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For latest updates to UFGS Prescriptive Technical Specifications, refer to the www.wbdg.org web site for Unified Facility Guide Specifications with UFGS notes specific to NAVFAC and NAVFAC Pacific area.

UFGS that have been unified for use by all participating agencies have a level 3 or level 4 MasterFormat™ number. UFGS that are agency-specific have a fifth level number indicating it as an agency specific specification. A specification that has a fifth level number "10" indicates USACE, a "20" indicates NAVFAC, a "30" indicates AFCEA, and a "40" indicates NASA. Preparing agencies are indicated in the UFGS header of each specification. Users of UFGS should first consider a unified UFGS if one is available, next a UFGS identified as specific to NAVFAC, "20" and lastly a UFGS identified as specific to another agency.

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SECTION 00 01 15

LIST OF DRAWINGS

01/07

PART 1 GENERAL

1.1 SUMMARY

This section lists the drawings for the project pursuant to contract clause "DFARS 252.236-7001, Contract Drawings, Maps and Specifications."

1.2 CONTRACT SKETCHES (CONTRACT SKETCHES ARE LOCATED AT THE END OF SPECIFICATIONS)

Contract sketches are as follows:

SKETCH NO.	TITLE
00 01 15-AA	FLEXIBLE PAVEMENT OVERLAY
00 01 15-AB	FLEXIBLE PAVEMENT TRANSITION DETAIL
00 01 15-AC	A.C. PAVEMENT REPAIR - TYPE I
00 01 15-AD	A.C. PAVEMENT REPAIR - TYPE II
00 01 15-AE	A.C. PAVEMENT REPAIR - TYPE III
00 01 15-AF	A.C. PAVEMENT REPAIR - TYPE IV
00 01 15-AG	A.C. CURB SECTION
00 01 15-AH	STANDARD CURB PAINTING
00 01 15-AI	RAISED PAVEMENT MARKERS
00 01 15-AJ	TYPICAL MARKING LAYOUT (Standard traffic stripes)
00 01 15-AK	TYPICAL MARKING LAYOUT (standard traffic stripes)
00 01 15-AL	TYPICAL MARKING LAYOUT (intersection)
00 01 15-AM	TYPICAL MARKING LAYOUT (intersection)
00 01 15-AN	TYPE "A" CROSSWALK DETAIL
00 01 15-AO	TYPE "B" CROSSWALK DETAIL
00 01 15-AP	TYPE "C" CROSSWALK DETAIL
00 01 15-AQ	PARALLEL PARKING STALLS
00 01 15-AR	90 DEGREE PARKING STALLS
00 01 15-AS	60 DEGREE PARKING STALLS
00 01 15-AT	45 DEGREE PARKING STALLS
00 01 15-AU	ARROW DETAIL
00 01 15-AV	ARROW DETAIL
00 01 15-AW	ARROW DETAIL
00 01 15-AX	PAVEMENT WORD MARKING
00 01 15-AY	PAVEMENT WORD MARKING
00 01 15-AZ	TYPICAL HANDICAP LOGO
00 01 15-BA	HANDICAP LOGO - PROPORTION
00 01 15-BB	CONCRETE THROUGH GUTTER
00 01 15-BC	INSTALLATION OF CONCRETE SIDEWALK
00 01 15-BD	CAST-IN-PLACE CONCRETE CURB
00 01 15-BE	CONCRETE PARKING BUMPER
00 01 15-BF	TYPICAL HANDICAP SIGNS

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SECTION 01 11 00

SUMMARY OF WORK

08/11

PART 1 GENERAL

1.1 REFERENCES

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

ASTM INTERNATIONAL (ASTM)

ASTM E2114 (2008) Standard Terminology for Sustainability Relative to the Performance of Buildings

1.2 DEFINITIONS

Definitions pertaining to sustainable development are as defined in ASTM E2114, , and as specified.

- a. "Environmentally preferable products" have a lesser or reduced effect on the environment in comparison to conventional products and services. This comparison may consider raw materials acquisition, production, manufacturing, packaging, distribution, reuse, operation, maintenance, or disposal of the product.
- b. "Indoor environmental quality" is the physical characteristics of the building interior that impact occupants, including air quality, illumination, acoustics, occupant control, thermal comfort, daylighting, and views.
- c. "Operational performance" is the functional behavior of the building as a whole or of the building components.
- d. "Sustainability" is the balance of environmental, economic, and societal considerations.

1.3 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are for Contractor Quality Control approval. The following shall be submitted in accordance with Section 01 33 00 SUBMITTAL PROCEDURES:

1.4 WORK COVERED BY CONTRACT DOCUMENTS

1.4.1 Project Description

The work includes material, labor, equipment and supervision to perform asphaltic concrete pavement work; portland cement concrete work; including sidewalks and curbs; marking and striping of pavement; signage and incidental related work.

1.4.2 Location

The work shall be located at the Navy, Marine Corp, Air Force, and other Federal facilities in the State of Hawaii, approximately as indicated. The exact location will be shown by the Contracting Officer on each individual task order.

1.5 PROJECT ENVIRONMENTAL GOALS

Contractor shall distribute copies of the Environmental Goals to each subcontractor and the Contracting Officer. The overall goal for design, construction, and operation is to produce a building that meets the functional program needs and incorporates the principles of sustainability. Specifically:

- a. Preserve and restore the site ecosystem and biodiversity; avoid site degradation and erosion. Minimize offsite environmental impact.
- b. Use the minimum amount of energy, water, and materials feasible to meet the design intent. Select energy and water efficient equipment and strategies.
- c. Use environmentally preferable products and decrease toxicity level of materials used.
- d. Use renewable energy and material resources.
- e. Optimize operational performance (through commissioning efforts) in order to ensure energy efficient equipment operates as intended. Consider the durability, maintainability, and flexibility of building systems.
- f. Manage construction site and storage of materials to ensure no negative impact on the indoor environmental quality of the building.
- g. Reduce construction waste through reuse, recycling, and supplier take-back.

1.5.1 Independent Verification

1.6 OCCUPANCY OF PREMISES

Building(s) may be occupied during performance of work under this Contract. Occupancy notifications will be posted in a prominent location in the work area.

Before work is started, the Contractor shall 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.

1.7 EXISTING WORK

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

- a. Remove or alter existing work in such a manner as to prevent injury or damage to any portions of the existing work which remain.
- b. Repair or replace portions of existing work which have been

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

1.8 LOCATION OF UNDERGROUND UTILITIES

Obtain digging permits prior to start of excavation by contacting the Contracting Officer 15 calendar days in advance. Scan the construction site with Ground Penetrating Radar and electromagnetic or sonic equipment, and mark the surface of the ground, pier deck or paved surface where existing underground utilities or utilities encased in pier structures are discovered. Verify the elevations of existing piping, utilities, and any type of underground or encased obstruction not indicated to be specified or removed but 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.

1.8.1 Notification Prior to Excavation

Notify the Contracting Officer at least 48 hours prior to starting excavation work.

1.9 SALVAGE MATERIAL AND EQUIPMENT

Items designated by the Contracting Officer to be salvaged shall remain the property of the Government.

The salvaged property shall be segregated, itemized, delivered, and off-loaded at the Government designated storage area located within the contract area or where indicated in each task order.

Contractor shall maintain property control records for material or equipment designated as salvage. Contractor's system of property control may be used if approved by the Contracting Officer. Contractor shall be responsible for storage and protection of salvaged materials and equipment until disposition by the Contracting Officer.

PART 2 PRODUCTS

Not used.

PART 3 EXECUTION

Not used.

-- End of Section --

SECTION 01 14 00

WORK RESTRICTIONS

11/11

PART 1 GENERAL

1.1 DEFINITIONS

1.1.1 State

"State" when used in reference to states of the United States also includes the Territory of Guam.

1.2 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are for Contractor Quality Control approval. The following shall be submitted in accordance with Section 01 33 00 SUBMITTAL PROCEDURES:

SD-01 Preconstruction Submittals

Visit Request for Pearl Harbor Naval Shipyard Form (PHNSY 14ND-SYD-5512/28); G

Completed Special Access Determination (NAVSEA 5510/15); G

Pier parking authorization; G

Government guard services; G

List of Contact Personnel; G

Personnel List; G

Vehicle List; G

Statement of Acknowledgement Form SF 1413; G

1.3 SPECIAL SCHEDULING REQUIREMENTS

Have materials, equipment, and personnel required to perform the work at the site prior to the commencement of the work.

b. The base 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, and/or utility service must be requested in writing a minimum of 15 calendar days prior to the desired date of interruption.

1.4 CONTRACTOR ACCESS AND USE OF PREMISES

1.4.1 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. Ingress and egress of Contractor vehicles at the Activity is limited to the H-3 gate. To minimize traffic congestion, delivery of materials must be outside of peak traffic hours (6:30 to 8:00 a.m. and 3:30 to 5:00 p.m.) unless otherwise approved by the Contracting Officer. Wear hard hats in designated areas. Do not enter any restricted areas unless required to do so and until cleared for such entry. Mark Contractor equipment for identification.

1.4.1.1 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.

1.4.1.2 Identification Badges and Installation Access

Application for and use of badges will be as directed. Obtain access to the installation by participating in the Navy Commercial Access Control System (NCACS), or by obtaining passes each day from the Base Pass and Identification Office. Costs for obtaining passes through the NCACS are the responsibility of the Contractor. One-day passes, issued through the Base Pass and Identification Office, will be furnished without charge. Furnish a completed EMPLOYMENT ELIGIBILITY VERIFICATION (DHS FORM I-9) form for all personnel requesting badges. This form is available at <http://www.uscis.gov/portal/site/uscis> by searching or selecting Employment Verification (Form I-9) . Immediately report instances of lost or stolen badges to the Contracting Officer.

- a. NCACS Program: NCACS is a voluntary program in which Contractor personnel who enroll, and are approved, are subsequently granted access to the installation for a period up to one year, or the length of the contract, whichever is less, and are not required to obtain a new pass from the Base Pass and Identification Office for each visit. The Government performs background screening and credentialing. Throughout the year the Contractor employee must continue to meet background screening standards. Periodic background screenings are conducted to verify continued NCACS participation and installation access privileges. Under the NCACS program, no commercial vehicle inspection is required, other than for Random Anti-Terrorism Measures (RAM) or in the case of an elevation of Force Protection Conditions (FPCON). Information on costs and requirements to participate and enroll in NCACS is available at <http://www.rapidgate.com> or by calling 1-877-727-4342.
- b. One-Day Passes: Participation in the NCACS is not mandatory, and if the Contractor chooses to not participate, the Contractor's personnel will have to obtain daily passes, be subject to daily mandatory vehicle inspection, and will have limited access to the installation. The Government will not be responsible for any cost or lost time associated with obtaining daily passes or added vehicle inspections incurred by non-participants in the NCACS.

1.4.1.3 FISC Pearl Harbor Safety/Security Policy

Non-FISC personnel requiring access to FISC property must check in at the Fuel Department, FISC Operations Division, B1757 1st deck, at the beginning and end of each work day. Keys to Fuel Facilities will be issued daily

between the hours of 6:30 a.m. and 4:00 p.m. Keys must be returned by 7:00 p.m. the same day. An after-hours drop box is located outside B1757.

At the end of each workday, update the check-in board in the FISC Operations Division and provide information as follows for the next workday:

- a. Contract name or number
- b. Name of person responsible for work crew(s)
- c. Emergency phone numbers
- d. Number of workers in crew
- e. Location of work
- f. Type of work to be conducted
- g. FISC support required:
 - 1) Transportation
 - 2) Draining of pipe
 - 3) Outages
 - 4) Elevator use
 - 5) Other

Route hot work permits to the FISC Fuel Department (Code 701) for approval. Following approval, submit permit to the Federal Fire Department (FFD). After approval by the FFD, submit a copy of the permit and the Marine Chemist Gas Free Certificate to the Fuels Operations Division for record.

1.4.1.4 No Smoking Policy

Smoking is prohibited within and outside of all buildings on installations under the cognizance of NAVFAC 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.

1.4.2 Working Hours

Regular working hours must consist of an 8 1/2 hour period, between 7:00 a.m. to 3:30 p.m., Monday through Friday, excluding Government holidays.

1.4.3 Work Outside Regular Hours

Work outside regular working hours requires Contracting Officer approval. Make application 21 calendar days prior to such work to allow arrangements to be made by the Government for inspecting the work in progress, giving the specific dates, hours, location, type of work to be performed, contract number and project title. Based on the justification provided, the Contracting Officer may approve work outside regular hours. During periods of darkness, the different parts of the work must be lighted in a manner

approved by the Contracting Officer. Make utility cutovers after normal working hours or on Saturdays, Sundays, and Government holidays unless directed otherwise.

1.4.4 Occupied Buildings

The Contractor shall be working around existing buildings which are occupied. Do not enter the buildings without prior approval of the Contracting Officer.

1.4.5 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 the 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, telephone service, electric service, air conditioning, heating, fire alarm, compressed air, are considered utility cutovers pursuant to the paragraph entitled "Work Outside Regular Hours." Such interruptions are further limited to approved hours. This time limit includes time for deactivation and reactivation.
- d. Operation of Station Utilities: The Contractor must not operate nor disturb the setting of control devices in the station utilities system, including water, sewer, electrical, and steam services. The Government will operate the control devices as required for normal conduct of the work. The Contractor must notify the Contracting Officer giving reasonable advance notice when such operation is required.

1.4.6 SHIPYARD AREA WORK CLEARANCE REQUEST

Coordinate excavation and electrical work, including testing and trouble shooting of circuits, within the Pearl Harbor Shipyard with Public Works Center Code 600 and NAVSHIPYD Code 308 via the Contracting Officer. Furnish the:

- a. Contract title and number
- b. Specific location of work
- c. Reason for work
- d. Duration of work

1.4.6.1 Shipyard Hazardous Areas

Do not enter into work areas where Shipyard personnel are using protective equipment such as respirator and masks or marked boundary areas without prior approval.

1.4.7 RESTRICTIONS ON USE OF YELLOW, ORANGE-YELLOW, RED, AND MAGENTA MATERIALS

The use of yellow, yellow-orange, red and magenta materials for the

following purposes is prohibited: sheeting, tarpaulins, polyethylene bottles or other containers, tapes, bags, banding of identification marks on tools, and boundary markers such as ribbons. Obtain Contracting Officer's prior approval for use of such colored materials for other purposes, such as buried vapor barrier membranes.

1.5 SECURITY REQUIREMENTS

1.5.1 Employment Restrictions For NAVFAC PAC

For projects in the Shipyard Controlled Industrial Area (CIA) and Sensitive Areas see "EXTRAORDINARY SECURITY REQUIREMENTS FOR PEARL HARBOR."

The Contractor must not employ any person, for any work required by this contract, who: (1) is a non-immigrant as described in section 101(a)(15)(H)(ii) of the Immigration and Nationality Act (8 U.S.C. 1101(a)(15)(H)(ii)), (2) is an alien having a residence in a foreign country which he has no intention of abandoning and who is coming to the United States to perform temporary services or labor.

1.5.2 Personnel List

Submit for approval, at least 15 days prior to the desired date of entry, an original alphabetical list of personnel who require entry into Government property to perform work on the project. Furnish for each person:

- a. Name
- b. Date and place of birth
- c. Citizenship
- d. Home address
- e. Social security number
- f. Current pass expiration date
- g. Naturalization or Alien Registration number
- h. Passport number, place of issue, and expiration date

1.5.2.1 Citizenship Requirements

Aliens will not be admitted to the work site without approval. Aliens are not allowed on the project site. Work under this contract is restricted to U.S. citizens.

1.5.2.2 Documents Acceptable for Proof of Citizenship

- a. Birth registration card
- b. Certificate of live birth, birth certificate
- c. Certificate of Naturalization
- d. Certificate of registration

- e. DD-214 (Must Cite Birthplace)
- f. DD Form 4 (Contract for Enlistment and Must Cite Birthplace)
- g. DD 1966 (Application for Enlistment)
- h. Military discharge papers (must cite birthplace)
- i. Delayed birth certificate
- j. Hawaii certificate of foreign birth
- k. Hospital birth certificate
- l. Marriage license certificate
- m. Merchant marine certificate
- n. Military officer ID card
- o. Notification of birth registration
- p. State of Hawaii ID card
- q. USA passport
- r. Verbal inquiry with State of Hawaii Vital Statistics Office

1.5.3 Vehicle List

Submit an original list of vehicles to be utilized at the work site with the following information for each vehicle:

- a. Make
- b. Year
- c. Model
- d. License number
- e. Registered owner
- f. Current NAVBASE Pearl Harbor pass expiration date.

1.5.4 Passes

Submit request for personnel and vehicle passes together. Include the Certificate of Insurance for Contractor and Subcontractor(s) and the Statement of Acknowledgement Form SF 1413 with the submittal. Passes will normally be issued within 21 days.

Obtain a blank vehicle pass from the ROICC Kaneohe office, Building 566, and complete and submit it to the Contracting Officer for processing. Include with the submittal, a Certificate of Insurance for Contractor and Subcontractor(s), the Statement of Acknowledgement Form SF 1413 (for Subcontractors only), a Vehicle List, and a Personnel List with Citizenship. Passes will normally be issued within 21 calendar days.

