. Provide test data indicating grade certification by the supplier at the time of delivery of each load to the mix plant. When warm-mix asphalt technology involves additives, grade the asphalt binder with the asphalt binder additive included. Submit copies of these certifications to the Government. The supplier is defined as the last source of any modification to the binder. The Government may sample and test the binder

at the mix plant at any time before or during mix production. Submit 5 gallon sample of the asphalt cement or asphalt binder not less than 14 days before start of the test section for mix design verification and approval. Obtain samples for this verification testing in accordance with ASTM D140/D140M and in the presence of the Government. Provide these samples to the Government for the verification testing, which will be performed at the Government's expense.

2.4 WARM-MIX ASPHALT TECHNOLOGIES/PRODUCTS

Provide warm-mix asphalt technologies/products that have a record of good performance and are included on the local state DOT's qualified products list, if the DOT maintains a qualified products list. These qualified products lists can be found at each state DOT's website.

2.5 MIX DESIGN

Develop the mix design. Perform Job Mix formula (JMF) and aggregates testing no earlier than 6 months before contract award. Provide asphalt mixture composed of well-graded aggregate, mineral filler if required, and asphalt material. Provide aggregate fractions sized, handled in separate size groups, and combined in such proportions that the resulting mixture meets the grading requirements of Table 4 Table 2. Do not produce asphalt pavement for payment acceptance until a JMF has been approved. Design the asphalt mixture using 50 75 blows with the Marshall hand-held hammer procedures contained in AI MS-2 and the criteria shown in Table 5 Table 3. Design the asphalt mixture using the Superpave gyratory compactor set at 50 75 gyrations. Prepare samples at various asphalt contents and compacted in accordance with ASTM D6925. Use laboratory compaction temperatures for Polymer Modified Asphalts as recommended by the asphalt binder manufacturer. Determine the Tensile Strength Ratio (TSR) of the composite mixture in accordance with ASTM D4867/D4867M. Compact the TSR specimens to an air void content of 7 percent plus or minus 1 percent. If the Tensile Strength Ratio (TSR) of the composite mixture is less than 75, reject the aggregates or treat the asphalt mixture with an anti-stripping agent. Add a sufficient amount of anti-stripping agent to produce a TSR of not less than 75. If an antistrip agent is required, provide it at no additional cost to the Government. Provide sufficient materials to produce 200 pound of blended mixture to the Government for verification of mix design at least 14 days prior to construction of test section.

2.5.1 JMF Requirements

Submit the proposed JMF in writing, for approval, at least 14 days prior to the start of the test section including, as a minimum:

a. Percent passing each sieve size.

b. Percent of asphalt cement.

c. Percent of each aggregate and mineral filler to be used.

d. Asphalt performance grade or penetration grade.

e. Number of blows of hammer per side of molded specimen.Number of Superpave gyratory compactor gyrations.

f. Laboratory mixing temperature.

g. Laboratory compaction temperature.

h. Temperature-viscosity relationship of the asphalt cement

i. Plot of the combined gradation on the 0.45 power gradation chart, stating the nominal maximum size.

j. Graphical plots and summary tabulation of Marshall stability, flow, air voids, voids in the mineral aggregate, and unit weight versus asphalt content as shown in AI MS-2. Include summary tabulation that includes individual specimen data for each specimen tested.

k. Specific gravity and absorption of each aggregate.

l. Percent natural sand.

m. Percent particles with two or more fractured faces (in coarse aggregate).

n. Fine aggregate angularity.

o. Percent flat or elongated particles in coarse aggregate.

p. Tensile Strength Ratio and wet/dry specimen test results.

q. Antistrip agent (if required).

r. List of all modifiers.

s. Percentage and properties (asphalt content, aggregate gradation, and aggregate properties) of RAP in accordance with paragraph RECYCLED ASPHALT PAVEMENT, if RAP is used.

t. Warm-mix additive or process.

Table 5. Table 3. Mix Design Criteria

Test Property	Marshall (50 Blows)	Marshall (75 Blows)	Superpave (50 75 gyrations)
Stability, pounds, minimum (NA for Superpave)	1000(1)	1800(1)	NA
Flow, 0.01 inch, (NA for Superpave)	8-18	8-16	NA
Air voids, percent	3-5	3-5	3-5
Minimum Percent Voids in Mineral Aggregate (VMA)(2)			
Gradation 1	13.0	13.0	13.0
Gradation 2	14.0	14.0	14.0
Gradation 3	15.0	15.0	15.0

Table 5. Table 3. Mix Design Criteria			
Test Property	Marshall (50 Blows)	Marshall (75 Blows)	Superpave (50 75 gyrations)
TSR, minimum percent	75	75	75
(1) This is a minimum requirement. Provide significantly higher average during construction to ensure compliance with the specifications.			
(2) Calculate VMA in accordance with AI MS-2, based on ASTM C127 and ASTM C128 bulk specific gravity for the aggregate.			

2.5.2 Adjustments to JMF

The JMF for each mixture is in effect until a new formula is approved in writing by the Government. Should a change in sources of any materials be made, perform a new mix design and a new JMF approved before the new material is used. Make minor adjustments within the specification limits to the JMF to optimize mix volumetric properties. Adjustments to the original JMF are limited to plus or minus 4 percent on the No. 4 and coarser sieves; plus or minus 3 percent on the No. 8 to No. 50 sieves; and plus or minus 1 percent on the No. 100 sieve and No. 200 sieve. Asphalt content adjustments are limited to plus or minus 0.40 from the original JMF. If adjustments are needed that exceed these limits, develop a new mix design.

2.6 RECYCLED HOT MIX ASPHALT

Recycled asphalt mixture is not allowed for the project. Provide recycled asphalt mixture consisting of reclaimed asphalt pavement (RAP), coarse aggregate, fine aggregate, mineral filler, and asphalt cement. Provide RAP of a consistent gradation, asphalt content, and properties. Maintain RAP stockpiles free from contamination including coal-tar sealers. Limit the maximum RAP chunk size to 2 inches when feeding RAP into the plant. The individual aggregates in a RAP chunk are not to exceed the maximum size aggregate of the gradation specified in Table 4 Table 2. Design the recycled asphalt mixture using procedures contained in AI MS-2. Provide RAP job mix that meets the requirements of paragraph MIX DESIGN. Limit the amount of RAP so the asphalt binder from the RAP does not exceed 30 percent of the total asphalt content.