1.5.4.1 Control

Maintain strict accountability over passes. Immediately report to the source of issue, passes missing or lost and the circumstances. If the Contractor has another active contract or one commencing immediately, employees' names may be transferred from one contract to the other. Final payment will not be effected until employees are transferred to another contract or the records are cleared. Furnish a signed letter, countersigned by the source of issue, stating that passes have been turned in.

1.6 EXTRAORDINARY SECURITY REQUIREMENTS FOR PEARL HARBOR

1.6.1 Shipyard CIA and Sensitive Areas

For PHNSY & IMF projects the Contractor shall follow the memo titled, "Security Requirements Applicable for Pearl Harbor Naval Shipyard & IMF's Controlled Industrial Area, Other Sensitive Areas, Controlled Nuclear Information Areas, and/or Nuclear Work Areas," dated Aug, 2013 or the latest dated edition.

U.S. citizen employees of a foreign owned, controlled, and/or influenced company (including a parent company) for access purposes are considered foreign nationals and special authorization would be required for escorted access to PHNSY & IMF spaces

Six weeks prior to entry into the CIA, submit a visit request for Pearl Harbor Naval Shipyard form (PHNSY 14ND-SYD-5512/28) to the Contracting Officer. The Visit Request must include certification of U.S. citizenship. Entry into the CIA for those listed on the Visit Request may be authorized under one of the following conditions:

- a. Contractors having a DOD Facility Security Clearance and whose employees have a DOD security clearance may be badged for immediate unescorted access into the CIA.
- b. Employees and representatives having current Shipyard ID badges authorizing CIA access will be permitted entry into the CIA.
- c. Employees not holding a current DOD security clearance or current CIA access badge must establish suitability and eligibility based on a Local Record Check (LRC) prior to being badged for unescorted CIA access. A LRC may take up to 3 weeks to process. Provide a Completed Special Access Determination (NAVSEA 5510/15) (Apr 90) for each employee.
- d. For situations other than the above, employees or representatives requiring CIA access may be issued an "Escort Required" ("ER") pass for CIA access under the escort of a cleared individual employed by the activity. Processing of "ER" passes may take up to 5 days.
 - (1) The initial submittal of Visit Request forms need not be all inclusive. It may be expanded to meet essential requirements of the Contractor. Each individual added to the list, however, is subject to the same pre-entry screening requirements as outlined above.
 - (2) Shipyard ID badges will be issued by the Shipyard Pass and Identification Office (Pass and ID Office) located in Building 207

at Eighth Street and Avenue "E."

1.6.2 Vehicle Regulations in the Shipyard CIA

No vehicle will be permitted access to a work site in the CIA without a valid Naval Base vehicle pass and a Shipyard vehicle pass. Naval Base vehicle passes are issued by the Base Security Office located in Building 3455 outside the Nimitz Gate. The Shipyard vehicle passes are issued by the Shipyard Pass and ID Office. Shipyard vehicle passes will not be issued unless a Naval Base vehicle pass has been obtained and proof of vehicle registration to the Contractor's company has been presented to Shipyard Pass and ID. Vehicles are required to conform to Shipyard traffic regulations. The speed limit is 15 mph in the CIA. Outside the CIA, the speed limit is as posted or marked.

1.6.2.1 Shipyard Vehicle Pass

Only those Contractor vehicles meeting the following criteria will be allowed to enter the CIA with the Shipyard vehicle pass:

- a. Vehicles must clearly display an authorized company sign or logo.
- b. Vehicles must be company or commercial vehicles used to transport heavy equipment or material to the job site or to conduct bona fide and required inspections and surveillance at the job site. Privately-owned vehicles will not be used to transport employees to the job site and will not be allowed in the CIA.

1.6.2.2 Commercial Vehicles

Vehicle passes will be issued to each commercial vehicle that is required for the job, authorizing entry and parking within the CIA. Every vehicle entering the CIA will display the pass on the dashboard or visor (facing outward). The pass will be visible at all times while in the CIA. Parking is limited to those areas that are specifically identified on the pass. If additional passes are required, present adequate justification to the Pass and ID Office via the Contracting Officer.

1.6.2.3 Gates

Vehicles must enter and exit from one of the two 24-hour gates located on Avenue "C" or on Fifth Street.

1.6.3 Parking

Prohibited on any piers and dry dock/waterfront areas. Do not park on or block the marked fire lanes at any time. An exception may be made for vehicles which are part of the equipment needed to do the required work and are attached or connected to the pier or ship; for example, a truck which uses a mounted generator or a vehicle with built-in equipment. For the CIA area, submit a written request for pier parking authorization with justification to the Shipyard Security Officer (Code 1125.2) via the Contracting Office at least 2 weeks prior to the date parking space is required. To obtain parking permits, limited to five, for Bravo pier side parking, submit a written request with justification to the ROICC. Permits do not include heavy equipment, loading/unloading operations or vehicles with Federal Fire Department (FFD) permission for support of immediate work activities in the fire lane. Permits are issued by the Port Operations Officer. Include with request the license number of the vehicle(s), make,

model, year, and size of the vehicle(s) (pickup truck, crane, or forklift), parking location, and purpose and duration. Harbor Operations will monitor dock operations and will have vehicle violators ticketed/towed. For permission to stage construction equipment in or protruding into the Bravo pier fire lanes, contact the FFD, c/o Fire Prevention Chief, pager 473-5199.

1.6.3.1 Parking Locations

Parking for privately-owned vehicles is available in lots "A" and "D" on Avenue "D," located between South Avenue and Eighth Street, and in lot "C" on Sixth Street and Central Avenue.

1.6.4 Vehicle Searches

Vehicles are subject to search while entering, remaining in, or leaving the Shipyard or Naval Base areas. Government material being transported out of the CIA must be covered by a Property Pass (OP-7), issued and signed by the Contracting Officer. Material found without a Property Pass will be confiscated and a police offense report issued.

1.6.5 Authorization of Entry

Coordinate entry into shop/office/ship spaces with respective Shop Superintendent/Office Head/Ship's Commanding Officer via the Contracting Officer.

1.6.6 Escort

For entrance to and work inside any building inside the CIA, contact the cognizant Shipyard code for escort services in the affected area.

1.6.7 Government Guard Services

The Shipyard Security Officer (SSO) will provide guard services on a reimbursable basis for work on CIA perimeter fence job sites. Notify and obtain approval from the SSO via the Contracting Office at least 48 hours prior to the time guard services will be required. Submit in writing the purpose and number of hours guard services will be required. Any work on the CIA fence must be completed by the end of the work day or the openings resulting from that work must be closed to prevent unauthorized access.

1.6.8 Areas Not Covered by Contract

Contractor personnel will not be permitted to enter Shipyard buildings, spaces, and areas not covered by this contract except on prior approval of the Shipyard department/office/shop having jurisdiction of the areas. Coordinate action with the Contracting Officer to obtain such entry approval.

1.6.9 Access to Unclassified Information

Access to unclassified U.S. Navy shipbuilding, conversion, or repair technology and related technical information manuals, documents, drawings, plans, specifications, and other unclassified information is restricted to official need-to-know basis, designated by physical markings to show the appropriate control designations. Handle, control, and safeguard to prevent oral, visual, and documentary disclosure to the public, to foreign sources, and to personnel not having an official need-to-know. Return this information to the Pearl Harbor Naval Shipyard upon completion of

contracted work, except when specific retention authorization is granted by the Contracting Officer.

1.6.10 Photographs

Photography is prohibited in the Pearl Harbor Naval Shipyard. When operationally required, submit a written request containing specific justification and details to the Video Production Center (Code 103) via review by the Security Officer prior to release.

1.6.11 Contractor Regulations

Comply with the following conditions:

- a. Submit a Visit Request (VR) and Special Access Determination (SAD) for each person listed to the Security Officer (Code 1125.2) via the Contracting Officer at least 6 weeks prior to the start date.
- b. Employees and representatives requiring access are U.S. citizens or U.S. nationals.
- c. Under no circumstances must personnel hand-carry their own visit request.
- d. Employees must provide documented proof of U.S. citizenship to the Pass and ID Office prior to being issued a Shipyard badge.
- e. Employees must be available for interviews upon request by the Shipyard Personnel Security Specialist.
- f. Employees' representatives must attend a 15-minute orientation on the safety, security, and radiological protection aspects of industrial operations within the Shipyard. The briefing, in the form of a video tape presentation, will be given at the Pass and ID Office in groups of 10, prior to the issuance of Shipyard badges or passes. Special arrangements for larger groups can be arranged on request.
- g. Employees must wear and display the Shipyard badge in the chest area at all times while entering, remaining in, and exiting Shipyard spaces and each badge must be used only by the specific individual named on the badge.
- h. Vehicles in Shipyard areas must display a valid Naval Base vehicle pass and must have company's name on both sides of any vehicle that enters the CIA.
- i. Maintain strict accountability over identification badges and passes issued by the Pass and ID office. Immediately report to the Pass and ID Office, any badges/passes missing or lost and the circumstances. Return badges/passes to the Contracting Officer immediately upon termination of any employee, expiration, completion of contract, or when no longer required. The Contracting Officer will ensure that all badges/passes are returned and forwarded to the Shipyard Pass and ID Office (Code 1125.2).
- j. Restrict hours of work to 7:00 a.m. - 3:30 p.m. Monday through Friday, work days only. When operational needs require scheduling of work after 3:30 p.m. (Monday through Friday) or on weekends and holidays, provide written notification at least 2 weeks in advance to the

Contracting Officer who will obtain approval from the respective Shipyard departments, offices, and shops. Such notifications will include specific dates, hours of work, location of work, type of work to be performed, contract number and project title. The Contracting Officer will provide a copy of the notification to the Security Officer along with written notification that work, as scheduled, has been approved by the respective department, office, or shop concerned.

- k. Restrict employees/representatives to the work site and control travel directly to and from the work site.
- l. Ensure that yellow plastic material is not used for warning signs, covering materials, etc.
- m. Restore all traffic/parking/security signs and markings, including space numbers, designations, and lines, to their original form if such signs/markings are defaced or deleted during construction/repair.
- n. Be responsible for control and security of Contractor-owned equipment and materials at the work site. Report immediately, missing/lost/stolen property to the Naval Base Police Department (phone 474-1237) as each case occurs.
- o. Ensure that no material is stacked within 10 feet of the CIA perimeter. Remove from the work site, or secure ladders or other such equipment which could be used to climb the CIA perimeter fence. Ensure that no vehicles are parked within 10 feet of the CIA perimeter.
- p. Provide written notification to the Commander, Pearl Harbor Naval Shipyard via the Contracting Officer 2 weeks prior to actual start of work to allow for notification of the appropriate Shipyard departments, offices, and shops of the impact resulting from the contract work. Such notifications will include specific details such as work schedules (including actual start date for Shipyard entry) and impact.
- q. Ensure that no openings in the roof/walls/windows/fence of the building exist at the end of the work day and do not exist where penetration is possible during non-working hours. If the building cannot be secured at the end of the work day, coordinate action with the Contracting Office to notify the cognizant code to arrange for a security watch by their personnel.
- r. Seventy-two hours prior to making any penetrations (such as tunneling under, cutting through a fence or building) in a restricted area, contact Code 1125.2 to make arrangements for a security guard or other measures required to meet all security requirements. Cost of security guard will be charged to the Contractor.

1.6.12 Other Sensitive Areas

1.6.12.1 Extraordinary Security Requirements

The Contract Clause entitled "Identification of Employees" and the following apply:

- a. Vehicle searches. All construction vehicles will be searched by the Marine sentry.
- b. Photographs. Photographs are prohibited in and around the building

unless a written request containing specific justification and details is approved by the security officer via the Contracting Officer. Four days' advance notice is required. Photographs, when approved, must only be taken in the presence of an activity escort.

c. Personnel restrictions. Due to sensitivity of building operations, the following apply:

- (1) Restrict personnel to the designated work site.
- (2) Contractor's movements within the building will be restricted. Contractor personnel will be escorted to and from designated work areas. Contractor personnel are not permitted outside of designated work areas without being escorted by authorized personnel. Submit requests for entry into the building 4 days in advance with information required by paragraph entitled "Personnel List" for submission to the "Division Project Officer" through the Contracting Officer.

PART 2 PRODUCTS

Not Used

PART 3 EXECUTION

Not Used

-- End of Section --

SECTION 01 20 00.00 20

PRICE AND PAYMENT PROCEDURES

11/11

PART 1 GENERAL

1.1 REFERENCES

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

U.S. ARMY CORPS OF ENGINEERS (USACE)

EP-1110-1-8 (2009) Construction Equipment Ownership and Operating Expense Schedule

1.2 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are for Contractor Quality Control approval. The following shall be submitted in accordance with Section 01 33 00 SUBMITTAL PROCEDURES:

SD-01 Preconstruction Submittals

Earned Value Report; G

1.3 EARNED VALUE REPORT

1.3.1 Data Required

This contract requires the use of a cost-loaded Network Analysis Schedule (NAS). The information required for the Schedule of Prices will be entered as an integral part of the Network Analysis Schedule. Within 15 calendar days of notice of award, prepare and deliver to the Contracting Officer an Earned Value Report (construction contract) as directed by the Contracting Officer. Provide a detailed breakdown of the contract price, giving quantities for each of the various kinds of work, unit prices, and extended prices. Costs shall be summarized and totals provided for each construction category.

1.3.2 Schedule Instructions

Payments will not be made until the Earned Value Report from the cost-loaded NAS has been submitted to and accepted by the Contracting Officer. Identify the cost for site work, and include incidental work to the 5 ft line. Identify costs for the building(s), and include work out to the 5 ft line. Work out to the 5 ft line shall include construction encompassed within a theoretical line 5 ft from the face of exterior walls and shall include attendant construction, such as pad mounted HVAC cooling equipment, cooling towers, and transformers placed beyond the 5 ft line.

1.3.3 Real Property Assets

The Government will provide the Draft DD Form 1354, Transfer and Acceptance of Military Real Property filled in with the appropriate Real Property

Unique Identifiers (RPUID) and related construction Category Codes to summarize the designed real property assets that apply to this contract. The Contractor shall meet with the Contracting Officer and the Real Property Accounting Officer during the Pre Construction Meeting and the Project Closeout Meetings to modify and include any necessary changes to the DD Form 1354. The Contractor shall provide the Interim DD Form 1354 that uses the appropriate division of the RPUIDs/ Category Codes to represent the final constructed facility and include all associated cost. Coordinate the Contractor's Price and Payment structure with the structure of the RPUIDs/ Category Codes.

Divide detailed asset breakdown into the RPUIDs and related construction Category Codes and populate associated costs which represent all aspects of the work. Where assets diverge into multiple RPUID/ Category Codes, divide the asset and provide the proportion of the assets in each RPUID/ Category Code. Assets and related RPUID/ Category Codes may be modified by the Contracting Officer as necessary during course of the work. Coordinate identification and proportion of these assets with the Government Real Property Accounting Officer.

Cost data accumulated under this section are required in the preparation of DD Form 1354.

1.4 CONTRACT MODIFICATIONS

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

1.5 CONTRACTOR'S INVOICE AND CONTRACT PERFORMANCE STATEMENT

1.5.1 Content of Invoice

Requests for payment will be processed in accordance with the Contract Clause FAR 52.232-27, Prompt Payment Construction Contracts and FAR 52.232-5, Payments Under Fixed-Price Construction Contracts. The requests for payment shall include the documents listed below.

- a. The Contractor's invoice, on NAVFAC Form 7300/30 furnished by the Government, showing in summary form, the basis for arriving at the amount of the invoice. Form 7300/30 shall include certification by Quality Control (QC) Manager as required by the contract.
- b. The Earned Value Report from the cost-loaded NAS, showing in detail: the estimated cost, percentage of completion, and value of completed performance for each of the construction categories stated in this contract.
- c. Updated Project Schedule and reports required by the contract.
- d. Contractor Safety Self Evaluation Checklist.
- e. Other supporting documents as requested.
- f. Updated copy of submittal register.
- g. Invoices not completed in accordance with contract requirements will be

returned to the Contractor for correction of the deficiencies.

1.5.2 Submission of Invoices

If NFAS Clause 5252.232-9301 is included in the contract, the documents listed in paragraph "CONTENT OF INVOICE" shall be provided in their entirety as attachments in Wide Area Work Flow (WAWF) for each invoice submitted. The maximum size of each WAWF attachment is two megabytes, but there are no limits on the number of attachments. If a document cannot be attached in WAWF due to system or size restriction it shall be provided as instructed by the Contracting Officer.

1.5.3 Final Invoice

- a. A final invoice shall be accompanied by the certification required by DFARS 252.247.7023 TRANSPORTATION OF SUPPLIES BY SEA, and the Contractor's Final Release. If the Contractor is incorporated, the Final Release shall contain the corporate seal. An officer of the corporation shall sign and the corporate secretary shall certify the Final Release.
- b. For final invoices being submitted via WAWF, the original Contractor's Final Release Form and required certification of Transportation of Supplies by Sea must be provided directly to the respective Contracting Officer prior to submission of the final invoice. Once receipt of the original Final Release Form and required certification of Transportation of Supplies by Sea has been confirmed by the Contracting Officer, the Contractor shall then submit final invoice and attach a copy of the Final Release Form and required certification of Transportation of Supplies by Sea in WAWF.
- c. Final invoices not accompanied by the Contractor's Final Release and required certification of Transportation of Supplies by Sea will be considered incomplete and will be returned to the Contractor.