2.6.1 RAP Aggregates and Asphalt Cement

Provide a blend of aggregates used in the recycled mix that meet the requirements of paragraph AGGREGATES. Establish the percentage of asphalt binder in the RAP for the mixture design according to ASTM D2172/D2172M or ASTM D6307 using the appropriate dust correction procedure.

2.6.2 RAP Mix

Select the virgin asphalt binder as described below:

a. For 0 to 20 percent recycled binder content - no change in virgin binder selection.

b. For 20+ percent to 30 percent recycled binder content - select virgin binder one grade softer than normal.

PART 3 EXECUTION

3.1 CONTRACTOR QUALITY CONTROL

3.1.1 General Quality Control Requirements

Submit the Quality Control Plan. Do not produce hot-mix warm-mix asphalt for payment acceptance until the quality control plan has been approved. In the quality control plan, address all elements which affect the quality of the pavement including, but not limited to:

a. Mix Design and unique JMF identification code

b. Aggregate Grading

c. Quality of Materials

d. Stockpile Management and procedures to prevent contamination

e. Proportioning including percent of warm-mix additive

f. Mixing and Transportation

g. Mixture Volumetrics

h. Moisture Content of Mixtures

i. Placing and Compaction

j. Joints

k. Surface Smoothness

l. Truck bed release agent

m. Correlation of mechanical hammer to hand hammer. Determine the number of blows of the mechanical hammer required to provide the same density of the JMF as provided by the hand hammer. Use the average of three specimens per trial blow application.

3.1.2 Testing Laboratory

Provide a fully equipped asphalt laboratory located at the plant or job site that is equipped with heating and air conditioning units to maintain a temperature of 75 plus or minus 5 degrees F. Provide laboratory facilities that are kept clean and all equipment maintained in proper working condition. Provide the Government with unrestricted access to inspect the laboratory facility, to witness quality control activities, and to perform any check testing desired. The Government will advise in writing of any noted deficiencies concerning the laboratory facility, equipment, supplies, or testing personnel and procedures. When the deficiencies are serious enough to adversely affect test results, immediately suspend the incorporation of the materials into the work. Incorporation of the materials into the work will not be permitted to resume until the deficiencies are corrected.

3.1.3 Quality Control Testing

Perform all quality control tests applicable to these specifications and as set forth in the Quality Control Program. Use the independent commercial laboratory for acceptance testing in paragraph ACCEPTANCE. Use in-house capabilities or the independent commercial laboratory for quality control testing. Required elements of the testing program include, but are not limited to tests for the control of asphalt content, aggregate gradation, aggregate moisture, moisture in the asphalt mixture, temperatures, VMA, Marshall stability, flow, and in-place density. Develop a Quality Control Testing Plan as part of the Quality Control Program.

3.1.3.1 Asphalt Content

Determine asphalt content a minimum of twice per lot (a lot is defined in paragraph PAVEMENT LOTS) using the ignition method in accordance with ASTM D6307. Use the extraction method in accordance with ASTM D2172/D2172M if the correction factor for the ignition method in ASTM D6307 is greater than 1.0. The asphalt content for the lot will be determined by averaging the test results.

3.1.3.2 Aggregate Properties

Determine aggregate gradations a minimum of twice per lot from mechanical analysis of extracted aggregate in accordance with ASTM D5444, ASTM C136/C136M, and ASTM C117. Determine the specific gravity of each aggregate size grouping for each 20,000 tons in accordance with ASTM C127 or ASTM C128. Determine fractured faces for gravel sources for each 20,000 tons in accordance with ASTM D5821. Determine the uncompacted void content of natural sand, manufactured sand, and blended aggregate for each 20,000 tons in accordance with AASHTO T 304 Method A.

3.1.3.3 Moisture Content of Aggregate

Determine the moisture content of aggregate used for production a minimum of once per lot in accordance with ASTM C566.

3.1.3.4 Moisture Content of Asphalt Mixture

Determine the moisture content of the asphalt mixture at least once per lot in accordance with AASHTO T 329.

3.1.3.5 Temperatures

Check temperatures at least four times per lot, at necessary locations to determine the temperature at the dryer, the asphalt cement binder in the storage tank, the asphalt mixture at the plant, and the asphalt mixture at the job site.

3.1.3.6 VMA, Marshall Stability, and Flow

Obtain mixture samples at least four times per lot. Calculate the VMA of each specimen in accordance with AI MS-2 based on ASTM C127 and ASTM C128 bulk specific gravity for the aggregate, as well as the Marshall stability and flow, as described in ASTM D6927. Provide VMA within the limits of Table 5 Table 3.

3.1.3.7 In-Place Density

Conduct any necessary testing to ensure the specified density is achieved. A nuclear gauge or other non-destructive testing device can be used to monitor pavement density.

3.1.3.8 Additional Testing

Perform any additional testing deemed necessary to control the process.

3.1.3.9 QC Monitoring

Submit all QC test results to the Government on a daily basis as the tests are performed. The Government reserves the right to monitor any of the Contractor's quality control testing and to perform duplicate testing as a check to the Contractor's quality control testing.

3.1.4 Sampling

When directed by the Government, sample and test any material which appears to not meet specification requirements unless such material is voluntarily removed and replaced or deficiencies corrected. Perform all sampling in accordance with standard procedures specified.

3.1.5 Control Charts

For process control, establish and maintain linear control charts on both individual samples and the running average of last four samples for the parameters listed in Table 6 Table 4, as a minimum. Post the control charts as directed by the Government and maintain current at all times. Identify the following on the control charts: the project number, the test parameter being plotted, the individual sample numbers, the Action and Suspension Limits listed in Table 6 Table 4 applicable to the test parameter being plotted, and the test results. Also show target values (JMF) on the control charts as indicators of central tendency for the cumulative percent passing, asphalt content, and laboratory air voids parameters. When the test results exceed either applicable Action Limit, take immediate steps to bring the process back in control. When the test results exceed either applicable Suspension Limit, halt production until the problem is solved. When the Suspension Limit is exceeded for individual values or running average values, the Government has the option to require removal and replacement of the material represented by the samples or to leave in place and base acceptance on mixture volumetric properties and in place density. Use the control charts as part of the process control system for identifying trends so that potential problems can be corrected before they occur. Make decisions concerning mix modifications based on analysis of the results provided in the control charts. In the Quality Control Plan, indicate the appropriate action to be taken to bring the process into control when certain parameters exceed their Action Limits.

Table 6. Table 4. Action and Suspension Limits for the Parameters to be Plotted on Individual and Running Average Control Charts				
	Individual Samples		Running Average of	
Parameter to be Plotted	Action Limit	Suspension Limit	Action Limit	Suspension Limit
No. 4 sieve, Cumulative percent passing, deviation for JMF target; plus or minus values	6	8	4	5
No. 30 sieve, Cumulative percent passing, deviation for JMF target; plus or minus values	4	6	3	4
No. 200 sieve, Cumulative percent passing, deviation for JMF target; plus or minus values	1.4	2.0	1.1	1.5
Asphalt content, percent deviation from JMF target; plus or minus value	0.4	0.5	0.2	0.3
Stability, pounds (minimum) (NA for Superpave)				
75 Blow JMF	1800	1700	1900	1800
50 Blow JMF	1000	900	1100	1000
Flow, 0.01 inch (NA for Superpave)				
75 Blow JMF	8 min.	7 min.	9 min.	8 min.
	16 max.	17 max.	15 max.	16 max.
50 Blow JMF	8 min.	7 min.	9 min.	8 min.
	18 max.	19 max.	17 max.	18 max.
Laboratory Air Voids, percent deviation from JMF target value	No specific action and suspension limits set since this parameter is used for acceptance			
In-place Mat Density, percent of TMD	No specific action and suspension limits set since this parameter is used for acceptance			
In-place Joint Density, percent of TMD	No specific action and suspension limits set since this parameter is used for acceptance			
VMA				
Gradation 1	13.5	13.0	13.3	13.0
Gradation 2	14.5	14.0	14.3	14.0
Gradation 3	15.5	15.0	15.3	15.0

3.2 PREPARATION OF ASPHALT BINDER MATERIAL

Heat the asphalt cement material while avoiding local overheating. Provide a continuous supply of the asphalt material to the mixer at a uniform temperature. Maintain the temperature of the asphalt delivered to the mixer to provide a suitable viscosity for adequate coating of the aggregate particles. For hot-mix, do not heat unmodified asphalt to a temperature exceeding 325 degrees F when added to the aggregate. Do not heat modified asphalt to a temperature exceeding 350 degrees F when added to the aggregate. For warm-mix, do not heat asphalt binder to a temperature exceeding 270 degrees F when added to the aggregate.

3.3 PREPARATION OF MINERAL AGGREGATE

Heat and dry the aggregate prior to mixing. Provide a rate of heating and a maximum temperature that does not damage the aggregates. Do not heat

the aggregate to a temperature exceeding 350 degrees F when the asphalt binder is added. Maintain the temperature no lower than is required to obtain complete coating and uniform distribution on the aggregate particles and to provide a mixture of satisfactory workability.

3.4 PREPARATION OF ASPHALT MIXTURE

Weigh or meter the aggregates and the asphalt cement and introduce into the mixer the amount specified by the JMF. Mix the combined materials until the aggregate obtains a uniform coating of asphalt binder and is thoroughly distributed throughout the mixture. The moisture content of all asphalt mixture upon discharge from the plant is not to exceed 0.5 percent by total weight of mixture as measured by AASHTO T 329.

3.5 PREPARATION OF THE UNDERLYING SURFACE

Immediately before placing the asphalt mixture, clean the underlying course of dust and debris. Apply a prime coat or tack coat in accordance with Section 32 12 13 BITUMINOUS TACK AND PRIME COATS.

3.6 TEST SECTION

Prior to full production, place a test section for each JMF used. Construct a test section 250 to 500 feet long and two paver passes wide with a longitudinal cold joint. Do not place the second lane of test section until the temperature of pavement edge is less than 175 degrees F. Construct the test section with the same depth as the course which it represents. Ensure the underlying grade or pavement structure upon which the test section is to be constructed is the same or very similar to underlying layer for the project. Use the same equipment and procedures in construction of the test section as on the remainder of the course represented by the test section. Construct the test section as part of the project pavement, as approved by the Government.

3.6.1 Sampling and Testing for Test Section

Obtain one sample at the plant from a random truck. Compact three specimens and test for laboratory air voids as well as the Marshall stability and flow. Test a portion of the same sample for theoretical maximum density (TMD), aggregate gradation, asphalt content, and TSR. Adjust the compactive effort as required to provide TSR specimens with an air void content of 7 plus or minus 1 percent. Obtain four randomly selected cores from each finished pavement mat (eight total), four from the longitudinal joint, and test for density. Perform random sampling in accordance with procedures contained in ASTM D3665. Construction may continue provided the test results are within the tolerances or exceed the minimum values shown in Table 7 Table 5. If all test results meet the specified requirements, the test section may remain as part of the project pavement. If test results exceed the tolerances shown, remove and replace the test section and construct another test section at no additional cost to the Government.

Table 7. Table 5. Test Section Requirements for Material and Mixture Properties	
Property	Specification Limit
Aggregate Gradation-Percent Passing (Individual Test Result)	
No. 4 and larger	JMF plus or minus 8
No. 8, No. 16, No. 30, and No. 50	JMF plus or minus 6
No. 100 and No. 200	JMF plus or minus 2.0
Asphalt Content, Percent (Individual Test Result)	JMF plus or minus 0.5
Laboratory Air Voids, Percent (Average of 3 specimens)	JMF plus or minus 1.0
VMA, Percent (Average of 3 specimens)	See Table 5 Table 3
Tensile Strength Ratio (TSR) (At 7 percent plus/minus 1 percent air void content)	75 percent minimum
Conditioned Strength	60 psi minimum
Mat Density, Percent of TMD (Average of 4 Random Cores)	92.0 - 96.0 93.0 minimum
Joint Density, Percent of TMD (Average of 4 Random Cores)	89.5 minimum 90.0 minimum
Stability, pounds (Average of 3 specimens) (for Marshall only)	1000 minimum for 50 blows1800 minimum for 75 blows
Flow, 0.01 inch (Average of 3 specimens) (for Marshall only with non-modified asphalt)	8 - 18 for 50 blows8 - 16 for 75 blows

3.6.2 Additional Test Sections

If the initial test section should prove to be unacceptable, make the necessary adjustments to the JMF, plant operation, placing procedures, and rolling procedures before beginning construction of a second test section. Construct and evaluate additional test sections, as required, for conformance to the specifications. Full production paving is not allowed until an acceptable section has been constructed and accepted.