1.6 PAYMENTS TO THE CONTRACTOR

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

1.6.1 Obligation of Government Payments

The obligation of the Government to make payments required under the provisions of this contract will, at the discretion of the Contracting Officer, be subject to reductions and/or suspensions permitted under the FAR and agency regulations including the following in accordance with "FAR 32.503-6:

- a. Reasonable deductions due to defects in material or workmanship;
- b. Claims which the Government may have against the Contractor under or in connection with this contract;
- c. Unless otherwise adjusted, repayment to the Government upon demand for overpayments made to the Contractor; and

- d. Failure to provide up to date record drawings not current as stated in Contract Clause "FAC 5252.236-9310, Record Drawings."

1.6.2 Payment for Onsite and Offsite Materials

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

- a. FAR 52.232-5(b) Payments Under Fixed Price Construction Contracts.
- b. Materials delivered on the site but not installed, including completed preparatory work, and off-site materials to be considered for progress payment shall be major high cost, long lead, special order, or specialty items, not susceptible to deterioration or physical damage in storage or in transit to the construction site. Examples of materials acceptable for payment consideration include, but are not limited to, structural steel, non-magnetic steel, non-magnetic aggregate, equipment, machinery, large pipe and fittings, precast/prestressed concrete products, plastic lumber (e.g., fender piles/curbs), and high-voltage electrical cable. Materials not acceptable for payment include consumable materials such as nails, fasteners, conduits, gypsum board, glass, insulation, and wall coverings.
- c. Materials to be considered for progress payment prior to installation shall be specifically and separately identified in the Contractor's estimates of work submitted for the Contracting Officer's approval in accordance with Earned Value Report requirement of this contract. Requests for progress payment consideration for such items shall be supported by documents establishing their value and that the title requirements of the clause at FAR 52.232-5 have been met.
- d. Materials are adequately insured and protected from theft and exposure.
- e. Provide a written consent from the surety company with each payment request for offsite materials.
- f. Materials to be considered for progress payments prior to installation shall be stored either in Hawaii, Guam, Puerto Rico, or the Continental United States. Other locations are subject to written approval by the Contracting Officer.

PART 2 PRODUCTS

Not Used

PART 3 EXECUTION

Not Used

-- End of Section --

SECTION 01 30 00

ADMINISTRATIVE REQUIREMENTS

11/11

PART 1 GENERAL

1.1 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are for Contractor Quality Control approval. The following shall be submitted in accordance with Section 01 33 00 SUBMITTAL PROCEDURES:

SD-01 Preconstruction Submittals

View location map; G

Progress and completion pictures; G

1.2 VIEW LOCATION MAP

Submit to the Contracting Officer, 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.

1.3 PROGRESS AND COMPLETION PICTURES

Photographically document site conditions prior to start of construction operations. Provide monthly, and within one month of the completion of work, digital photographs, 1600x1200x24 bit true color 5 megapixel minimum resolution in JPEG file format showing the sequence and progress of work. Take a minimum of 20 digital photographs each week throughout the entire project from a minimum of ten views from points located by the Contracting Officer. Submit a view location sketch indicating points of view. Submit with the monthly invoice two sets of digital photographs each set on a separate CD-R, cumulative of all photos to date. Indicate photographs demonstrating environmental procedures. Photographs for each month shall be in a separate monthly directory and each file shall be named to indicate its location on the view location sketch. The view location sketch shall also be provided on the CD as digital file. All file names shall include a date designator. Cross reference submittals in the appropriate daily report. Photographs shall be provided for unrestricted use by the Government.

1.4 MINIMUM INSURANCE REQUIREMENTS

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

- a. Comprehensive general liability: \$500,000 per occurrence
- b. Automobile liability: \$200,000 per person, \$500,000 per occurrence for bodily injury, \$20,000 per occurrence for property damage
- c. Workmen's compensation as required by Federal and State workers' compensation and occupational disease laws.

- d. Employer's liability coverage of \$100,000, except in States where workers compensation may not be written by private carriers,
- e. Others as required by the State of Hawaii law.

1.5 SUPERVISION

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

1.6 PRECONSTRUCTION CONFERENCE

After award of the contract but prior to commencement of any work at the site, meet with the Contracting Officer to discuss and develop a mutual understanding relative to the administration of the value engineering and safety program, preparation of the schedule of prices or earned value report, shop drawings, and other submittals, scheduling programming, prosecution of the work, and clear expectations of the "Interim DD Form 1354" Submittal. Major subcontractors who will engage in the work shall also attend.

1.7 FACILITY TURNOVER PLANNING MEETINGS (NAVFAC Red Zone - NRZ)

Key personnel will meet to identify strategies to ensure the project is carried to expeditious closure and turnover to the Client. Start the turnover process at the Pre Construction Conference meeting and convene at the Facility Turnover Meetings once the project has reached approximately 75 percent completion or three to six months prior to Beneficial Occupancy Date (BOD), whichever comes first. The Contracting Officer's Representative will lead the meetings and guide discussions based on an agenda provided by the Government. The facility Turnover effort shall include the following:

- a. Pre Construction Meeting - Contracting Officer's Technical Representative (COTR) will provide the NRZ Checklist and the Contractor, Client, and NAVFAC Representatives will compare Contractor's schedule to NRZ Checklist items.
- b. Facility Turnover Meetings
 1. Fill in the NRZ Checklist including Contractor, Client, and NAVFAC Checklist Items and assign a person responsible for each item and a due date. The Contractor's Representative will facilitate the assignment of responsibilities, fill out the NRZ Checklist, and discuss "Interim DD Form 1354" requirements.
 2. Review the Contractor's updated schedule. The Contractor shall develop a POAM for the completion of all Contractor, Client, and NAVFAC Checklist items.
 3. Confirm that all NRZ Checklist items will be completed on time for the scheduled Facility Turnover.

1.8 PARTNERING

To most effectively accomplish this contract, the Government requires the formation of a cohesive partnership within the Project Team whose members are from the Government, the Contractor and their Subcontractors. Key personnel from the Supported Command, the End User (who will occupy the facility), NAVFAC (Echelon III and IV), the Navy Region/Installation, the Contractor and Subcontractors, and the Designer of Record will be invited to participate in the Partnering process. The Partnership will draw on the strength of each organization in an effort to achieve a project that is without any safety mishaps, conforms to the Contract, and stays within budget and on schedule.

The Contracting Officer will provide Information on the Partnering Process and a list of key and optional personnel who should attend the Partnering meeting.

1.8.1 Formal Partnering

Provide and host the Partnering sessions with key personnel of the Project Team, including Contractor personnel and Government personnel. Pay all costs associated with the Partnering effort including the Facilitator, the meeting room, and other incidental items. In exception, participants shall bear their own costs for meals, lodging, and transportation associated with the Partnering sessions.

Before a Partnering session, coordinate with the Facilitator all requirements for incidental items (such as audio-visual equipment, easels, flipchart paper, colored markers, note paper, pens/pencils, colored flash cards, etc.), and have these items available at the Partnering session. Provide copies of documents for distribution to all attendees.

The Facilitator shall be experienced in conducting Partnering Workshops, and shall be acceptable to both the Government and the Contractor. The Facilitator is responsible for leading the team in a timely manner and making sure that issues are identified and resolved. A list of Partnering Facilitators is available from the Contracting Officer.

- a. The Initial Partnering Session shall be a duration of half day minimum. It shall be located at a place off the construction site, as agreed to by the Contracting Officer and the Contractor. It may take place concurrently with the Pre-Construction Meeting.
- b. The Follow-on Partnering Session(s) generally last a half day or less. Schedule them at 3 to six month intervals, or when needed. Participants are encouraged to utilize electronic means to expedite meetings. Meetings may be held at a location off-Base, at the project site, or in a Government Facility on Base. Follow-on meetings may be held concurrently with other scheduled meetings. Attendees need only be those required to resolve current issues. Recommend using the same Facilitator from the Initial Partnering session to achieve best results and for continuity.

1.8.2 Informal Partnering

The Contracting Officer will organize the Partnering Sessions with key personnel of the project team, including Contractor personnel and Government personnel.

The Initial Partnering session should be a part of the Pre-Construction Meeting. Partnering sessions will be held at a location agreed to by the Contracting Officer and the Contractor (typically a conference room provided by the PWD FEAD/ROICC office or the Contractor).

The Initial Informal Partnering Session will be conducted and facilitated using electronic media (a video and accompanying forms) provided by the Contracting Officer.

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

1.9 AVAILABILITY OF CADD DRAWING FILES

After award and upon request, the electronic "Computer-Aided Drafting and Design (CADD)" drawing files will only be made available to the Contractor for use in preparation of construction data related to the referenced contract subject to the following terms and conditions. Request specific drawing numbers of files required; the entire set of drawing files will not be provided.

Data contained on these electronic files shall not be used for any purpose other than as a convenience in the preparation of construction data for the referenced project. Any other use or reuse shall be at the sole risk of the Contractor and without liability or legal exposure to the Government. The Contractor shall 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 shall, 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 CADD drawing files are not construction documents. Differences may exist between the CADD files and the corresponding construction documents. The Government makes no representation regarding the accuracy or completeness of the electronic CADD files, nor does it make representation to the compatibility of these files with the Contractors hardware or software. In the event that a conflict arises between the signed and sealed construction documents prepared by the Government and the furnished CADD files, the signed and sealed construction documents shall govern. The Contractor is responsible for determining if any conflict exists. Use of these CADD 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 and/or modifies these electronic CADD files for use in producing construction drawings and data related to this contract, all previous indicia of ownership (seals, logos, signatures, initials and dates) shall be removed.

1.10 ELECTRONIC MAIL (E-MAIL) ADDRESS

The Contractor shall establish and maintain electronic mail (e-mail) capability along with the capability to open various electronic attachments in Microsoft, Adobe Acrobat, and other similar formats. Within 10 days after contract award, the Contractor shall provide the Contracting Officer

a single (only one) e-mail address for electronic communications from the Contracting Officer related to this contract including, but not limited to contract documents, invoice information, request for proposals, and other correspondence. The Contracting Officer may also use email to notify the Contractor of base access conditions when emergency conditions warrant, such as hurricanes, terrorist threats, etc. Multiple email address will not allowed.

It is the Contractor's responsibility to make timely distribution of all Contracting Officer initiated e-mail with its own organization including field office(s). The Contractor shall promptly notify the Contracting Officer, in writing, of any changes to this email address.

PART 2 PRODUCTS

Not Used

PART 3 EXECUTION

Not Used

-- End of Section --

SECTION 01 32 16.00 20

SMALL PROJECT CONSTRUCTION PROGRESS SCHEDULES

02/15

PART 1 GENERAL

1.1 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are for Contractor Quality Control approval. Submit the following in accordance with Section 01 33 00 SUBMITTAL PROCEDURES:

SD-01 Preconstruction Submittals

Construction Schedule; G

SD-07 Certificates

Monthly Updates; G

1.2 ACCEPTANCE

Prior to the start of work, prepare and submit to the Contracting Officer for acceptance a construction schedule in the form of a Network Analysis Schedule (NAS) in accordance with the terms in Contract Clause "FAR 52.236-15, Schedules for Construction Contracts," except as modified in this contract.

The acceptance of a Baseline Construction Schedule is a condition precedent to:

- a. The Contractor starting work on the demolition 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 Schedule, and subsequent schedule updates, must be understood to be the Contractor's certification that the submitted schedule meets all of the requirements of the Contract Documents, represents the Contractor's plan on how the work must 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. Importing data into the scheduling program using data conversion techniques or third party software will be cause for rejection of the submitted schedule. Build the schedule as follows:

- a. The Project Schedule must show submittals, Government review periods, material/equipment delivery, utility outages, all 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.
- b. With the exception of the Contract Award and End Contract milestone activities, no activities must be open-ended; 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. Any such change must be documented 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.
- c. Each activity must be assigned its appropriate Responsibility Code indicating responsibility to accomplish the work indicated by the activity, Phase Code and Work Location Code.
- d. Date/time constraint(s) and/or lags, other than those required by the contract, are not allowed unless accepted by the Contracting Officer. Include as the last activity in the contract schedule, a milestone activity named "Contract Completion Date".

1.3.1.1 Primavera P6 Settings and Parameters

Primavera P6 settings and parameters which must be used in preparing the Baseline Schedule are as follows. Deviation from these settings and parameters, without prior consent of the Contracting Officer, is cause for rejection of schedule submission.

- a. General: Calendars and Activity Codes are defined or established at the "Project" level, not the "Global" level.
- b. Admin Drop-Down Menu, Admin Preferences, Time Periods Tab:
 - (1) Time periods for P6 must be set 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. Project Level, Dates Tab:
 - (1) Set "Must Finish By" date to "Contract Completion Date".
- d. 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.

e. 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.

f. Project Level, Settings Tab:

- (1) Define Critical Activities: Check "Total Float is less than or equal to" and add "0d".

g. No on-site construction activity Must have durations in excess of 20 working days.

1.3.2 Schedule Submittals and Procedures

Submit Network Analysis Schedules (NAS) 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.

1.4 SCHEDULE MONTHLY UPDATES

Update the Construction Schedule at monthly intervals or when the schedule has been revised. The updated schedule must be kept 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: Provide with schedule updates. Identify and justify;

- (1) Progress made in each area of the project
- (2) Critical Path
- (3) Date/time constraint(s), other than those required by the contract
- (4) Changes in the following; added or deleted activities, original and remaining durations for activities that have not started, logic, milestones, planned sequence of operations, and critical path
- (5) Status of Contract Completion Date and interim milestones;
- (6) Current and anticipated delays (describe cause of delay and

corrective actions(s) and mitigation measures to minimize);

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

Each entry in the narrative report will cite the respective Activity ID and Activity Description, 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. If the impact has not occurred within 30 calendar days, TIA procedure must be reduced to the most basic level possible to still reflect a reasonable assessment of the result of a delay, representing actual conditions as they occurred.
- c. All TIAs must include any mitigation, and must determine the apportionment of the overall delay assignable to each individual delay. The associated narrative must clearly describe the findings in a chronological listing beginning with the earliest delay event.
 - (1) Identify types of delays as follows:
 - (a) Excusable Delay: Force-Majeure (e.g. weather) - Contractor may receive time extension, but time will not be compensable.
 - (b) Inexcusable Delay: Contractor Responsibility - Contractor must not receive time extension.
 - (c) Compensable Delay: Government Responsibility - Contractor may receive compensable time extension.
 - (2) If a combination of delay types occurs, it is considered Concurrent Delay, which is defined in the following combinations:
 - (a) Excusable Delay and Compensable Delay results in Excusable

Delay

(b) Excusable Delay and Inexcusable Delay results in Inexcusable Delay

(c) Compensable Delay and Inexcusable Delay results in Excusable Delay

- d. Submit Data disks containing the narrative and native schedule files.
- e. Unless the Contracting Officer requests otherwise, only conformed contract modifications must be added into the Project NAS.

1.6 3-WEEK LOOK AHEAD SCHEDULE

The Contractor must 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. The work plans must be keyed to activity numbers when a NAS is required and updated 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. Three hard copies and one electronic file of the 3-Week Look Ahead Schedule must be delivered to the Contracting Officer no later than 8 a.m. each Monday and reviewed during the weekly CQC Coordination or Production Meeting.

1.7 CORRESPONDENCE AND TEST REPORTS:

All 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. All test reports (e.g., concrete, soil compaction, weld, pressure) must reference Schedule Activities that are being addressed.

1.8 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 requirement of this section.

PART 2 PRODUCTS

Not used.

PART 3 EXECUTION

Not used.

-- End of Section --

SECTION 01 33 00

SUBMITTAL PROCEDURES

05/11

PART 1 GENERAL

1.1 DEFINITIONS

1.1.1 Submittal Descriptions (SD)

Submittals requirements are specified in the technical sections. Submittals are identified by Submittal Description (SD) numbers and titles as follows:

SD-01 Preconstruction Submittals

Submittals which are required prior to or commencing work on site.

Certificates of insurance

Surety bonds

List of proposed Subcontractors

List of proposed products

Construction progress schedule

Network Analysis Schedule (NAS)

Submittal register

Schedule of prices

Health and safety plan

Work plan

Quality Control(QC) plan

Environmental protection plan

SD-02 Shop Drawings

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

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

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

SD-03 Product Data

Catalog cuts, illustrations, schedules, diagrams, performance charts,

instructions and brochures illustrating size, physical appearance and other characteristics of materials, 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 by which the ensuring work can be judged. Includes assemblies or portions of assemblies which are to be incorporated into the project and those which will be removed at conclusion of the work.

SD-05 Design Data

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

SD-06 Test Reports

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

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

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

Investigation reports.

Daily 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 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 purpose of which is to further quality of orderly progression of a portion of the work by documenting procedures, acceptability of methods or personnel qualifications.

Confined space entry permits.

Text of posted operating instructions.

SD-08 Manufacturer's Instructions

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

SD-11 Closeout Submittals

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

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.

Interim "DD Form 1354" with cost breakout for all assets 30 days prior to facility turnover.

1.1.2 Approving Authority

Office or designated person authorized to approve submittal.

1.1.3 Work

As used in this section, on- 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.

1.2 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are for Contractor QC approval. Submit the following in accordance with this section.