3.7 TRANSPORTING AND PLACING

3.7.1 Transporting

Transport asphalt mixture from the mixing plant to the site in clean, tight vehicles. Schedule deliveries so that placing and compacting of

mixture is uniform with minimum stopping and starting of the paver. Provide adequate artificial lighting for night placements. Hauling over freshly placed material will not be permitted until the material has been compacted as specified, and allowed to cool to 140 degrees F.

3.7.2 Placing

Place the mix in lifts of adequate thickness and compact at a temperature suitable for obtaining density, surface smoothness, and other specified requirements. Upon arrival, place the mixture to the full width by an asphalt paver; strike off in a uniform layer of such depth that, when the work is completed, the required thickness is obtained and the surface conforms to the grade and contour indicated. Do not broadcast waste mixture onto the mat or recycle into the paver hopper. Collect waste mixture and dispose off site. Regulate the speed of the paver to eliminate pulling and tearing of the asphalt mat. Begin placement of the mixture along the centerline of a crowned section or on the high side of areas with a one-way slope. Place the mixture in consecutive adjacent strips having a minimum width of 10 feet. Offset the longitudinal joint in one course from the longitudinal joint in the course immediately below by at least 1 foot; however, locate the joint in the surface course at the centerline of the pavement. Offset transverse joints in one course by at least 10 feet from transverse joints in the previous course. Offset transverse joints in adjacent lanes a minimum of 10 feet. On isolated areas where irregularities or unavoidable obstacles make the use of mechanical spreading and finishing equipment impractical, the mixture can be spread and luted by hand tools.

3.8 COMPACTION OF MIXTURE

3.8.1 General

a. After placing, thoroughly and uniformly compact the mixture by rolling. Compact the surface as soon as possible without causing displacement, cracking, or shoving. Determine the sequence of rolling operations and the type of rollers used with the exception that application of more than three passes with a vibratory roller in the vibrating mode is prohibited. Maintain the speed of the roller, at all times, sufficiently slow to avoid displacement of the asphalt mixture and to be effective in compaction. Correct at once any displacement occurring as a result of reversing the direction of the roller, or from any other cause.

b. Furnish sufficient rollers to handle the output of the plant. Continue rolling until the surface is of uniform texture, true to grade and cross section, and the required field density is obtained. To prevent adhesion of the mixture to the roller, keep the wheels properly moistened, but excessive water is not permitted. In areas not accessible to the roller, thoroughly compact the mixture with hand tampers or small compactors. Remove the full depth of any mixture that becomes loose and broken, mixed with dirt, contains check-cracking, or is in any way defective. Replace with fresh asphalt mixture and immediately compact to conform to the surrounding area. Perform this work at no expense to the Government. Skin patching is not allowed.

3.8.2 Segregation

The Government can sample and test any material that looks deficient.

When the in-place material appears to be segregated, the Government has the option to sample the material and have it tested and compared to the aggregate gradation, asphalt content, and in-place density requirements in Table 7 Table 5in-place density requirements in Table 2 paragraph ACCEPTANCE. If the material fails to meet these specification requirements, remove and replace the extent of the segregated material the full depth of the layer of asphalt mixture at no additional cost to the Government. When segregation occurs in the mat, take appropriate action to correct the process so that additional segregation does not occur.

3.9 JOINTS

Construct joints to ensure a continuous bond between the courses and to obtain the required density. Provide all joints with the same texture as other sections of the course and meet the requirements for smoothness and grade.

3.9.1 Transverse Joints

Do not pass the roller over the unprotected end of the freshly laid mixture, except when necessary to form a transverse joint. When necessary to form a transverse joint, construct by means of placing a bulkhead or by tapering the course. Utilize a dry saw cut on the transverse joint full depth and width on a straight line to expose a vertical face prior to placing the adjacent lane. Remove the cutback material from the project. In both methods, provide a light tack coat of asphalt material to all contact surfaces before placing any fresh mixture against the joint.

3.9.2 Longitudinal Joints

Provide a joint that meets density and smoothness requirements for joints and has uniform texture. Cut back longitudinal joints which are irregular, damaged, uncompacted, cold (less than 175 degrees F at the time of placing adjacent lanes), or otherwise defective, a maximum of 3 inches from the top of the course with a cutting wheel to expose a clean, sound, near vertical surface for the full depth of the course. Remove all cutback material from the project. Provide a light tack coat of asphalt material to all contact surfaces prior to placing any fresh mixture against the joint.

-- End of Section --

SECTION 32 16 19

CONCRETE CURBS, GUTTERS AND SIDEWALKS
05/18

PART 1 GENERAL

1.1 UNIT PRICES

1.1.1 Measurement

1.1.1.1 Sidewalks

The quantities of sidewalks to be paid for will be the number of square yards of each depth of sidewalk constructed as indicated.

1.1.1.2 Curbs and Gutters

The quantities of curbs and gutters to be paid for will be the number of linear feet of each cross section constructed as indicated, measured along the face of the curb at the gutter line.

1.1.2 Payment

1.1.2.1 Sidewalks

Payment of the quantities of sidewalks measured as specified will be at the Contract unit price per square yard of the thickness specified.

1.1.2.2 Curbs and Gutters

Payment of the quantities of curbs and gutters measured as specified will be at the Contract unit price per linear foot of each cross section.