SD-01 Preconstruction Submittals

Submittal Register; G

1.3 SUBMITTAL CLASSIFICATION

Submittals are classified as follows:

1.4 FORWARDING SUBMITTALS REQUIRING GOVERNMENT APPROVAL

1.4.1 Submittals Required from the Contractor

As soon as practicable after award of contract, and before procurement of fabrication, forward to the Contracting Officer submittals required in the

technical sections of this specification, including shop drawings, product data and samples. One copy of the transmittal form for all submittals shall be forwarded to the Resident Officer in Charge of Construction.

Contracting Officer will review and approve for the Contracting Officer those submittals reserved for Contracting Officer approval to verify submittals comply with the contract requirements.

1.4.1.1 O&M Data

Contracting Officer will review and approve for the Contracting Officer O&M Data to verify the submittals comply with the contract requirements; submit data specified for a given item within 30 calendar days after the item is delivered to the contract site.

In the event the Contractor fails to deliver O&M Data within the time limits specified, the Contracting Officer may withhold from progress payments 50 percent of the price of the item with which such O&M Data are applicable.

1.5 PREPARATION

1.5.1 Transmittal Form

Transmit each submittal, except sample installations and sample panels to office of approving authority. Transmit submittals with transmittal form prescribed by Contracting Officer and standard for project. On the transmittal form identify Contractor, indicate date of submittal, and include information prescribed by transmittal form and required in paragraph entitled, "Identifying Submittals," of this section. Process transmittal forms to record actions regarding samples .

1.5.2 Identifying Submittals

When submittals are provided by a Subcontractor, the Prime Contractor is to prepare, review and stamp with Contractor's approval all specified submittals prior to submitting for Government approval.

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. Construction contract number.
- c. Date 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 section by which submittal is required.
- f. Submittal description (SD) number of each component of submittal.
- g. When 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 Format for SD-02 Shop Drawings

Shop drawings are not to be 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 other form is required. Drawings are to be suitable for reproduction and be of a quality to produce clear, distinct lines and letters with dark lines on a white background.

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

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

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

Reserve a blank space, no smaller than 4 inches on the right hand side of each sheet for the Government disposition stamp.

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.

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

1.5.4 Format of SD-03 Product Data and SD-08 Manufacturer's Instructions

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

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

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

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. Should manufacturer's data require supplemental information for clarification, submit as specified for SD-07 Certificates.

Where equipment or materials are specified to conform to industry and technical society reference standards of the organizations such as American

National Standards Institute (ANSI), ASTM International (ASTM), National Electrical Manufacturer's Association (NEMA), Underwriters Laboratories (UL), and 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.

Collect required data submittals for each specific material, product, unit of work, or system into a single submittal and 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 construction effort.

Submit manufacturer's instructions prior to installation.

1.5.5 Format of SD-04 Samples

Furnish samples in sizes below, unless otherwise specified or unless the manufacturer has prepackaged samples of approximately 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 of Non-Solid Materials: Pint. Examples of non-solid 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.

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.

Reusable Samples: Incorporate returned samples into work only if so specified or indicated. Incorporated samples are to be in undamaged

condition at time of use.

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

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

1.5.6 Format of SD-05 Design Data and SD-07 Certificates

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

1.5.7 Format of SD-06 Test Reports and SD-09 Manufacturer's Field Reports

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

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

1.5.8 Format of SD-01 Preconstruction Submittals and SD-11 Closeout Submittals

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

1.6 QUANTITY OF SUBMITTALS

1.6.1 Number of Copies of SD-02 Shop Drawings

Submit four copies of submittals of shop drawings requiring review and approval only by QC organization and copies of shop drawings requiring review and approval by Contracting Officer.

1.6.2 Number of Copies of SD-03 Product Data and SD-08 Manufacturer's Instructions

Submit in compliance with quantity requirements specified for shop drawings.

1.6.3 Number of Samples SD-04 Samples

- a. Submit two samples, or two sets of samples showing range of variation, of each required item. One approved sample or set of samples will be retained by approving authority and one will be returned to Contractor.
- b. Submit one sample panel or provide one sample installation where directed. Include components listed in technical section or as directed.
- c. Submit one sample installation, where directed.
- d. Submit one sample of non-solid materials.

1.6.4 Number of Copies SD-05 Design Data and SD-07 Certificates

Submit in compliance with quantity requirements specified for shop drawings.

1.6.5 Number of Copies SD-06 Test Reports and SD-09 Manufacturer's Field Reports

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 Copies of SD-01 Preconstruction Submittals and SD-11 Closeout Submittals

Unless otherwise specified, submit two sets of administrative submittals.

1.7 VARIATIONS

Variations from contract requirements require both Designer of Record (DOR) and Government approval pursuant to contract Clause FAR 52.236-21 and will be considered where advantageous to Government.

1.7.1 Considering Variations

Discussion with Contracting Officer prior to submission, after consulting with the DOR, will help ensure functional and quality requirements are met and minimize rejections and re-submittals. When contemplating a variation which results in lower cost, consider submission of the variation as a Value Engineering Change Proposal (VECP).

Specifically point out variations from contract requirements in transmittal letters. Failure to point out deviations may result in the Government requiring rejection and removal of such work at no additional cost to the Government.

1.7.2 Proposing Variations

When proposing variation, deliver written request to the Contracting Officer, with documentation of the nature and features of the variation and why the variation is desirable and beneficial to Government, including the DOR's written analysis and approval. 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.

1.7.3 Warranting That Variations Are Compatible

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

1.7.4 Review Schedule Is Modified

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

1.8 SUBMITTAL REGISTER

Prepare and maintain submittal register, as the work progresses. Do not change data which is output in columns (c), (d), (e), and (f) as delivered by Government; retain data which is output in columns (a), (g), (h), and (i) as approved. A submittal register showing items of equipment and materials for which submittals are required by the specifications is provided as an attachment. This list may not be all inclusive and additional submittals may be required.

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

Column (d): Lists each submittal description (SD No. and type, e.g. SD-02 Shop Drawings) required in each specification section.

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

Column (f): Indicate approving authority for each submittal.

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

1.8.1 Use of Submittal Register

Submit submittal register. Submit with QC plan and project schedule. Verify that all submittals required for 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 approving authority to receive submittals.

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

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

1.8.2 Contractor Use of Submittal Register

Update the following fields with each submittal throughout contract.

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

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

Column (l) List date of submittal transmission.

Column (q) List date approval received.

1.8.3 Approving Authority Use of Submittal Register

Update the following fields.

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

Column (l) List date of submittal receipt.

Column (m) through (p) List Date related to review actions.

Column (q) List date returned to Contractor.

1.8.4 Action Codes

Entries for columns (j) and (o), are to be used are as follows (others may be prescribed by Transmittal Form):

1.8.4.1 Government Review Action Codes

"A" - "Approved as submitted"; "Completed"

"B" - "Approved, except as noted on drawings"; "Completed"

"C" - "Approved, resubmission required"; "Resubmit"

"D" - "Returned by correspondence"; "Completed"

"E" - "Disapproved (See attached)"; "Resubmit"

"F" - "Receipt acknowledged"; "Completed"

"G" - "Other (Specify)"; "Resubmit"

"X" - "Receipt acknowledged, does not comply"; "Resubmit"

1.8.5 Copies Delivered to the Government

Deliver one copy of submittal register updated by Contractor to Government with each invoice request.

1.9 SCHEDULING

Schedule and submit concurrently submittals covering component items forming a system or items that are interrelated. Include certifications to be submitted with the pertinent drawings at the same time. No delay damages or time extensions will be allowed for time lost in late submittals. .

- a. Coordinate scheduling, sequencing, preparing and processing of submittals with performance of work so that work will not be delayed by submittal processing. Allow for potential resubmittal of requirements.
- b. Submittals called for by the contract documents will be listed on the register. If a submittal is called for 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 which have been omitted from the register or marked "N/A."

- c. Re-submit register and annotate monthly by the Contractor with actual submission and approval dates. When all items on the register have been fully approved, no further re-submittal is required.
 - d. Carefully control procurement operations to ensure that each individual submittal is made on or before the Contractor scheduled submittal date shown on the approved "Submittal Register."
 - e. Except as specified otherwise, allow review period, beginning with receipt by approving authority, that includes at least 15 working days for submittals for QC Manager approval and 20 working days for submittals for Contracting Officer approval. Period of review for submittals with Contracting Officer approval begins when Government receives submittal from QC organization.
 - f. For submittals requiring review by fire protection engineer, allow review period, beginning when Government receives submittal from QC organization, of 30 working days for return of submittal to the Contractor.
 - g. Period of review for each resubmittal is the same as for initial submittal.
- 1.9.1 Reviewing, Certifying, Approving Authority

The QC organization is responsible for reviewing and certifying that submittals are in compliance with contract requirements. Approving authority on submittals is QC Manager unless otherwise specified for specific submittal. At each "Submittal" paragraph in individual specification sections, a notation "G," following a submittal item, indicates Contracting Officer is approving authority for that submittal item.

1.9.2 Constraints

Conform to provisions of this section, unless explicitly stated otherwise for submittals listed or specified in this contract.

Submit complete submittals for each definable feature of work. Submit at the same time components of definable feature interrelated as a system.

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

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

1.9.3 QC Organization Responsibilities

- a. Note date on which submittal was received from Contractor on each submittal.
- b. Review each submittal; and check and coordinate each submittal with requirements of work and contract documents.
- c. Review submittals for conformance with project design concepts and

compliance with contract documents.

- d. Act on submittals, determining appropriate action based on QC organization's review of submittal.
 - (1) When QC Manager is approving authority, take appropriate action on submittal from the possible actions defined in paragraph entitled, "Approved Submittals," of the section."
 - (2) When Contracting Officer is approving authority or when variation has been proposed, forward submittal to Government with certifying statement or return submittal marked "not reviewed" or "revise and resubmit" as appropriate. The QC organization's review of submittal determines appropriate action.
- e. Ensure that material is clearly legible.
- f. Stamp each sheet of each submittal with QC certifying statement or approving statement, except that data submitted in bound volume or on one sheet printed on two sides may be stamped on the front of the first sheet only.
 - (1) When approving authority is Contracting Officer, QC organization will certify submittals forwarded to Contracting Officer with the following certifying statement:

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

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

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

- (2) When approving authority is QC Manager, QC Manager will use the following approval statement when returning submittals to Contractor as "Approved" or "Approved as Noted."

"I hereby certify that the (material) (equipment) (article) shown and marked in this submittal and proposed to be incorporated with contract Number , is in compliance with the contract drawings and specification, can be installed in the allocated spaces, and is approved for use.

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

Approved by QC Manager _____, Date _____"
 (Signature)

- g. Sign certifying statement or approval statement. The QC organization member designated in the approved QC plan is the person signing certifying statements. The use of original ink for signatures is required. Stamped signatures are not acceptable.
- h. Update submittal register as submittal actions occur and maintain the

submittal register at project site until final acceptance of all work by Contracting Officer.

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

1.10 GOVERNMENT APPROVING AUTHORITY

When approving authority is Contracting Officer, the Government will:

- a. Note date on which submittal was received from QC Manager.
- b. Review submittals for approval within scheduling period specified and only for conformance with project design concepts and compliance with contract documents.
- c. Identify returned submittals with one of the actions defined in paragraph entitled, "Review Notations," of this section and with markings appropriate for action indicated.

Upon completion of review of submittals requiring Government approval, stamp and date approved submittals. One copies of the approved submittal will be retained by the Contracting Officer and one copies of the submittal will be returned to the Contractor.

1.10.1 Review Notations

Contracting Officer review will be completed within 21 calendar days after date of submission. Submittals will be returned to the Contractor with the following notations:

- a. Submittals marked "approved" or "accepted" authorize the Contractor to proceed with the work covered.
- b. Submittals marked "approved as noted" "or approved except as noted, resubmittal not required," authorize the Contractor to proceed with the work covered provided he takes no exception to the corrections.
- c. Submittals marked "not approved" or "disapproved," or "revise and resubmit," indicate noncompliance with the contract requirements or design concept, or that submittal is incomplete. Resubmit with appropriate changes. No work shall proceed for this item until resubmittal is approved.
- d. Submittals marked "not reviewed" will indicate submittal has been previously reviewed and approved, is not required, does not have evidence of being reviewed and approved by Contractor, or is not complete. A submittal marked "not reviewed" will be returned with an explanation of the reason it is not reviewed. Resubmit submittals returned for lack of review by Contractor or for being incomplete, with appropriate action, coordination, or change.

1.11 DISAPPROVED OR REJECTED SUBMITTALS

Contractor shall 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; notice as required under the clause entitled, "Changes," is to be given to the Contracting Officer. Contractor is responsible for the

dimensions and design of connection details and construction of work. Failure to point out deviations may result in the Government requiring rejection and removal of such work at the Contractor's expense.

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

1.12 APPROVED/ACCEPTED SUBMITTALS

The Contracting Officer's approval or acceptance 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.

Approval or acceptance will not relieve the Contractor of the responsibility for any error which may exist, as the Contractor under the Contractor Quality Control (CQC) requirements of this contract is responsible for dimensions, the design of adequate connections and details, and the satisfactory construction of all work.

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.

1.13 APPROVED SAMPLES

Approval of a sample is only for the characteristics or use named in such approval and is not to be construed to change or modify any contract requirements. Before submitting samples, the Contractor to assure 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 which may be damaged in testing, will be returned to the Contractor, at his expense, upon completion of the contract. Samples not approved 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 of that material. Government reserves the right to disapprove any material or equipment which previously has 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. Contractor to replace such materials or equipment to meet contract requirements.

Approval of the Contractor's samples by the Contracting Officer does not relieve the Contractor of his responsibilities under the contract.

PART 2 PRODUCTS

Not Used

PART 3 EXECUTION

Not Used

-- End of Section --

SUBMITTAL REGISTER

CONTRACT NO.

TITLE AND LOCATION
IDIQ CONTRACT FOR PAVING

CONTRACTOR

ACTIVITY NO	TRANSMITTAL NO	SPEC SECT	DESCRIPTION ITEM SUBMITTED	PARAGRAPH	GOVT OR CLASSIFICATION REVIEW	CONTRACTOR: SCHEDULE DATES			CONTRACTOR ACTION		APPROVING AUTHORITY				REMARKS		
						SUBMIT	APPROVAL NEEDED BY	MATERIAL NEEDED BY	ACTION CODE	DATE OF ACTION	DATE FWD TO APPR AUTH/ FROM CONTR	DATE FWD TO OTHER REVIEWER	DATE RCD FROM OTH REVIEWER	ACTION CODE		DATE OF ACTION	MAILED TO CONTR/ DATE RCD FRM APPR AUTH
(a)	(b)	(c)	(d)	(e)	(f)	(g)	(h)	(i)	(j)	(k)	(l)	(m)	(n)	(o)	(p)	(q)	(r)
		01 14 00	SD-01 Preconstruction Submittals														
			Visit Request for Pearl Harbor	1.6.1	G												
			Naval Shipyard Form (PHNSY 14ND-SYD-5512/28)														
			Completed Special Access Determination (NAVSEA 5510/15)	1.6.1	G												
			Pier parking authorization	1.6.3	G												
			Government guard services	1.6.7	G												
			List of Contact Personnel	1.4.1.1	G												
			Personnel List	1.5.2	G												
			Vehicle List	1.5.3	G												
			Statement of Acknowledgement Form SF 1413	1.5.4	G												
		01 20 00.00 20	SD-01 Preconstruction Submittals														
			Earned Value Report	1.3	G												
		01 30 00	SD-01 Preconstruction Submittals														
			View location map	1.2	G												
			Progress and completion pictures	1.3	G												
		01 32 16.00 20	SD-01 Preconstruction Submittals														
			Construction Schedule	1.2	G												
			SD-07 Certificates														
			Monthly Updates	1.4	G												
		01 33 00	SD-01 Preconstruction Submittals														
			Submittal Register	1.8	G												
		01 35 26	SD-01 Preconstruction Submittals														
			Accident Prevention Plan (APP)	1.7	G												

SUBMITTAL REGISTER

CONTRACT NO.