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 ASSOCIATION OF STATE HIGHWAY AND TRANSPORTATION OFFICIALS (AASHTO)

AASHTO M 182	(2005; R 2021; E 2024) Standard Specification for Burlap Cloth Made from Jute or Kenaf and Cotton Mats

ASTM INTERNATIONAL (ASTM)

ASTM A615/A615M	(2025) Standard Specification for Deformed and Plain Carbon-Steel Bars for Concrete Reinforcement
ASTM A1064/A1064M	(2024) Standard Specification for Carbon-Steel Wire and Welded Wire Reinforcement, Plain and Deformed, for Concrete

ASTM C31/C31M	(2026) Standard Practice for Making and Curing Concrete Test Specimens in the Field
ASTM C94/C94M	(2025a) Standard Specification for Ready-Mixed Concrete
ASTM C143/C143M	(2020) Standard Test Method for Slump of Hydraulic-Cement Concrete
ASTM C171	(2020) Standard Specification for Sheet Materials for Curing Concrete
ASTM C172/C172M	(2017) Standard Practice for Sampling Freshly Mixed Concrete
ASTM C173/C173M	(2024a) Standard Test Method for Air Content of Freshly Mixed Concrete by the Volumetric Method
ASTM C231/C231M	(2026) Standard Test Method for Air Content of Freshly Mixed Concrete by the Pressure Method
ASTM C309	(2025) Standard Specification for Liquid Membrane-Forming Compounds for Curing Concrete
ASTM C920	(2018; R 2024) Standard Specification for Elastomeric Joint Sealants
ASTM D1751	(2018) 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 D5893/D5893M	(2016) Standard Specification for Cold Applied, Single Component, Chemically Curing Silicone Joint Sealant for Portland Cement Concrete Pavements

INTERNATIONAL CODE COUNCIL (ICC)

ICC A117.1	(2017) Standard And Commentary Accessible and Usable Buildings and Facilities

1.3 SUBMITTALS

Government approval is required for submittals with a "G" or "S" classification. Submittals not having a "G" or "S" classification are for Contractor Quality Control approval. Submittals not having a "G" or "S" classification are for information only. When used, a code following the "G" classification identifies the office that will review the submittal for the Government. Submit the following in accordance with Section

01 33 00 SUBMITTAL PROCEDURES:

SD-03 Product Data

Concrete

Biodegradable Form Release Agent

SD-06 Test Reports

Field Quality Control

1.4 EQUIPMENT, TOOLS, AND MACHINES

1.4.1 General Requirements

Plant, equipment, machines, and tools used in the work will be subject to approval and must be maintained in a satisfactory working condition at all times. Use equipment capable of producing the required product, meeting grade controls, thickness control and smoothness requirements as specified. Discontinue using equipment that produces unsatisfactory results. Allow the Contracting Officer access at all times to the plant and equipment to ensure proper operation and compliance with specifications.

1.4.2 Slip Form Equipment

Slip form paver or curb forming machines, will be approved based on trial use on the job and must be self-propelled, automatically controlled, crawler mounted, and capable of spreading, consolidating, and shaping the plastic concrete to the desired cross section in one pass.

1.5 ENVIRONMENTAL REQUIREMENTS

1.5.1 Placing During Cold Weather

Do not place concrete when the air temperature reaches 40 degrees F and is falling, or is already below that point. Placement may begin when the air temperature reaches 35 degrees F and is rising, or is already above 40 degrees F. Make provisions to protect the concrete from freezing during the specified curing period. If necessary to place concrete when the temperature of the air, aggregates, or water is below 35 degrees F, placement and protection must be approved in writing. Approval will be contingent upon full conformance with the following provisions. Prepare and protect the underlying material so that it is entirely free of frost when the concrete is deposited. Heat mixing water and aggregates mixing water aggregates as necessary to result in the temperature of the in-place concrete being between 50 and 85 degrees F. Methods and equipment for heating must be approved. Use only aggregates that are free of ice, snow, and frozen lumps before entering the mixer. Provide covering or other means as needed to maintain the concrete at a temperature of at least 50 degrees F for not less than 72 hours after placing, and at a temperature above freezing for the remainder of the curing period.

1.5.2 Placing During Warm Weather

The temperature of the concrete as placed must not exceed 85 degrees F except where an approved retarder is used. Cool the mixing water and aggregates as necessary to maintain a satisfactory placing temperature.

The placing temperature must not exceed 95 degrees F at any time.

PART 2 PRODUCTS

2.1 CONCRETE

Provide concrete conforming to the applicable requirements of Section 03 30 00 CAST-IN-PLACE CONCRETE ASTM C94/C94M except as otherwise specified. Concrete must have a minimum compressive strength of 3500 psi at 28 days. Size of aggregate must not exceed 1-1/2 inches. Submit copies of certified delivery tickets for all concrete used in the construction.

2.1.1 Air Content

Use concrete mixtures that have an air content by volume of concrete of 5 to 7 percent, based on measurements made immediately after discharge from the mixer.

2.1.2 Slump

Use concrete with a slump of 3 inches plus or minus 1 inch for hand placed concrete or 1 inch plus or minus 1/2 inch for slipformed concrete as determined in accordance with ASTM C143/C143M.

2.1.3 Reinforcement Steel

Use reinforcement bars conforming to ASTM A615/A615M. Use wire mesh reinforcement conforming to ASTM A1064/A1064M.

2.2 CONCRETE CURING MATERIALS

2.2.1 Impervious Sheet Materials

Use impervious sheet materials conforming to ASTM C171, type optional, except that polyethylene film, if used, must be white opaque.

2.2.2 Burlap

Use burlap conforming to AASHTO M 182.

2.2.3 White Pigmented Membrane-Forming Curing Compound

Use white pigmented membrane-forming curing compound conforming to ASTM C309, Type 2.

2.3 CONCRETE PROTECTION MATERIALS

Use concrete protection materials consisting of a linseed oil mixture of equal parts, by volume, of linseed oil and either mineral spirits, naphtha, or turpentine. At the option of the Contractor, commercially prepared linseed oil mixtures, formulated specifically for application to concrete to provide protection against the action of deicing chemicals may be used, except that emulsified mixtures are not acceptable.

2.4 JOINT FILLER STRIPS

2.4.1 Contraction Joint Filler for Curb and Gutter

Use hard-pressed fiberboard contraction joint filler for curb and gutter.

2.4.2 Expansion Joint Filler, Premolded

Onless otherwise indicated, use 1/2 inch thick premolded expansion joint filler conforming to ASTM D1751 or ASTM D1752.

2.5 JOINT SEALANTS

Use cold-applied joint sealant conforming to ASTM C920 or ASTM D5893/D5893M.

2.6 FORM WORK

Design and construct form work to ensure that the finished concrete will conform accurately to the indicated dimensions, lines, and elevations, and within the tolerances specified. Use wood or steel forms that are straight and of sufficient strength to resist springing during depositing and consolidating concrete.

2.6.1 Wood Forms

Use forms that are surfaced plank, 2 inches nominal thickness, straight and free from warp, twist, loose knots, splits or other defects. Use forms with a nominal length of 10 feet. Radius bends may be formed with 3/4 inch boards, laminated to the required thickness.

2.6.2 Steel Forms

Use channel-formed sections with a flat top surface and welded braces at each end and at not less than two intermediate points. Use forms with interlocking and self-aligning ends. Provide flexible forms for radius forming, corner forms, form spreaders, and fillers as needed. Use forms with a nominal length of 10 feet and that have a minimum of 3 welded stake pockets per form. Use stake pins consisting of solid steel rods with chamfered heads and pointed tips designed for use with steel forms.

2.6.3 Sidewalk Forms

Use sidewalk forms that are of a height equal to the full depth of the finished sidewalk.

2.6.4 Curb and Gutter Forms

Use curb and gutter outside forms that have a height equal to the full depth of the curb or gutter. Use rigid forms for curb returns, except that benders or thin plank forms may be used for curb or curb returns with a radius of 10 feet or more, where grade changes occur in the return, or where the central angle is such that a rigid form with a central angle of 90 degrees cannot be used. Back forms for curb returns may be made of 1-1/2 inch benders, for the full height of the curb, cleated together. In lieu of inside forms for curbs, a curb "mule" may be used for forming and finishing this surface, provided the results are approved.

2.6.5 Biodegradable Form Release Agent

Use form release agent that is colorless and biodegradableand that is composed of at least 87 percent biobased material. Provide product that does not bond with, stain, or adversely affect concrete surfaces and does not impair subsequent treatments of concrete surfaces. Provide form release agent that does not contain diesel fuel, petroleum-based lubricating oils, waxes, or kerosene.

2.7 Detectable Warning System

Detectable Warning Systems shown on the Contract plans are to meet requirements of ICC A117.1 - Section 705.

PART 3 EXECUTION

3.1 SUBGRADE PREPARATION

Construct subgrade to the specified grade and cross section prior to concrete placement.

3.1.1 Sidewalk Subgrade

Place and compact the subgrade in accordance with Section 31 00 00 EARTHWORK Section . Test the subgrade for grade and cross section with a template extending the full width of the sidewalk and supported between side forms.

3.1.2 Curb and Gutter Subgrade

Place and compact the subgrade in accordance with Section 31 00 00 EARTHWORK Section 32 11 23 AGGREGATE BASE COURSE AND/ORGRADED CRUSHED AGGREGATE BASE COURSE FOR FLEXIBLE PAVING Section . Test the subgrade for grade and cross section by means of a template extending the full width of the curb and gutter. Use subgrade materials equal in bearing quality to the subgrade under the adjacent pavement.

3.1.3 Maintenance of Subgrade

Maintain subgrade in a smooth, compacted condition in conformity with the required section and established grade until the concrete is placed. The subgrade must be in a moist condition when concrete is placed. Prepare and protect subgrade so that it is free from frost when the concrete is deposited.

3.2 FORM SETTING

Set forms to the indicated alignment, grade and dimensions. Hold forms rigidly in place by a minimum of 3 stakes per form placed at intervals not to exceed 4 feet. Use additional stakes and braces at corners, deep sections, and radius bends, as required. Use clamps, spreaders, and braces where required to ensure rigidity in the forms. Remove forms in a manner that will not injure the concrete. Do not use bars or heavy tools against the concrete when removing the forms. Promptly and satisfactorily repair concrete found to be defective after form removal. Clean forms and coat with form oil or biodegradable form release agent each time before concrete is placed. Wood forms may, instead, be thoroughly wetted with water before concrete is placed, except that with probable freezing temperatures, oiling is mandatory.

3.2.1 Sidewalks

Set forms for sidewalks with the upper edge true to line and grade with an allowable tolerance of 1/8 inch in any 10 foot long section. After forms are set, grade and alignment must be checked with a 10 foot straightedge. Sidewalks must have a transverse slope as indicated of 1/4 inch per foot Unless otherwise indicated, construct sidewalks that are located adjacent to curbs with the low side adjacent to the curb. Do not remove side forms less than 12 hours after finishing has been completed.

3.2.2 Curbs and Gutters

Remove forms used along the front of the curb not less than 2 hours nor more than 6 hours after the concrete has been placed. Do not remove forms used along the back of curb until the face and top of the curb have been finished, as specified for concrete finishing. Do not remove gutter forms while the concrete is sufficiently plastic to slump in any direction.

3.3 SIDEWALK CONCRETE PLACEMENT AND FINISHING

3.3.1 Formed Sidewalks

Place concrete in the forms in one layer. When consolidated and finished, the sidewalks must be of the thickness indicated. Use a strike-off guided by side forms after concrete has been placed in the forms to bring the surface to proper section to be compacted. Consolidate concrete by tamping and spading or with an approved vibrator. Finish the surface to grade with a strike off.

3.3.2 Concrete Finishing

After straightedging, when most of the water sheen has disappeared, and just before the concrete hardens, finish the surface with a wood or magnesium float or darby to a smooth and uniformly fine granular or sandy texture free of waves, irregularities, or tool marks. Produce a scored surface by brooming with a fiber-bristle brush in a direction transverse to that of the traffic, followed by edging.

3.3.3 Edge and Joint Finishing

Finish all slab edges, including those at formed joints, with an edger having a radius of 1/8 inch. Edge transverse joints before brooming. Eliminate the flat surface left by the surface face of the edger with brooming. Clean and solidly fill corners and edges which have crumbled and areas which lack sufficient mortar for proper finishing with a properly proportioned mortar mixture and then finish.

3.3.4 Surface and Thickness Tolerances

Finished surfaces must not vary more than 5/16 inch from the testing edge of a 10-foot straightedge. Permissible deficiency in section thickness will be up to 1/4 inch.

3.4 CURB AND GUTTER CONCRETE PLACEMENT AND FINISHING

3.4.1 Formed Curb and Gutter

Place concrete to the required section in a single lift. Consolidate

concrete using approved mechanical vibrators. Curve shaped gutters must be finished with a standard curb "mule".

3.4.2 Curb and Gutter Finishing

Approved slipformed curb and gutter machines may be used in lieu of hand placement.