TITLE AND LOCATION
IDIQ CONTRACT FOR PAVING

CONTRACTOR

ACTIVITY NO	TRANSMITTAL NO	SPEC SECT	DESCRIPTION ITEM SUBMITTED	PARAGRAPH	GOVT OR CLASSIFICATION REVIEW	CONTRACTOR: SCHEDULE DATES			CONTRACTOR ACTION		APPROVING AUTHORITY				MAILED TO CONTR/ DATE RCD FRM APPR AUTH	REMARKS	
						SUBMIT	APPROVAL NEEDED BY	MATERIAL NEEDED BY	ACTION CODE	DATE OF ACTION	DATE FWD TO APPR AUTH/ DATE RCD FROM CONTR	DATE FWD TO OTHER REVIEWER	DATE RCD FROM OTH REVIEWER	ACTION CODE			DATE OF ACTION
(a)	(b)	(c)	(d)	(e)	(f)	(g)	(h)	(i)	(j)	(k)	(l)	(m)	(n)	(o)	(p)	(q)	(r)
		01 35 26	Activity Hazard Analysis (AHA)	1.8	G												
			Crane Critical Lift Plan	1.7.1	G												
			Crane Operators	1.6.1.3	G												
			SD-06 Test Reports														
			Notifications and Reports	1.12													
			Accident Reports	1.12.2	G												
			Crane Reports	1.12.3													
			SD-07 Certificates														
			Confined Space Entry Permit	1.9													
			Hot work permit	1.9													
			License Certificates	1.14													
			Contractor Safety Self-Evaluation Checklist	1.4	G												
			Certificate of Compliance	1.12.4													
		01 45 00.00 20	SD-01 Preconstruction Submittals														
			Construction Quality Control (QC) Plan	1.6.1	G												
		01 50 00	SD-01 Preconstruction Submittals														
			Traffic control plan	3.3.1	G												
			SD-06 Test Reports														
			Backflow Preventer Tests	2.2.5	G												
			SD-07 Certificates														
			Backflow Tester	1.3.1	G												
			Backflow Preventers	1.3													
		01 57 19.00 20	SD-01 Preconstruction Submittals														
			Preconstruction Survey	1.5.1	G												

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		01 57 19.00 20	Solid Waste Management Plan and Permit	3.3	G												
			Regulatory Notifications	1.5.2	G												
			Environmental Protection Plan	1.6	G												
			Storm Water Pollution Prevention Plan	3.1.2.1	G												
			Storm Water Notice of Intent (for NPDES coverage under the general permit for construction activities)	3.1.2.1	G												
			Dirt and Dust Control Plan	3.13.1													
			Contractor Hazardous Material Inventory Log	3.7.1	G												
			SD-06 Test Reports														
			Laboratory Analysis	3.12.2.2													
			Disposal Requirements	3.14.2													
			Erosion and Sediment Control Inspection Reports	3.1.2													
			Storm Water Inspection Reports for General Permit	3.1.2													
			Solid Waste Management Report	3.3.1	G												
			SD-07 Certificates														
			Contractor 40 CFR employee training records	1.5.5	G												
			ECATTS certificate of completion	1.4.1													
			SD-11 Closeout Submittals														

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(a)	(b)	(c)	(d)	(e)	(f)	(g)	(h)	(i)	(j)	(k)	(l)	(m)	(n)	(o)	(p)	(q)	(r)
		01 57 19.00 20	Storm Water Pollution Prevention Plan compliance notebook	3.1.2.2	G												
			Waste Determination Documentation	3.4													
			Disposal Documentation for Hazardous and Regulated Waste	3.3.2.1													
			Contractor 40 CFR Employee Training Records	1.5.5													
			Solid Waste Management Permit	3.3													
			Solid Waste Management Report	3.3.1													
			Contractor Hazardous Material Inventory Log	3.7.1	G												
			Hazardous Waste/Debris Management	3.12.2													
			Regulatory Notifications	1.5.2													
		01 57 19.01 20	SD-01 Preconstruction Submittals														
			Excavation Permits		G												
			Storage Inventory Form	1.2	G												
		01 74 19	SD-01 Preconstruction Submittals														
			Waste Management Plan	1.6	G												
			SD-11 Closeout Submittals														
			Records	1.7													
		01 78 00	SD-03 Product Data														
			As-Built Record of Equipment and Materials	1.3.2													
			Warranty Management Plan	1.7.1													

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		01 78 00	Warranty Tags	1.7.4													
			Final Cleaning	1.8													
			Spare Parts Data	1.4													
			SD-08 Manufacturer's Instructions														
			Preventative Maintenance	1.5													
			Condition Monitoring (Predictive Testing)	1.5													
			Inspection	1.5													
			Instructions	1.7.1													
			SD-11 Closeout Submittals														
			Record Drawings	1.3.1													
			Certification of EPA Designated Items	1.6	G												
			Interim Form DD1354	1.9	G												
			Checklist for Form DD1354	1.9	G												
		02 41 00	SD-01 Preconstruction Submittals														
			Existing Conditions	1.10	G												
			SD-07 Certificates														
			Demolition Plan	1.2.1	G												
			Notification	1.6													
			Notification of Demolition and Renovation form	1.6.1	G												
		02 61 23	SD-03 Product Data														
			Field Screening Test	2.2													
			SD-07 Certificates														
			Protection Plan	1.4.4	G												

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		02 61 23	PCB Contaminated Soil Removal Plan	1.4.5	G												
			PCB Contaminated Water Handling Plan	1.4.6	G												
			Sampling and Testing Plan	1.4.7	G												
			Confirmatory Grid Sampling Plan	3.3.4.2	G												
			Training certification	1.4.8													
			CIH qualifications	1.4.9	G												
			PCB Disposal Plan	1.4.10	G												
			Shipping documentation	3.5.1.2													
			Vehicle decontamination verification	1.4.11													
			Borrow site testing	3.8													
			Certificate of Disposal	3.5.2.1													
			SD-11 Closeout Submittals														
			Closeout Report	1.4.12	G												
		31 05 19	SD-03 Product Data														
			Thread	2.1.2													
			Manufacturing Quality Control	2.2													
			Sampling and Testing														
			SD-04 Samples														
			Quality Assurance Samples and Tests	3.1													
			SD-07 Certificates														
			Geotextile	2.1.1													
		31 05 21	SD-03 Product Data														

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		31 05 21	Geogrid Reinforcement	2.1													
		31 11 00	SD-03 Product Data														
			Nonsaleable Materials	3.6.2	G												
			SD-04 Samples														
			Tree wound paint	2.1													
			Herbicide	2.2													
		31 23 00.00 20	SD-06 Test Reports														
			Borrow Site Testing	1.5	G												
			Fill and backfill	3.13.2.1													
			Select material	3.13.2.2													
			Density tests	3.13.2.4													
		32 01 13	SD-03 Product Data														
			Equipment List	1.2.1													
			Inspection Reports	3.5.3													
			SD-04 Samples														
			Bituminous Materials	1.4.3													
			Aggregates	1.4.2													
			Fog Seal	2.4	G												
			SD-06 Test Reports														
			Tests	3.3.1													
		32 01 13.00 20	SD-03 Product Data														
			Contractor Qualifications	1.4	G												
			Equipment List	1.2.1	G												
			Friction Test	3.4.7	G												
			Inspection Reports	3.1	G												
			SD-04 Samples														

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																		(a)
		32 01 13.00 20	Emulsified Asphalt	2.1														
			Aggregates	1.4.2														
			SD-06 Test Reports															
			Tests	3.4.1	G													
			Bituminous Materials	1.4.3	G													
		32 01 17.16	SD-03 Product Data															
			Installation of Sealant	3.4														
			SD-06 Test Reports															
			Test Requirements	1.3														
		32 10 00	SD-03 Product Data															
			Precast car stops	2.11														
			Aggregate															
			Asphalt cement															
			SD-04 Samples															
			Uncompacted mix	3.3.2.1														
			cores	3.3														
			SD-06 Test Reports															
			Trial batch	1.3.4														
			Mix design	1.3.5														
			Asphalt concrete	2.1														
			Density	3.3.2.2														
			Density	3.3.2.3														
			Thickness	3.3.2.2														
			Thickness	3.3.2.3														
			Straightedge test	3.3.2.2														
			SD-07 Certificates															

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		32 10 00	mix delivery record	1.3.3													
			Asphalt concrete	2.1													
			Asphalt concrete	2.1													
			Traffic signs	2.10													
		32 16 13	SD-03 Product Data														
			Concrete	2.1													
			SD-06 Test Reports														
			Field Quality Control	3.8													
		32 17 23.00 20	SD-03 Product Data														
			Reflective media for roads and streets	2.1.2													
			Paints for roads and streets	2.1.1													
			High Build Acrylic Coating (HBAC)	2.1.6	G												
			Thermoplastic compound	2.1.3													
			Thermoplastic compound	3.2.2.3													
			Raised Pavement Markers	2.1.5													
			Equipment	1.5	G												
			SD-06 Test Reports														
			Reflective media for roads and streets	2.1.2													
			Paints for roads and streets	2.1.1													
			High Build Acrylic Coating (HBAC)	2.1.6	G												
			Thermoplastic compound	2.1.3													
			Thermoplastic compound	3.2.2.3													

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		32 17 23.00 20	Raised Pavement Markers	2.1.5													
			SD-07 Certificates														
			Reflective media for roads and streets	2.1.2													
			Paints for roads and streets	2.1.1													
			Volatile Organic Compound	3.5.2													
			Thermoplastic compound	2.1.3													
			Thermoplastic compound	3.2.2.3													
			Construction equipment list	1.5													
			SD-08 Manufacturer's Instructions														
			Paints for roads and streets	2.1.1													
			Thermoplastic compound	2.1.3													
			Thermoplastic compound	3.2.2.3													
		32 84 24	SD-02 Shop Drawings														
			Irrigation sprinkler system	1.2													
			SD-03 Product Data														
			Piping materials	2.1													
			Valves	2.3													
			heads	2.2													
			Backflow preventers	2.3.5													
			Automatic controller	2.5													
			Solvent cement	2.1.3													
			Control wiring	2.6.1													
			Drip irrigation	2.1.6													
			Water meter	2.4.2													
			Tapping tee	2.4.1													

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		32 84 24	Valve boxes and lids	3.1.7.3													
			Drip head accessories	2.4.3													
			SD-05 Design Data														
			System pressure calculations														
			Irrigation requirements														
			SD-06 Test Reports														
			tests	1.5.1													
			Backflow preventers	2.3.5													
			Pressure test	3.2.1													
			Operation test	3.2.2													
			SD-07 Certificates														
			Backflow preventers	2.3.5													
			SD-08 Manufacturer's Instructions														
			Automatic controller	2.5													
			heads	2.2													
			Piping materials	2.1													
			Backflow preventers	2.3.5													
			Valves	2.3													
			Solvent cement	2.1.3													
			Control wiring	2.6.1													
			Drip irrigation	2.1.6													
			Water meter	2.4.2													
			Rain shut-off device														
			SD-11 Closeout Submittals														
			Controller Charts	3.2.3													
		32 92 19	SD-03 Product Data														

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ACTIVITY NO	TRANSMITTAL NO	SPEC SECT	DESCRIPTION ITEM SUBMITTED	PARAGRAPH	GOVT OR A/E REVIEWER CLASSIFICATION	CONTRACTOR: SCHEDULE DATES			CONTRACTOR ACTION		APPROVING AUTHORITY					REMARKS	
						SUBMIT	APPROVAL NEEDED BY	MATERIAL NEEDED BY	ACTION CODE	DATE OF ACTION	DATE FWD TO APPR AUTH/ FROM CONTR	DATE FWD TO OTHER REVIEWER	DATE RCD FROM OTH REVIEWER	ACTION CODE	DATE OF ACTION		MAILED TO CONTR/ DATE RCD FRM APPR AUTH
		32 92 19	Wood cellulose fiber mulch	2.5.3													
			Fertilizer	2.4													
			SD-06 Test Reports														
			Topsoil composition tests	2.2.3													
			SD-07 Certificates														
			seed	2.1													
			SD-08 Manufacturer's Instructions														
			Erosion Control Materials	2.7													
		32 92 26	SD-03 Product Data														
			Fertilizer	2.5													
			SD-06 Test Reports														
			Topsoil composition tests	2.3.3													
			SD-07 Certificates														
			seed	2.2													
			sprigs	2.1													
			SD-08 Manufacturer's Instructions														
			Erosion Control Materials	2.8													

SECTION 01 35 26

GOVERNMENTAL SAFETY REQUIREMENTS

02/12

PART 1 GENERAL

1.1 REFERENCES

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

AMERICAN SOCIETY OF SAFETY ENGINEERS (ASSE/SAFE)

ASSE/SAFE A10.32	(2012) Fall Protection
ASSE/SAFE A10.34	(2001; R 2012) Protection of the Public on or Adjacent to Construction Sites
ASSE/SAFE Z359.1	(2007) Safety Requirements for Personal Fall Arrest Systems, Subsystems and Components

ASME INTERNATIONAL (ASME)

ASME B30.22	(2010) Articulating Boom Cranes
ASME B30.3	(2012) Tower Cranes
ASME B30.5	(2011) Mobile and Locomotive Cranes
ASME B30.8	(2010) Floating Cranes and Floating Derricks

NATIONAL FIRE PROTECTION ASSOCIATION (NFPA)

NFPA 10	(2013) Standard for Portable Fire Extinguishers
NFPA 241	(2013) Standard for Safeguarding Construction, Alteration, and Demolition Operations
NFPA 51B	(2014) Standard for Fire Prevention During Welding, Cutting, and Other Hot Work
NFPA 70	(2014; AMD 1 2013; Errata 1 2013; AMD 2 2013; Errata 2 2013; AMD 3 2014; Errata 3-4 2014; AMD 4-6 2014) National Electrical Code
NFPA 70E	(2012; Errata 2012) Standard for Electrical Safety in the Workplace

U.S. ARMY CORPS OF ENGINEERS (USACE)

EM 385-1-1	(2008; Errata 2011) Safety and Health
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Requirements Manual

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

10 CFR 20	Standards for Protection Against Radiation
29 CFR 1910	Occupational Safety and Health Standards
29 CFR 1910.146	Permit-required Confined Spaces
29 CFR 1915	Confined and Enclosed Spaces and Other Dangerous Atmospheres in Shipyard Employment
29 CFR 1926	Safety and Health Regulations for Construction
29 CFR 1926.1400	Cranes & Derricks in Construction
29 CFR 1926.16	Rules of Construction
29 CFR 1926.450	Scaffolds
29 CFR 1926.500	Fall Protection
CPL 2.100	(1995) Application of the Permit-Required Confined Spaces (PRCS) Standards, 29 CFR 1910.146

U.S. NAVAL FACILITIES ENGINEERING COMMAND (NAVFAC)

NAVFAC P-307	(2009; Change 1 Mar 2011; Change 2 Aug 2011) Management of Weight Handling Equipment
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1.2 DEFINITIONS

- a. Competent Person for Fall Protection. A person who is capable of identifying hazardous or dangerous conditions in the personal fall arrest system or any component thereof, as well as their application and use with related equipment, and has the authority to take prompt corrective measures to eliminate the hazards of falling.
- b. High Visibility Accident. Any mishap which may generate publicity or high visibility.
- c. Medical Treatment. Treatment administered by a physician or by registered professional personnel under the standing orders of a physician. Medical treatment does not include first aid treatment even through provided by a physician or registered personnel.
- d. Operating Envelope. The area surrounding any crane. Inside this "envelope" is the crane, the operator, riggers and crane walkers, rigging gear between the hook and the load, the load and the crane's supporting structure (ground, rail, etc.).
- e. Recordable Injuries or Illnesses. Any work-related injury or illness that results in:

- (1) Death, regardless of the time between the injury and death, or the length of the illness;
 - (2) Days away from work (any time lost after day of injury/illness onset);
 - (3) Restricted work;
 - (4) Transfer to another job;
 - (5) Medical treatment beyond first aid;
 - (6) Loss of consciousness; or
 - (7) A significant injury or illness diagnosed by a physician or other licensed health care professional, even if it did not result in (1) through (6) above.
- f. "USACE" property and equipment specified in USACE EM 385-1-1 should be interpreted as Government property and equipment.
- g. Weight Handling Equipment (WHE) Accident. A WHE accident occurs when any one or more of the eight elements in the operating envelope fails to perform correctly during operation, including operation during maintenance or testing resulting in personnel injury or death; material or equipment damage; dropped load; derailment; two-blocking; overload; or collision, including unplanned contact between the load, crane, or other objects. A dropped load, derailment, two-blocking, overload and collision are considered accidents even though no material damage or injury occurs. A component failure (e.g., motor burnout, gear tooth failure, bearing failure) is not considered an accident solely due to material or equipment damage unless the component failure results in damage to other components (e.g., dropped boom, dropped load, roll over, etc.) Any mishap meeting the criteria described above shall be documented in both the Contractor Significant Incident Report (CSIR) and using the NAVFAC prescribed Navy Crane Center (NCC) form submitted within five days both as provided by the Contracting Officer. Comply with additional requirements and procedures for accidents in accordance with NAVFAC P-307, Section 12.

1.3 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are for Contractor Quality Control approval. Submit the following in accordance with Section 01 33 00 SUBMITTAL PROCEDURES:

SD-01 Preconstruction Submittals

Accident Prevention Plan (APP); G

Activity Hazard Analysis (AHA); G

Crane Critical Lift Plan; G

Proof of qualification for Crane Operators; G

SD-06 Test Reports

Notifications and Reports

Submit reports as their incidence occurs, in accordance with the requirements of the paragraph, "Notifications and Reports."

Accident Reports; G

Crane Reports

SD-07 Certificates

Confined Space Entry Permit

Hot work permit

License Certificates

Contractor Safety Self-Evaluation Checklist; G
Certificate of Compliance (Crane)

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

1.4 CONTRACTOR SAFETY SELF-EVALUATION CHECKLIST

Contracting Officer will provide a "Contractor Safety Self-Evaluation checklist" to the Contractor at the pre-construction conference. Complete the checklist monthly and submit with each request for payment voucher. An acceptable score of 90 or greater is required. Failure to submit the completed safety self-evaluation checklist or achieve a score of at least 90 may result in retention of up to 10 percent of the voucher. Additionally, provide a Monthly Exposure Report and attach to the monthly billing request. This report is a compilation of employee-hours worked each month for all site workers, both prime and subcontractor. Failure to submit the report may result in retention of up to 10 percent of the voucher. The Contracting Officer will submit a copy of the Contractor Safety Self-Evaluation and Monthly Exposure Report to the local safety and occupational health office.