3.4.3 Concrete Finishing

Float and finish exposed surfaces with a smooth wood float until true to grade and section and uniform in texture. Brush floated surfaces with a fine-hair brush using longitudinal strokes. Round the edges of the gutter and top of the curb with an edging tool to a radius of 1/2 inch. Immediately after removing the front curb form, rub the face of the curb with a wood or concrete rubbing block and water until blemishes, form marks, and tool marks have been removed. Brush the front curb surface, while still wet, in the same manner as the gutter and curb top. Finish the top surface of gutter and entrance to grade with a wood float.

3.4.4 Joint Finishing

Finish curb edges at formed joints as indicated.

3.4.5 Surface and Thickness Tolerances

Finished surfaces must not vary more than 1/4 inch from the testing edge of a 10-foot straightedge. Permissible deficiency in section thickness will be up to 1/4 inch.

3.5 SIDEWALK JOINTS

Construct sidewalk joints to divide the surface into rectangular areas. Space transverse contraction joints at a distance equal to the sidewalk width or 5 feet on centers, whichever is less, and continuous across the slab. Construct longitudinal contraction joints along the centerline of all sidewalks 10 feet or more in width. Construct transverse expansion joints at sidewalk returns and opposite expansion joints in adjoining curbs. Where the sidewalk is not in contact with the curb, install transverse expansion joints as indicated. Form expansion joints around structures and features which project through or into the sidewalk pavement, using joint filler of the type, thickness, and width indicated. Expansion joints are not required between sidewalks and curb that abut the sidewalk longitudinally.

3.5.1 Sidewalk Contraction Joints

Form contraction joints in the fresh concrete by cutting a groove in the top portion of the slab to a depth of at least one-fourth of the sidewalk slab thickness. Unless otherwise approved or indicated, either use a jointer to cut the groove or saw a groove in the hardened concrete with a power-driven saw. Construct sawed joints by sawing a groove in the concrete with a 1/8 inch blade. Provide an ample supply of saw blades on the jobsite before concrete placement is started. Provide at least one standby sawing unit in good working order at the jobsite at all times during the sawing operations.

3.5.2 Sidewalk Expansion Joints

Form expansion joints using 1/2 inch joint filler strips. Joint filler in expansion joints surrounding structures and features within the sidewalk may consist of preformed filler material conforming to ASTM D1752 or building paper. Hold joint filler in place with steel pins or other devices to prevent warping of the filler during floating and finishing. Immediately after finishing operations are completed, round joint edges using an edging tool having a radius of 1/8 inch. Remove any concrete over the joint filler. At the end of the curing period, clean the top of expansion joints and fill with cold-applied joint sealant. Use joint sealant that is gray or stone in color. Thoroughly clean the joint opening before the sealing material is placed. Do not spill sealing material on exposed surfaces of the concrete. Apply joint sealing material only when the concrete at the joint is surface dry and atmospheric and concrete temperatures are above 50 degrees F. Immediately remove any excess material on exposed surfaces of the concrete and clean the concrete surfaces.

3.5.3 Reinforcement Steel Placement

Accurately and securely fasten reinforcement steel in place with suitable supports and ties before the concrete is placed.

3.6 CURB AND GUTTER JOINTS

Construct curb and gutter joints at right angles to the line of curb and gutter.

3.6.1 Contraction Joints

Construct contraction joints directly opposite contraction joints in abutting portland cement concrete pavements and spaced so that monolithic sections between curb returns will not be less than 5 feet nor greater than 15 feet in length.

a. Construct contraction joints (except for slip forming) by means of 1/8 inch thick separators and of a section conforming to the cross section of the curb and gutter. Remove separators as soon as practicable after concrete has set sufficiently to preserve the width and shape of the joint and prior to finishing.

b. When slip forming is used, cut the contraction joints in the top portion of the gutter/curb hardened concrete in a continuous cut across the curb and gutter, using a power-driven saw. Cut the contraction joint to a depth of at least one-fourth of the gutter/curb depth using a 1/8 inch saw blade.

3.6.2 Expansion Joints

Form expansion joints by means of preformed expansion joint filler material cut and shaped to the cross section of curb and gutter. Construct expansion joints in curb and gutter directly opposite expansion joints of abutting portland cement concrete pavement using the same type and thickness of joints as joints in the pavement. Where curb and gutter do not abut portland cement concrete pavement, provide expansion joints at least 1/2 inch in width at intervals not less than 30 feet nor greater than 120 feet. Seal expansion joints immediately following curing of the concrete or as soon thereafter as weather conditions permit. Seal

expansion joints and the top 1 inch depth of curb and gutter contraction-joints with joint sealant. Thoroughly clean the joint opening before the sealing material is placed. Do not spill sealing material on exposed surfaces of the concrete. Concrete at the joint must be surface dry and atmospheric and concrete temperatures must be above 50 degrees F at the time of application of joint sealing material. Immediately remove excess material on exposed surfaces of the concrete and clean concrete surfaces.

3.7 CURING AND PROTECTION

3.7.1 General Requirements

Protect concrete against loss of moisture and rapid temperature changes for at least 7 days from the beginning of the curing operation. Protect unhardened concrete from rain and flowing water. All equipment needed for adequate curing and protection of the concrete must be on hand and ready for use before actual concrete placement begins. Protect concrete as necessary to prevent cracking of the pavement due to temperature changes during the curing period.

3.7.1.1 Mat Method

Cover the entire exposed surface with two or more layers of burlap. Overlap mats at least 6 inches. Thoroughly wet the mat with water prior to placing on concrete surface and keep the mat continuously in a saturated condition and in intimate contact with concrete for not less than 7 days.

3.7.1.2 Impervious Sheeting Method

Wet the entire exposed surface with a fine spray of water and then cover with impervious sheeting material. Lay sheets directly on the concrete surface with the light-colored side up and overlapped 12 inches when a continuous sheet is not used. Use sheeting that is not less than 18-inches wider than the concrete surface to be cured. Secure sheeting using heavy wood planks or a bank of moist earth placed along edges and laps in the sheets. Satisfactorily repair or replace sheets that are torn or otherwise damaged during curing. Sheeting must remain on the concrete surface to be cured for not less than 7 days.