1.5 REGULATORY REQUIREMENTS

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

1.6 SITE QUALIFICATIONS, DUTIES AND MEETINGS

1.6.1 Personnel Qualifications

1.6.1.1 Site Safety and Health Officer (SSHO)

The SSHO must meet the requirements of EM 385-1-1 section 1 and ensure that the requirements of 29 CFR 1926.16 are met for the project. Provide a Safety oversight team that includes a minimum of one (1) person at each

project site to function as the Site Safety and Health Officer (SSHO). The SSHO or an equally-qualified Designated Representative/alternate shall be at the work site at all times to implement and administer the Contractor's safety program and government-accepted Accident Prevention Plan. The SSHO's training, experience, and qualifications shall be as required by EM 385-1-1 paragraph 01.A.17, entitled SITE SAFETY AND HEALTH OFFICER (SSHO), and all associated sub-paragraphs. The Superintendent and SSHO can be the same person provided the superintendent meet the same qualifications as the SSHO. The SSHO shall meet the following minimum level requirements:

Level 1:

The SSHO is required to have a minimum of 5 years of construction industry safety experience on similar projects. Complete the 30-hour OSHA construction safety class or equivalent within the last 5 years. Complete an average of at least 24 hours of formal safety training each year for the past 5 years. Complete the 40-hour Construction Hazard Awareness Course. Achieve certification as a Safety Trained Supervisor (STS). Competent person training as needed.

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

1.6.1.1.1 Contractor Quality Control (QC) Person:

The Contractor Quality Control Person cannot be the SSHO on this project, even though the QC has safety inspection responsibilities as part of the QC duties unless otherwise indicated in each task order.

1.6.1.1.2 Additional Site Safety and Health Officer (SSHO) Requirements and Duties

The SSHO shall have completed the "40 Hour Construction Safety Hazard Awareness Training Course for Contractors".

1.6.1.1.3 40 Hour Construction Safety Hazard Awareness Training Course for Contractors

The training requirements for the SSHO must include the successful completion of the course entitled "40 Hour Construction Safety Hazard Awareness Training Course for Contractors". If the SSHO does not have a current certification, they shall obtain the course certification within sixty (60) calendar days from award.

As a minimum this course shall provide the participant with knowledge of the unique EM 385-1-1 U.S. Army Corps of Engineers Safety and Health requirements, NAVFAC P-307 Management of Weight Handling Equipment Manual, Hazard Identification, Recommending Hazard Abatement Methods, Properly preparing a site-specific Accident Prevention Plan (APP), Activity Hazard Analysis (AHA), and other skills necessary to effectively manage a safety program for contractors doing business with the US Navy, NAVFAC, US Army Corps of Engineers and other government DOD agencies.

The 40 Hour Construction Safety Hazard Awareness Course will include a written examination that will cover the following the following safety

topics as it applies to the requirements identified in the 1) EM 385-1-1 U.S. Army Corps of Engineers Safety and Health requirements Manual and 2) the NAVFAC P-307 Management of Weight Handling Equipment Manual:

Program Management, Sanitation, Medical and First-Aid Requirements, Temporary Facilities, Personal Protective and Safety Equipment, Hazardous or Toxic Agents and Environments, Lighting, Accident Prevention Signs, Tags, Labels, Signals, Piping System Identification, and Traffic Control, Fire Prevention and Protection, Welding and Cutting, Electrical, Control of Hazardous Energy, Hand and Power Tools, Material Handling, Storage, & Disposal, Rigging, Cranes and Hoisting Equipment, Conveyors, Motor Vehicles, Machinery and Mechanized Equipment, All Terrain Vehicles, Utility Vehicles, and other Specialty Vehicles, Floating Plant and Marine Activities, Pressurized Equipment Systems, Fall Protection, Work Platforms and Scaffolding, Demolition, Safe Access, Ladders, Floor & Wall Openings, Stairs and Railing Systems, Excavations and Trenching, Underground Construction (Tunnels), Shafts, and Caissons, Concrete, Masonry, Steel Erection and Residential Construction, Hazardous Waste Operations and Emergency Response (HAZWOPER), and Confined Space Entry.

This course is periodically offered by General Contractors Association of Hawaii, Hawaii Building Industry Foundation, Associated Builders and Contractors - Hawaii Chapter, and the Guam Contractors Association.

1.6.1.1.4 Qualified Trainer Requirements

Qualified Trainer Requirements for 40 Hour Construction Safety Hazard Awareness Training Course for Contractors and 16 hours of classroom training on the requirements of the latest version of the EM 385-1-1:

Completed the following courses:

- a. OSHA 510, Occupational Safety and Health Standards for Construction
- b. OSHA 500, Trainer Course in OSHA Standards for Construction
- c. OSHA 3095, Electrical Standards
- d. OSHA 7115, Lockout/Tagout
- e. OSHA 3110, Fall Arrest Systems
- f. OSHA 2264, Permit-Required Confined Space Entry
- g. OSHA 3010, Excavation, Trenching and Soil Mechanics
- h. Scaffolds in accordance with 29 CFR 1926.450, Subpart L
- i. NAVFAC 40-hour Construction Safety Hazard Awareness Training

Responsibilities of Authorized Trainers:

- a. Prepare class presentations that cover construction-related safety requirements and includes topics covered in the NAVFAC Construction Safety Hazard Awareness Course for Contractors.
- b. Ensure that all attendees attend all sessions by using a class roster signed daily by each attendee. Maintain copies of the roster for at least five (5) years. This is a certification class and must be attended 100 percent. In cases of emergency where an attendee cannot make it to a session, the attendee can make it up in another class session for the same subject.
- c. Update training course materials whenever an update of the EM 385-1-1 becomes available.

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

Copies of test and student answers shall be retained for five (5) years and will be made available for inspection by the NAVFAC Pacific, Site Safety and Health Manager upon request.

1.6.1.2 Competent Person for Confined Space Entry

Provide a "Competent Person" to supervise the entry into each confined space. That individual must meet the requirements and definition of Competent Person as contained in EM 385-1-1.

1.6.1.3 Crane Operators

Meet the crane operators requirements in USACE EM 385-1-1, Section 16 and Appendix I. In addition, for mobile cranes with Original Equipment Manufacturer (OEM) rated capacities of 50,000 pounds or greater, designate crane operators as qualified by a source that qualifies crane operators (i.e., union, a government agency, or an organization that tests and qualifies crane operators). Provide proof of current qualification. In addition, the Contractor shall comply with Contractor Operated Crane Requirements included in the latest revision of document NAVFAC P-307 Section 1.7.2 "Contractor Operated Cranes," and Appendix P, Figure P-1 and with 29 CFR 1926, Subpart CC.

Also meet the crane operator requirements of the State of Hawaii for Crane certification.

1.6.2 Personnel Duties

1.6.2.1 Site Safety and Health Officer (SSHO)

The SSHO shall:

- a. Conduct daily safety and health inspections and maintain a written log which includes area/operation inspected, date of inspection, identified hazards, recommended corrective actions, estimated and actual dates of corrections. Attach safety inspection logs to the Contractors' daily production of quality control report.
- b. Conduct mishap investigations and complete required reports. Maintain the OSHA Form 300 and Daily Production reports for prime and sub-contractors.
- c. Maintain applicable safety reference material on the job site.
- d. Attend the pre-construction conference, pre-work meetings including preparatory inspection meeting, and periodic in-progress meetings.
- e. Implement and enforce accepted APPS and AHAs.
- f. Maintain a safety and health deficiency tracking system that monitors outstanding deficiencies until resolution. Post a list of unresolved safety and health deficiencies on the safety bulletin board.
- g. Ensure sub-contractor compliance with safety and health requirements.

- h. Maintain a list of hazardous chemicals on site and their material safety data sheets.

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

1.6.3 Meetings

1.6.3.1 Preconstruction Conference

- a. Contractor representatives who have a responsibility or significant role in accident prevention on the project shall attend the preconstruction conference. This includes the project superintendent, site safety and health officer, quality control supervisor, or any other assigned safety and health professionals who participated in the development of the APP (including the Activity Hazard Analyses (AHAs) and special plans, program and procedures associated with it).
- 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 at the conference and an agreement will be reached between the Contractor and the Contracting Officer's representative as to which phases will require an analysis. In addition, establish a schedule for the preparation, submittal, review, and acceptance of AHAs to preclude project delays.
- c. Deficiencies in the submitted APP will be brought to the attention of the Contractor at the preconstruction conference, and the Contractor shall revise the plan to correct deficiencies and re-submit it for acceptance. Do not begin work until there is an accepted APP.

1.6.3.2 Safety Meetings

Conduct and document meetings as required by EM 385-1-1. Attach minutes showing contract title, signatures of attendees and a list of topics discussed to the Contractors' daily production or quality control report.

1.7 ACCIDENT PREVENTION PLAN (APP)

Use a qualified person to prepare the written site-specific APP. Prepare the APP in accordance with the format and requirements of USACE EM 385-1-1 and as supplemented herein. Cover all paragraph and subparagraph elements in USACE EM 385-1-1, Appendix A, "Minimum Basic Outline for Accident Prevention Plan". Specific requirements for some of the APP elements are described below. The APP shall be job-specific and address any unusual or unique aspects of the project or activity for which it is written. The APP shall interface with the Contractor's overall safety and health program. Include any portions of the Contractor's overall safety and health program referenced in the APP in the applicable APP element and made site-specific. The Government considers the Prime Contractor to be the "controlling authority" for all work site safety and health of the subcontractors. Contractors are responsible for informing their subcontractors of the safety provisions under the terms of the contract and the penalties for noncompliance, coordinating the work to prevent one craft from interfering with or creating hazardous working conditions for other crafts, and

inspecting subcontractor operations to ensure that accident prevention responsibilities are being carried out. The APP shall be signed by the person and firm (senior person) preparing the APP, the Contractor, the on-site superintendent, the designated site safety and health officer, the Contractor Quality control Manager, and any designated CSP or CIH.

Submit the APP to the Contracting Officer 15 calendar days prior to the date of the preconstruction conference for acceptance. Work cannot proceed without an accepted APP.

Once accepted by the Contracting Officer, the APP and attachments will be enforced as part of the contract. Disregarding the provisions of this contract or the accepted APP will be cause for stopping of work, at the discretion of the Contracting Officer, until the matter has been rectified.

Once work begins, changes to the accepted APP shall be made with the knowledge and concurrence of the Contracting Officer, project superintendent, SSO and quality control manager. 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/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 ASSE/SAFE A10.34,) and the environment.

Copies of the accepted plan will be maintained at the Contracting Officer's office and at the job site.

Continuously review and amend the APP, as necessary, throughout the life of the contract. Incorporate unusual or high-hazard activities not identified in the original APP as they are discovered.

1.7.1 EM 385-1-1 Contents

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

- a. Names and qualifications (resumes including education, training, experience and certifications) of all site safety and health personnel designated to perform work on this project to include the designated site safety and health officer and other competent and qualified personnel to be used such as CSPs, CIHs, STSs, CHSTs. Specify the duties of each position.
- b. Qualifications of competent and of qualified persons. As a minimum, designate and submit qualifications of competent persons for each of the following major areas: excavation; scaffolding; fall protection; hazardous energy; confined space; health hazard recognition, evaluation and control of chemical, physical and biological agents; personal protective equipment and clothing to include selection, use and maintenance.
- c. Confined Space Entry Plan. Develop a confined and/or enclosed space entry plan in accordance with USACE EM 385-1-1, applicable OSHA standards 29 CFR 1910, 29 CFR 1915, and 29 CFR 1926, OSHA Directive CPL 2.100, and any other federal, state and local regulatory requirements identified in this contract. Identify the qualified person's name and qualifications, training, and experience. Delineate the qualified person's authority to direct work stoppage in the event

of hazardous conditions. Include procedure for rescue by contractor personnel and the coordination with emergency responders. (If there is no confined space work, include a statement that no confined space work exists and none will be created.)

- d. Crane Critical Lift Plan. Prepare and sign weight handling critical lift plans for lifts over 75 percent of the capacity of the crane or hoist (or lifts over 50 percent of the capacity of a barge mounted mobile crane's hoists) at any radius of lift; lifts involving more than one crane or hoist; lifts of personnel; and lifts involving non-routine rigging or operation, sensitive equipment, or unusual safety risks. Submit 15 calendar days prior to on-site work and include the requirements of USACE EM 385-1-1, paragraph 16.H. and the following:
- (1) For lifts of personnel, demonstrate compliance with the requirements of 29 CFR 1926.1400.
 - (2) For barge mounted mobile cranes, barge stability calculations identifying barge list and trim based on anticipated loading; and load charts based on calculated list and trim. The amount of list and trim shall be within the crane manufacturer's requirements.
- e. Fall Protection and Prevention (FP&P) Program Documentation. The program documentation shall be site specific and address all fall hazards in the work place and during different phases of construction. Address how to protect and prevent workers from falling to lower levels when they are exposed to fall hazards above 6 feet. A qualified person for fall protection shall prepare and sign the program documentation. Include fall protection and prevention systems, equipment and methods employed for every phase of work, responsibilities, assisted rescue, self-rescue and evacuation procedures, training requirements, and monitoring methods. Revise the Fall Protection and Prevention Program documentation every six months for lengthy projects, reflecting any changes during the course of construction due to changes in personnel, equipment, systems or work habits. Keep and maintain the accepted Fall Protection and Prevention Program documentation at the job site for the duration of the project. Include the Fall Protection and Prevention Program documentation in the Accident Prevention Plan (APP).
- The FP&P Plan shall include a Rescue and Evacuation Plan in accordance with USACE EM 385-1-1, Section 21.M. The plan shall include a detailed discussion of the following: methods of rescue; methods of self-rescue; equipment used; training requirement; specialized training for the rescuers; procedures for requesting rescue and medical assistance; and transportation routes to a medical facility. Include the Rescue and Evacuation Plan in the Fall Protection and Prevention (FP&P) Plan, and as part of the Accident Prevention Plan (APP).
- j. PCB Plan. The safety and health aspects of Polychlorinated Biphenyls work, prepared in accordance with Sections 02 61 23 REMOVAL AND

DISPOSAL OF PCB CONTAMINATED SOILS.

- k. Site Demolition Plan. The safety and health aspects prepared in accordance with Section 02 41 00 DEMOLITION and referenced sources. Include engineering survey as applicable.

1.8 ACTIVITY HAZARD ANALYSIS (AHA)

The Activity Hazard Analysis (AHA) format shall be in accordance with USACE EM 385-1-1, Section 1. Submit the AHA for review at least 15 calendar days prior to the start of each phase. Format subsequent AHAs as amendments to the APP. The analysis should be used during daily inspections to ensure the implementation and effectiveness of the activity's safety and health controls.

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

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

1.9 DISPLAY OF SAFETY INFORMATION

Within one calendar day(s) after commencement of work, erect a safety bulletin board at the job site. Where size, duration, or logistics of project do not facilitate a bulletin board, an alternative method, acceptable to the Contracting Officer, that is accessible and includes all mandatory information for employee and visitor review, shall be deemed as meeting the requirement for a bulletin board. Include and maintain information on safety bulletin board as required by EM 385-1-1, section 01.A.06. Additional items required to be posted include:

- a. Confined space entry permit.
- b. Hot work permit.

1.10 SITE SAFETY REFERENCE MATERIALS

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

1.11 EMERGENCY MEDICAL TREATMENT

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

1.12 NOTIFICATIONS and REPORTS

1.12.1 Accident Notification

Notify the Contracting Officer as soon as practical, but no more than four hours after any accident meeting the definition of Recordable Injuries or

Illnesses or High Visibility Accidents, property damage equal to or greater than \$2,000, or any weight handling equipment accident. 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 (to include type of construction equipment used, PPE used, etc.). Preserve the conditions and evidence on the accident site until the Government investigation team arrives on-site and Government investigation is conducted.

1.12.2 Accident Reports

- a. Conduct an accident investigation for recordable injuries and illnesses, for Medical Treatment defined in paragraph DEFINITIONS, property damage accidents resulting in at least \$20,000 in damages, and near misses as defined in EM 385-1-1, to establish the root cause(s) of the accident. Complete the applicable NAVFAC Contractor Incident Reporting System (CIRS), and electronically submit via the NAVFAC Enterprise Safety Applications Management System (ESAMS). The Contracting Officer will provide copies of any required or special forms.
- b. Near Misses: Complete the applicable documentation in NAVFAC Contractor Incident Reporting System (CIRS), and electronically submit via the NAVFAC Enterprise Safety Applications Management System (ESAMS).
- c. Conduct an accident investigation for any weight handling equipment accident (including rigging gear accidents) to establish the root cause(s) of the accident, complete the WHE Accident Report (Crane and Rigging Gear) form and provide the report to the Contracting Officer within 30 calendar days of the accident. Do not proceed with crane operations until cause is determined and corrective actions have been implemented to the satisfaction of the contracting officer. The Contracting Officer will provide a blank copy of the accident report form.

1.12.3 Crane Reports

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

1.12.4 Certificate of Compliance

Provide a Certificate of Compliance for each crane entering an activity under this contract (see Contracting Officer for a blank certificate). State within the certificate that the crane and rigging gear meet applicable OSHA regulations (with the Contractor citing which OSHA regulations are applicable, e.g., cranes used in construction, demolition, or maintenance comply with 29 CFR 1926 and USACE EM 385-1-1 Section 16 and Appendix I. Certify on the Certificate of Compliance that the crane operator(s) is qualified and trained in the operation of the crane to be used. Also certify that all of its crane operators working on the DOD activity have been trained in the proper use of all safety devices (e.g., anti-two block devices). Post certifications on the crane.

1.13 HOT WORK

Submit and obtain a written permit prior to performing "Hot Work" (welding,

cutting, etc.) or operating other flame-producing/spark producing devices, from the Fire Division. A permit is required from the Explosives Safety Office for work in and around where explosives are processed, stored, or handled. CONTRACTORS ARE REQUIRED TO MEET ALL CRITERIA BEFORE A PERMIT IS ISSUED. Provide at least two (2) twenty (20) pound 4A:20 BC rated extinguishers for normal "Hot Work". All extinguishers shall be current inspection tagged, approved safety pin and tamper resistant seal. It is also mandatory to have a designated FIRE WATCH for any "Hot Work" done at this activity. The Fire Watch shall be trained in accordance with NFPA 51B and remain on-site for a minimum of 30 minutes after completion of the task or as specified on the hot work permit.

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

1.14 RADIATION SAFETY REQUIREMENTS

License Certificates for radiation materials and equipment shall be submitted to the Contracting Officer and Radiation Safety Office (RSO), and Contracting Oversight Technician (COT) for all specialized and licensed material and equipment that could cause fatal harm to construction personnel or to the construction project.

Workers shall be protected from radiation exposure in accordance with 10 CFR 20. Standards for Protection Against Radiation

Loss of radioactive material shall be reported immediately to the Contracting Officer.

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

In instances where radiography is scheduled near or adjacent to buildings or areas having limited access or one-way doors, no assumptions shall be made 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, a fully instructed employee shall be positioned inside such building or area to prevent exiting while external radiographic operations are in process. Transportation of Regulated Amounts of Radioactive Material will comply with 49 CFR, Subchapter C, Hazardous Material Regulations. Local Fire authorities and the site Radiation Safety officer (RSO) shall be notified of any Radioactive Material use.

Transmitter Requirements: The base policy concerning the use of transmitters such as radios, cell phones, etc., must be adhered to by all contractor personnel. They must also obey Emissions control (EMCON) restrictions.

1.15 FACILITY OCCUPANCY CLOSURE

Streets, walks, and other facilities occupied and used by the Government shall not be closed or obstructed without written permission from the Contracting Officer.

1.16 SEVERE STORM PLAN

In the event of a severe storm warning, the Contractor must:

- a. Secure outside equipment and materials and place materials that could be damaged in protected areas.
- b. Check surrounding area, including roof, for loose material, equipment, debris, and other objects that could be blown away or against existing facilities.
- c. Ensure that temporary erosion controls are adequate.

1.17 CONFINED SPACE ENTRY REQUIREMENTS.

Contractors entering and working in confined spaces while performing general industry work are required to follow the requirements of OSHA 29 CFR 1926 and comply with the requirements in Section 34 of EM 385-1-1, OSHA 29 CFR 1910, and OSHA 29 CFR 1910.146. Contractors entering and working in confined spaces while performing shipyard industry work are required to follow the requirements of OSHA 29 CFR 1915 Subpart B.

PART 2 PRODUCTS

2.1 CONFINED SPACE SIGNAGE

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

PART 3 EXECUTION

3.1 CONSTRUCTION AND OTHER WORK

Comply with USACE 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 carried/available on each person.

Mandatory PPE includes:

- a. Hard Hat
- b. Appropriate Safety Shoes
- c. Reflective Vests

3.1.1 Hazardous Material Use

Each hazardous material must receive approval from the Contracting Office or their designated representative prior to being brought onto the job site or prior to any other use in connection with this contract. Allow a

minimum of 10 working days for processing of the request for use of a hazardous material.

3.1.2 Hazardous Material Exclusions

Notwithstanding any other hazardous material used in this contract, radioactive materials or instruments capable of producing ionizing/non-ionizing radiation (with the exception of radioactive material and devices used in accordance with USACE EM 385-1-1 such as nuclear density meters for compaction testing and laboratory equipment with radioactive sources) as well as materials which contain asbestos, mercury or polychlorinated biphenyls, di-isocyanates, lead-based paint are prohibited. The Contracting Officer, upon written request by the Contractor, may consider exceptions to the use of any of the above excluded materials. 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

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

3.2 PRE-OUTAGE COORDINATION MEETING

Apply for utility outages at least 30 days in advance. As a minimum, the request should include the location of the outage, utilities being affected, duration of outage and any necessary sketches. Special requirements for electrical outage requests are contained elsewhere in this specification section. Once approved, and prior to beginning work on the utility system requiring shut down, attend a pre-outage coordination meeting with the Contracting Officer to review the scope of work and the lock-out/tag-out procedures for worker protection. No work will be performed on energized electrical circuits unless proof is provided that no other means exist.

3.3 CONTROL OF HAZARDOUS ENERGY (LOCKOUT/TAGOUT)

Ensure that each employee is familiar with and complies with these procedures and USACE EM 385-1-1, Section 12, Control of Hazardous Energy.

Contracting Officer will, at the Contractor's request, apply lockout/tagout tags and take other actions that, because of experience and knowledge, are known to be necessary to make the particular equipment safe to work on for government owned and operated systems.

No person, regardless of position or authority, shall operate any switch, valve, or equipment that has an official lockout/tagout tag attached to it, nor shall such tag be removed except as provided in this section. No

person shall work on any energized equipment including, but not limited to activities such as erecting, installing, constructing, repairing, adjusting, inspecting, un-jamming, setting up, trouble shooting, testing, cleaning, dismantling, servicing and maintaining machines equipment of processes until an evaluation has been conducted identifying the energy source and the procedures which will be taken to ensure the safety of personnel.

When work is to be performed on electrical circuits, only qualified personnel shall perform work on electrical circuits.

No person shall work on any equipment that requires a lockout/tagout tag unless he, his immediate supervisor, project leader, or a subordinate has in his possession the stubs of the required lockout/tagout tags.

A supervisor who is required to enter an area protected by a lockout/tagout tag will be considered a member of the protected group provided he notifies the holder of the tag stub each time he enters and departs from the protected area.

Identification markings on building light and power distribution circuits shall not be relied on for established safe work conditions.

Before clearance will be given on any equipment other than electrical (generally referred to as mechanical apparatus), the apparatus, valves, or systems shall be secured in a passive condition with the appropriate vents, pins, and locks.

Pressurized or vacuum systems shall be vented to relieve differential pressure completely.

Vent valves shall be tagged open during the course of the work.

Where dangerous gas or fluid systems are involved, or in areas where the environment may be oxygen deficient, system or areas shall be purged, ventilated, or otherwise made safe prior to entry.

3.3.1 Tag Placement

Lockout/tagout tags shall be completed in accordance with the regulations printed on the back thereof and attached to any device which, if operated, could cause an unsafe condition to exist.

If more than one group is to work on any circuit or equipment, the employee in charge of each group shall have a separate set of lockout/tagout tags completed and properly attached.

When it is required that certain equipment be tagged, the Government will review the characteristics of the various systems involved that affect the safety of the operations and the work to be done; take the necessary actions, including voltage and pressure checks, grounding, and venting, to make the system and equipment safe to work on; and apply such lockout/tagout tags to those switches, valves, vents, or other mechanical devices needed to preserve the safety provided. This operation is referred to as "Providing Safety Clearance."

3.3.2 Tag Removal

When any individual or group has completed its part of the work and is clear of the circuits or equipment, the supervisor, project leader, or individual for whom the equipment was tagged shall turn in his signed lockout/tagout tag stub to the Contracting Officer. That group's or individual's lockout/tagout tags on equipment may then be removed on authorization by the Contracting Officer.

3.4 FALL HAZARD PROTECTION AND PREVENTION PROGRAM

Establish a fall protection and prevention program, for the protection of all employees exposed to fall hazards. Within the program include company policy, identify responsibilities, education and training requirements, fall hazard identification, prevention and control measures, inspection, storage, care and maintenance of fall protection equipment and rescue and evacuation procedures in accordance with ASSE/SAFE Z359.1.

3.4.1 Training

Institute a fall protection training program. As part of the Fall Hazard Protection and Prevention Program, provide training for each employee who might be exposed to fall hazards. Provide training by a competent person for fall protection in accordance with USACE EM 385-1-1, Section 21.B.

3.4.2 Fall Protection Equipment and Systems

Enforce use of the fall protection equipment and systems designated for each specific work activity in the Fall Protection and Prevention Plan and/or AHA at all times when an employee is exposed to a fall hazard. Protect employees from fall hazards as specified in EM 385-1-1, Section 21. In addition to the required fall protection systems, safety skiff, personal floatation devices, life rings etc., are required when working above or next to water in accordance with USACE EM 385-1-1, Paragraphs 21.N through 21.N.04. Personal fall arrest systems are required when working from an articulating or extendible boom, swing stages, or suspended platform. In addition, personal fall arrest systems are required when operating other equipment such as scissor lifts if the work platform is capable of being positioned outside the wheelbase. The need for tying-off in such equipment is to prevent ejection of the employee from the equipment during raising, lowering, or travel. Fall protection must comply with 29 CFR 1926.500, Subpart M, USACE EM 385-1-1 and ASSE/SAFE A10.32.

3.4.2.1 Personal Fall Arrest Equipment

Personal fall arrest equipment, systems, subsystems, and components shall meet ASSE/SAFE Z359.1. Only a full-body harness with a shock-absorbing lanyard or self-retracting lanyard is an acceptable personal fall arrest body support device. Body belts may only be used as a positioning device system (for uses such as steel reinforcing assembly and in addition to an approved fall arrest system). Harnesses shall have a fall arrest attachment affixed to the body support (usually a Dorsal D-ring) and specifically designated for attachment to the rest of the system. Only locking snap hooks and carabiners shall be used. Webbing, straps, and ropes shall be made of synthetic fiber. The maximum free fall distance when using fall arrest equipment shall not exceed 6 feet. The total fall distance and any swinging of the worker (pendulum-like motion) that can occur during a fall shall always be taken into consideration when attaching a person to a fall arrest system.

3.4.3 Horizontal Lifelines

Design, install, certify and use under the supervision of a qualified person horizontal lifelines for fall protection as part of a complete fall arrest system which maintains a safety factor of 2 (29 CFR 1926.500).

3.4.4 Guardrails and Safety Nets

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

3.4.5 Rescue and Evacuation Procedures

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

3.5 SCAFFOLDING

Provide employees with a safe means of access to the work area on the scaffold. Climbing of any scaffold braces or supports not specifically designed for access is prohibited. Access scaffold platforms greater than 20 feet maximum in height by use of a scaffold stair system. Do not use vertical ladders commonly provided by scaffold system manufacturers for accessing scaffold platforms greater than 20 feet maximum in height. The use of an adequate gate is required. Ensure that employees are qualified to perform scaffold erection and dismantling. Do not use scaffold without the capability of supporting at least four times the maximum intended load or without appropriate fall protection as delineated in the accepted fall protection and prevention plan. Stationary scaffolds must be attached to structural building components to safeguard against tipping forward or backward. Give special care to ensure scaffold systems are not overloaded. Side brackets used to extend scaffold platforms on self-supported scaffold systems for the storage of material is prohibited. The first tie-in shall be at the height equal to 4 times the width of the smallest dimension of the scaffold base. Place work platforms on mud sills. Scaffold or work platform erectors shall have fall protection during the erection and dismantling of scaffolding or work platforms that are more than six feet. Delineate fall protection requirements when working above six feet or above dangerous operations in the Fall Protection and Prevention (FP&P) Plan and Activity Hazard Analysis (AHA) for the phase of work.

3.6 EQUIPMENT

3.6.1 Material Handling Equipment

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

- b. The use of hooks on equipment for lifting of material must be in accordance with manufacturer's printed instructions. Additionally, when material handling equipment is used as a crane it must meet NAVFAC P-307 requirements in Sections 1.7.2, "Contractor Operated Cranes," and 12, "Investigation and Reporting of Crane and Rigging Gear Accidents."
- c. Operators of forklifts or power industrial trucks shall be licensed in accordance with OSHA.

3.6.2 Weight Handling Equipment

- a. Equip cranes and derricks as specified in EM 385-1-1, section 16.
- b. Notify the Contracting Officer 15 days in advance of any cranes entering the activity so that necessary quality assurance spot checks can be coordinated. Contractor's operator shall remain with the crane during the spot check.
- c. Comply with the crane manufacturer's specifications and limitations for erection and operation of cranes and hoists used in support of the work. Perform erection under the supervision of a designated person (as defined in ASME B30.5). Perform all testing in accordance with the manufacturer's recommended procedures.
- d. Comply with ASME B30.5 for mobile and locomotive cranes, ASME B30.22 for articulating boom cranes, ASME B30.3 for construction tower cranes, and ASME B30.8 for floating cranes and floating derricks.
- e. Under no circumstance shall a Contractor make a lift at or above 90 percent of the cranes rated capacity in any configuration.
- f. When operating in the vicinity of overhead transmission lines, operators and riggers shall be alert to this special hazard and follow the requirements of USACE EM 385-1-1 Section 11, NAVFAC P-307 Figure 10-3 and ASME B30.5 or ASME B30.22 as applicable.
- g. Do not crane suspended personnel work platforms (baskets) unless the Contractor proves that using any other access to the work location would provide a greater hazard to the workers or is impossible. Do not lift personnel with a line hoist or friction crane.
- h. Inspect, maintain, and recharge portable fire extinguishers as specified in NFPA 10, Standard for Portable Fire Extinguishers.
- i. All employees must keep clear of loads about to be lifted and of suspended loads.
- j. Use cribbing when performing lifts on outriggers.
- k. The crane hook/block must be positioned directly over the load. Side loading of the crane is prohibited.
- l. A physical barricade must be positioned to prevent personnel from entering the counterweight swing (tail swing) area of the crane.
- m. Certification records which include the date of inspection, signature of the person performing the inspection, and the serial number or other

identifier of the crane that was inspected shall always be available for review by Contracting Officer personnel.

- n. Written reports listing the load test procedures used along with any repairs or alterations performed on the crane shall be available for review by Contracting Officer personnel.
- o. Certify that all crane operators have been trained in proper use of all safety devices (e.g. anti-two block devices).
- p. Take steps to ensure that wind speed does not contribute to loss of control of the load during lifting operations. Prior to conducting lifting operations set a maximum wind speed at which a crane can be safely operated based on the equipment being used, the load being lifted, experience of operators and riggers, and hazards on the work site. This maximum wind speed determination shall be included as part of the activity hazard analysis plan for that operation.

3.6.3 Equipment and Mechanized Equipment

- a. Proof of qualifications for operator shall be kept on the project site for review.
- b. Manufacture specifications or owner's manual for the equipment shall be on-site and reviewed for additional safety precautions or requirements that are sometimes not identified by OSHA or USACE EM 385-1-1. Incorporate such additional safety precautions or requirements into the AHAs.

3.6.4 USE OF EXPLOSIVES

Explosives shall not be used or brought to the project site.

3.7 EXCAVATIONS

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

3.7.1 Utility Locations

Prior to digging, the appropriate digging permit must be obtained. All underground utilities in the work area must be positively identified by a third party, independent, private utility locating company in addition to any station locating service and coordinated with the station utility department.

3.7.2 Utility Location Verification

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

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

Utilities located within and under concrete slabs or pier structures, bridges, parking areas, and the like, are extremely difficult to identify. Whenever contract work involves chipping, saw cutting, or core drilling

through concrete, bituminous asphalt or other impervious surfaces, the existing utility location must be coordinated with station utility departments in addition to location and depth verification by a third party, independent, private locating company. The third party, independent, private locating company shall locate utility depth by use of Ground Penetrating Radar (GPR), X-ray, bore scope, or ultrasound prior to the start of demolition and construction. Outages to isolate utility systems must be used in circumstances where utilities are unable to be positively identified. The use of historical drawings does not alleviate the contractor from meeting this requirement.

3.8 ELECTRICAL

3.9.1 Portable Extension Cords

Size portable extension cords in accordance with manufacturer ratings for the tool to be powered and protected from damage. Immediately removed from service all damaged extension cords. Portable extension cords shall meet the requirements of EM 385-1-1, NFPA 70E, and OSHA electrical standards.

3.9 WORK IN CONFINED SPACES

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

- a. Entry Procedures. Prohibit entry into a confined space by personnel for any purpose, including hot work, until the qualified person has conducted appropriate tests to ensure the confined or enclosed space is safe for the work intended and that all potential hazards are controlled or eliminated and documented. (See Section 34 of USACE EM 385-1-1 for entry procedures.) All hazards pertaining to the space shall be reviewed with each employee during review of the AHA.
- b. Forced air ventilation is required for all confined space entry operations and the minimum air exchange requirements must be maintained to ensure exposure to any hazardous atmosphere is kept below its' action level.
- c. Sewer wet wells require continuous atmosphere monitoring with audible alarm for toxic gas detection.

3.10 SAFETY APPAREL ON CONSTRUCTION JOBSITES

All personnel on construction jobsites shall wear high-visibility safety apparel (garment, vest, or harness of retro-reflective and fluorescent material) meeting ANSI/ISEA 107 2004 or later requirements. As a minimum, all personnel shall wear ANSI/ISEA 107 2004 Class I compliant apparel. When the risk level exceeds those of Class I, Class II or Class III safety apparel shall be worn.