3.7.1.3 Membrane Curing Method

Apply a uniform coating of white-pigmented membrane-curing compound to the entire exposed surface of the concrete as soon after finishing as the free water has disappeared from the finished surface. Coat formed surfaces immediately after the forms are removed and in no case longer than 1 hour after the removal of forms. Do not allow concrete surface to dry before application of the membrane. If drying has occurred, moisten the surface of the concrete with a fine spray of water and apply the curing compound as soon as the free water disappears. Apply curing compound in two coats by hand-operated pressure sprayers at a coverage of approximately 200 square feet/gallon for the total of both coats. Apply the second coat in a direction approximately at right angles to the direction of application of the first coat. The compound must form a uniform, continuous, coherent film that will not check, crack, or peel and must be free from pinholes or other imperfections. If pinholes, abrasion, or other discontinuities exist, apply an additional coat to the affected areas within 30 minutes. Respray concrete surfaces that are subjected to heavy rainfall within 3

hours after the curing compound has been applied by the method and at the coverage specified above. Respray areas where the curing compound is damaged by subsequent construction operations within the curing period. Take precautions necessary to ensure that the concrete is properly cured at sawed joints, and that no curing compound enters the joints. Tightly seal the top of the joint opening and the joint groove at exposed edges before the concrete in the region of the joint is resprayed with curing compound. Use a method used for sealing the joint groove that prevents loss of moisture from the joint during the entire specified curing period. Provide approved standby facilities for curing concrete pavement at a location accessible to the jobsite for use in the event of mechanical failure of the spraying equipment or other conditions that might prevent correct application of the membrane-curing compound at the proper time. Adequately protect concrete surfaces to which membrane-curing compounds have been applied during the entire curing period from pedestrian and vehicular traffic, except as required for joint-sawing operations and surface tests, and from other possible damage to the continuity of the membrane.

3.7.2 Backfilling

After curing, remove debris and backfill, grade, and compact the area adjoining the concrete to conform to the surrounding area in accordance with lines and grades indicated.

3.7.3 Protection

Protect completed concrete from damage until accepted. Repair damaged concrete and clean concrete discolored during construction. Remove and reconstruct concrete that is damaged for the entire length between regularly scheduled joints. Refinishing the damaged portion will not be acceptable. Dispose of removed material as directed.

3.7.4 Protective Coating

Apply a protective coating of linseed oil mixture to the exposed-to-view concrete surface after the curing period, if concrete will be exposed to de-icing chemicals within 6 weeks after placement. Moist cure concrete to receive a protective coating.

3.7.4.1 Application

Complete curing and backfilling operation prior to applying two coats of protective coating. Concrete must be surface dry and clean before each application. Spray apply at a rate of not more than 50 square yards/gallon for first application and not more than 70 square yards/gallon for second application, except that the number of applications and coverage for each application for commercially prepared mixture must be in accordance with the manufacturer's instructions. Protect coated surfaces from vehicular and pedestrian traffic until dry.

3.7.4.2 Precautions

Do not heat protective coating by direct application of flame or electrical heaters and protect the coating from exposure to open flame, sparks, and fire adjacent to open containers or applicators. Do not apply material at ambient or material temperatures lower than 50 degrees F.

3.8 FIELD QUALITY CONTROL

Submit copies of all test reports within 24 hours of completion of the test.

3.8.1 General Requirements

Perform the inspection and tests described and meet the specified requirements for inspection details and frequency of testing. Based upon the results of these inspections and tests, take the action and submit reports as required below, and additional tests to ensure that the requirements of these specifications are met.

3.8.2 Concrete Testing

3.8.2.1 Strength Testing

Take concrete samples in accordance with ASTM C172/C172M not less than once a day nor less than once for every 250 cubic yards of concrete placed. Mold cylinders in accordance with ASTM C31/C31M for strength testing by an approved laboratory. Each strength test result must be the average of 2 test cylinders from the same concrete sample tested at 28 days, unless otherwise specified or approved. Concrete specified on the basis of compressive strength will be considered satisfactory if the averages of all sets of three consecutive strength test results equal or exceed the specified strength, and no individual strength test result falls below the specified strength by more than 500 psi.

3.8.2.2 Air Content

Determine air content in accordance with ASTM C173/C173M or ASTM C231/C231M. Use ASTM C231/C231M with concretes and mortars made with relatively dense natural aggregates. Make two tests for air content on randomly selected batches of each class of concrete placed during each shift. Make additional tests when excessive variation in concrete workability is reported by the placing foreman or the Government inspector. Notify the placing foreman if results are out of tolerance. The placing foreman must take appropriate action to have the air content corrected at the plant. Additional tests for air content will be performed on each truckload of material until such time as the air content is within the tolerance specified.

3.8.2.3 Slump Test

Perform two slump tests on randomly selected batches of each class of concrete for every 250 cubic yards, or fraction thereof, of concrete placed during each shift. Perform additional tests when excessive variation in the workability of the concrete is noted or when excessive crumbling or slumping is noted along the edges of slip-formed concrete.

3.8.3 Thickness Evaluation

Determine the anticipated thickness of the concrete prior to placement by passing a template through the formed section or by measuring the depth of opening of the extrusion template of the curb forming machine. If a slip form paver is used for sidewalk placement, construct the subgrade true to grade prior to concrete placement. The thickness will be determined by measuring each edge of the completed slab.

3.8.4 Surface Evaluation

Provide finished surfaces for each category of the completed work that are uniform in color and free of blemishes and form or tool marks.

3.9 SURFACE DEFICIENCIES AND CORRECTIONS

3.9.1 Thickness Deficiency

When measurements indicate that the completed concrete section is deficient in thickness by more than 1/4 inch the deficient section will be removed, between regularly scheduled joints, and replaced.

3.9.2 High Areas

In areas not meeting surface smoothness and plan grade requirements, reduce high areas either by rubbing the freshly finished concrete with carborundum brick and water when the concrete is less than 36 hours old or by grinding the hardened concrete with an approved surface grinding machine after the concrete is 36 hours old or more. The area corrected by grinding the surface of the hardened concrete must not exceed 5 percent of the area of any integral slab, and the depth of grinding must not exceed 1/4 inch. Remove and replace pavement areas requiring grade or surface smoothness corrections in excess of the limits specified.

3.9.3 Appearance

Exposed surfaces of the finished work will be inspected by the Contracting Officer and deficiencies in appearance will be identified. Remove and replace areas which exhibit excessive cracking, discoloration, form marks, or tool marks or which are otherwise inconsistent with the overall appearances of the work.

3.10 DETECTABLE WARNING SYSTEM

Install Detectable Warning Systems required by Contract plans in accordance with ICC A117.1, Section 705, and by manufacturers' installation instructions.

-- End of Section --