All workers will be required to wear their hard hats with the bill facing forward. Ball caps, knit caps, or other headdress worn under the hard hat is prohibited unless approved by the hard hat manufacturer.

-- End of Section --

SECTION 01 45 00.00 20

QUALITY CONTROL

11/11

PART 1 GENERAL

1.1 REFERENCES

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

U.S. ARMY CORPS OF ENGINEERS (USACE)

EM 385-1-1 (2008; Errata 2011) Safety and Health Requirements Manual

1.2 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are for Contractor Quality Control approval. Submit the following in accordance with Section 01 33 00 SUBMITTAL PROCEDURES

SD-01 Preconstruction Submittals

Construction Quality Control (QC) Plan; G

Submit a Construction QC Plan prior to start of construction.

1.3 INFORMATION FOR THE CONTRACTING OFFICER

Prior to commencing work on construction, the Contractor can obtain a single copy set of the current report forms from the Contracting Officer. The report forms will consist of the Contractor Production Report, Contractor Production Report (Continuation Sheet), Contractor Quality Control (CQC) Report, (CQC) Report (Continuation Sheet), Preparatory Phase Checklist, Initial Phase Checklist, Rework Items List, and Testing Plan and Log.

Deliver the following to the Contracting Officer during Construction:

- a. CQC Report: Mail or hand-carry the original (wet signatures) and one copy by 10:00 AM the next working day after each day that work is performed and for every seven consecutive calendar days of no-work.
- b. Contractor Production Report: Submit the report electronically by 10:00 AM the next working day after each day that work is performed and for every seven consecutive calendar days of no-work.
- c. Preparatory Phase Checklist: Submit the report electronically in the same manner as the CQC Report for each Preparatory Phase held.
- d. Initial Phase Checklist: Submit the report electronically in the same manner as the CQC Report for each Initial Phase held.

- e. QC Specialist Reports: Submit the report electronically by 10:00 AM the next working day after each day that work is performed.
- f. Field Test Reports: Within two working days after the test is performed, submit the report as an electronic attachment to the CQC Report.
- g. Monthly Summary Report of Tests: Submit the report as an electronic attachment to the CQC Report at the end of each month.
- h. Testing Plan and Log: Submit the report as an electronic attachment to the CQC Report, at the end of each month. A copy of the final Testing Plan and Log shall be provided to the OMSI preparer for inclusion into the OMSI documentation.
- i. Rework Items List: Submit lists containing new entries daily, in the same manner as the CQC Report.
- j. CQC Meeting Minutes: Within two working days after the meeting is held, submit the report as an electronic attachment to the CQC Report.
- k. QC Certifications: As required by the paragraph entitled "QC Certifications."

1.4 QC PROGRAM REQUIREMENTS

Establish and maintain a QC program as described in this section. This QC program is a key element in meeting the objectives of NAVFAC Commissioning. 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, and QC certifications and documentation necessary to provide materials, equipment, workmanship, fabrication, construction and operations which comply with the requirements of this Contract. The QC program shall cover on-site and off-site work and shall 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 the Project Superintendent. 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.

1.4.1 Acceptance of the Construction Quality Control (QC) Plan

Acceptance of the QC Plan is required prior to the start of construction. The Contracting Officer reserves the right to require changes in the QC Plan and operations as necessary, including removal of personnel, to ensure the specified quality of work. The Contracting Officer reserves the right to interview any member of the QC organization at any time in order to verify the submitted qualifications. All QC 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.

1.4.2 Preliminary Construction Work Authorized Prior to Acceptance

The only construction work that is authorized to proceed prior to the acceptance of the QC Plan is mobilization of storage and office trailers,

temporary utilities, and surveying.

1.4.3 Notification of Changes

Notify the Contracting Officer, in writing, of any proposed changes in the QC Plan or changes to the QC organization personnel, a minimum of 10 work days prior to a proposed change. Proposed changes are subject to acceptance by the Contracting Officer.

1.5 QC ORGANIZATION

1.5.1 QC Manager

1.5.1.1 Duties

Provide a QC Manager at the work site to implement and manage the QC program. The only duties and responsibilities of the QC Manager are to manage and implement the QC program on this Contract. The QC Manager is required to attend the partnering meetings, 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.

1.5.1.2 Qualifications

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 two 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.

1.5.2 Construction Quality Management Training

In addition to the above experience and education requirements, the QC Manager must have completed the course entitled "Construction Quality Management (CQM) for Contractors." If the QC Manager does not have a current certification, they must obtain the CQM for Contractors course certification within 90 days of award. This course is periodically offered by the Naval Facilities Engineering Command and the Army Corps of Engineers. Contact the Contracting Officer for information on the next scheduled class.

1.5.3 Alternate QC Manager Duties and Qualifications

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

1.5.4 Submittal Reviewers Duties and Qualifications

Provide a Submittal Reviewers, other than the QC Manager or CA, 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.

1.6 QUALITY CONTROL (QC) PLAN

1.6.1 Construction Quality Control (QC) Plan

1.6.1.1 Requirements

Provide, for acceptance by the Contracting Officer, a Construction QC Plan submitted in a three-ring binder that includes a table of contents, with major sections identified with tabs, with pages numbered sequentially, and that documents the proposed methods and responsibilities for accomplishing commissioning activities during the construction of the project:

- a. QC ORGANIZATION: A chart showing the QC organizational structure.
- b. NAMES AND QUALIFICATIONS: Names and qualifications, in resume format, for each person in the QC organization. Include the CQM for Contractors course certifications for the QC Manager and Alternate QC Manager as required by the paragraphs entitled "Construction Quality Management Training" and "Alternate QC Manager Duties and Qualifications".
- c. DUTIES, RESPONSIBILITY AND AUTHORITY OF QC PERSONNEL: Duties, responsibilities, and authorities of each person in the QC organization.
- d. 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.
- e. APPOINTMENT LETTERS: Letters signed by an officer of the firm appointing the QC Manager and Alternate QC Manager 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 which is not in compliance with the Contract. Letters of direction are to be issued by the QC Manager to all other QC Specialists outlining their duties, authorities, and responsibilities. Include copies of the letters in the QC Plan.
- f. SUBMITTAL PROCEDURES AND INITIAL SUBMITTAL REGISTER: Procedures for reviewing, approving, and managing submittals. 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.
- g. TESTING LABORATORY INFORMATION: Testing laboratory information

required by the paragraphs entitled "Accreditation Requirements", as applicable.

- h. TESTING PLAN AND LOG: A Testing Plan and Log that includes the tests required, referenced by the specification paragraph number requiring the test, the frequency, and the person responsible for each test. Use Government forms to log and track tests.
 - i. PROCEDURES TO COMPLETE REWORK ITEMS: Procedures to identify, record, track, and complete rework items. Use Government forms to record and track rework items.
 - j. DOCUMENTATION PROCEDURES: Use Government form.
 - k. 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 and is an item or activity on the construction schedule. Include in the list of DFOWs, but not be limited to, all critical path activities on the NAS. Include all activities for which this specification requires QC Specialists or specialty inspection personnel. Provide separate DFOWs in the Network Analysis Schedule for each design development stage and submittal package.
 - l. PROCEDURES FOR PERFORMING THE THREE PHASES OF CONTROL: Identify procedures used to ensure the three phases of control to manage the quality on this project. For each 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.
 - m. PERSONNEL MATRIX: Not Applicable
 - n. 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.
 - o. TRAINING PROCEDURES AND TRAINING LOG: Procedures for coordinating and documenting the training of personnel required by the Contract.
 - p. ORGANIZATION AND PERSONNEL CERTIFICATIONS LOG: Procedures for coordinating, tracking and documenting all certifications on subcontractors, testing laboratories, suppliers, personnel, etc. 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.
- 1.7 QC PLAN MEETINGS

Prior to submission of the QC Plan, the QC Manager will meet with the Contracting Officer to discuss the QC Plan requirements of this Contract. The purpose of this meeting is to develop a mutual understanding of the QC Plan requirements prior to plan development and submission and to agree on the Contractor's list of DFOWs.

1.8 COORDINATION AND MUTUAL UNDERSTANDING MEETING

After submission of the QC Plan, and prior to the start of construction, the QC Manager will meet with the Contracting Officer to present the QC program required by this Contract. When a new QC Manager is appointed, the coordination and mutual understanding meeting shall be repeated.

1.8.1 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, environmental requirements and procedures, coordination of activities to be performed, and the coordination of the Contractor's management, production, and QC personnel. At the meeting, the Contractor will be required to 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. IAQ Management Plan.
- c. Procedures for noise and acoustics management.
- d. Environmental Protection Plan.
- e. Environmental regulatory requirements.
- f. Cx Plan.

1.8.2 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 prefunctional tests and startup testing with Cx.

1.8.3 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, CA, Environmental Manager, and subcontractor representatives. Each subcontractor who will be assigned QC responsibilities shall have a principal of the firm at the meeting. Minutes of the meeting will be prepared by the QC Manager and signed by the Contractor.

1.9 QC MEETINGS

After the start of construction, conduct QC meetings once every two weeks by the QC Manager at the work site with the Project Superintendent, QC Specialists, the CA, and the foremen who are performing the work of the DFOWs. The QC Manager is to prepare the minutes of the meeting and provide a copy to the Contracting Officer within two 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 rework.
- c. Review the status of submittals.
- d. Review the work to be accomplished in the next two weeks and documentation required.
- e. Resolve QC and production problems (RFI, etc.).
- f. Address items that may require revising the QC Plan.
- g. Review Accident Prevention Plan (APP).
- h. Review environmental requirements and procedures.
- i. Review Waste Management Plan.
- j. Review IAQ Management Plan.
- k. Review Environmental Management Plan.
- l. Review the status of training completion.

1.10 DESIGN REVIEW AND DOCUMENTATION

1.10.1 Contract Document Review

Review the Contract documents to verify that Cx is adequately specified, and that each commissioned system is likely to meet the design intent relative to functionality, energy performance, water performance, maintainability, sustainability, system cost, indoor environmental quality, and local environmental impacts.

1.11 THREE PHASES OF CONTROL

Adequately cover both on-site and off-site work with the Three Phases of Control and include the following for each DFOW.

1.11.1 Preparatory Phase

Notify the Contracting Officer at least two work 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 CA, and the foreman responsible for the DFOW. When the DFOW will be accomplished by a subcontractor, that subcontractor's foreman shall attend the preparatory phase meeting. Document the results of the preparatory phase actions in the daily Contractor Quality Control Report and in the Preparatory Phase Checklist. Perform the following prior to beginning work on each DFOW:

- a. Review each paragraph of the applicable specification sections.
- b. Review the Contract drawings.
- c. Verify that field measurements are as indicated on construction and/or

shop drawings before confirming product orders, in order 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.
- g. Coordinate the schedule of product delivery to designated prepared areas in order to minimize site storage time and potential damage to stored materials.
- h. Arrange for the return of shipping/packaging materials, such as wood pallets, where economically feasible.
- i. 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.
- j. Discuss specific controls used and 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.
- k. Review the APP and appropriate Activity Hazard Analysis (AHA) to ensure that applicable safety requirements are met, and that required Material Safety Data Sheets (MSDS) are submitted.
- l. Review the Cx Plan and ensure all preliminary work items have been completed and documented.

1.11.2 Initial Phase

Notify the Contracting Officer at least two work 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, 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, or when acceptable levels of specified quality are not being met. Perform the following for each DFOW:

- a. Establish the quality of workmanship required.
- b. Resolve conflicts.
- c. Ensure that testing is performed by the approved laboratory.
- d. Check work procedures for compliance with the APP and the appropriate AHA to ensure that applicable safety requirements are met.
- e. Review the Cx Plan and ensure all preparatory work items have been completed and documented.

1.11.3 Follow-Up Phase

Perform the following for on-going work daily, or more frequently as necessary, until the completion of each DFOW and document in the daily CQC Report:

- a. Ensure the work is in compliance with Contract requirements.
- b. Maintain the quality of workmanship required.
- c. Ensure that testing is performed by the approved laboratory.
- d. Ensure that rework items are being corrected.
- e. Assure manufacturers representatives have performed necessary inspections if required and perform safety inspections.
- f. Review the Cx Plan and ensure all work items, testing, and documentation has been completed.

1.11.4 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 is resumed after substantial period of inactivity, or if other problems develop.

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

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

1.12 SUBMITTAL REVIEW AND APPROVAL

Procedures for submission, review and approval of submittals are described in Section 01 33 00 SUBMITTAL PROCEDURES.

1.13 TESTING

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

1.13.1 Accreditation Requirements

Construction materials testing laboratories must be accredited by a laboratory accreditation authority and will be required to submit a copy of the Certificate of Accreditation and Scope of Accreditation. The laboratory's scope of accreditation must include the appropriate ASTM standards (E 329, C 1077, D 3666, D 3740, A 880, E 543) listed in the technical sections of the specifications. Laboratories engaged in Hazardous Materials Testing shall meet the requirements of OSHA and EPA. The policy applies to the specific laboratory performing the actual testing, not just the Corporate Office.

1.13.2 Laboratory Accreditation Authorities

Laboratory Accreditation Authorities include the National Voluntary

Laboratory Accreditation Program (NVLAP) administered by the National Institute of Standards and Technology at <http://ts.nist.gov/ts/htdocs/210/214/214.htm> , the American Association of State Highway and Transportation Officials (AASHTO) program at <http://www.transportation.org/aashto/home.nsf/frontpage> , International Accreditation Services, Inc. (IAS) at <http://www.iasonline.org>, U. S. Army Corps of Engineers Materials Testing Center (MTC) at <http://www.wes.army.mil/SL/MTC/>, the American Association for Laboratory Accreditation (A2LA) program at <http://www.a2la.org/>, the Washington Association of Building Officials (WABO) at <http://www.wabo.org/> (Approval authority for WABO is limited to projects within Washington State), and the Washington Area Council of Engineering Laboratories (WACEL) at <http://www.wacel.org/labaccred.html> (Approval authority by WACEL is limited to projects within Facilities Engineering Command (FEC) Washington geographical area).

1.13.3 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.

1.13.4 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. Furnish a summary report of field tests at the end of each month, per the paragraph entitled "INFORMATION FOR THE CONTRACTING OFFICER".

1.13.5 Test Reports and Monthly Summary Report of Tests

Furnish the signed reports, certifications, and a summary report of field tests at the end of each month to the Contracting Officer. Attach a copy of the summary report to the last daily Contractor Quality Control Report of each month. Provide a copy of the signed test reports and certifications to the OMSI preparer for inclusion into the OMSI documentation.

1.14 QC CERTIFICATIONS

1.14.1 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."

1.14.2 Invoice Certification

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

1.14.3 Completion Certification

Upon completion of work under this Contract, the QC Manager shall furnish a certificate to the Contracting Officer attesting that "the work has been completed, inspected, tested and is in compliance with the Contract." Provide a copy of this final QC Certification for completion to the OMSI preparer for inclusion into the OMSI documentation.

1.15 COMPLETION INSPECTIONS

1.15.1 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 and the CA 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 "Rework Items List", which were not corrected prior to the Punch-Out Inspection. 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. Once this is accomplished, notify the Government that the facility is ready for the Government "Pre-Final Inspection".

1.15.2 Pre-Final Inspection

The Government and QCM 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 CQM as a result of this inspection. The QC Manager will ensure that all items on this list are corrected prior to notifying the Government that a "Final" inspection with the Client can be scheduled. Any items noted on the "Pre-Final" inspection must be corrected in a timely manner and be accomplished before the contract completion date for the work, or any particular increment thereof, if the project is divided into increments by separate completion dates.

1.15.3 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, the CA, and others deemed necessary. Attendees for the Government will include the Contracting Officer, other FEAD/ROICC 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."

1.16 DOCUMENTATION

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

1.16.1 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. The forms identified under the paragraph "INFORMATION FOR THE CONTRACTING OFFICER" will be used. Reports are required for each day work is performed. Account for each calendar day throughout the life of the Contract. Every space on the forms must be filled in. Use N/A if nothing can be reported in one of the spaces. The Project Superintendent and the QC Manager must prepare and sign the Contractor Production and CQC Reports, respectively. 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 and a record of visitors to the work site, quality control problem areas, deviations from the QC Plan, construction deficiencies encountered, meetings held. For each entry in the report(s), identify the Schedule Activity No. that is associated with the entered remark.

1.16.2 Quality Control Validation

Establish and maintain the following in a series of three ring binders. Binders shall be divided and tabbed as shown below. These binders must be readily available to the Contracting Officer during all business hours.

- a. All completed Preparatory and Initial Phase Checklists, arranged by specification section.
- b. All milestone inspections, arranged by Activity Number.
- c. An up-to-date copy of the Testing Plan and Log with supporting field test reports, arranged by specification section.
- d. Copies of all contract modifications, arranged in numerical order. Also include documentation that modified work was accomplished.
- e. An up-to-date copy of the Rework Items List.
- f. Maintain up-to-date copies of all punch lists issued by the QC staff to the Contractor and Sub-Contractors and all punch lists issued by the Government.
- g. Commissioning documentation including Cx checklists, schedules, tests, and reports.

1.16.3 Reports from the QC Specialist(s)

Reports are required for each day that work is performed in their area of responsibility. QC Specialist reports shall include the same documentation

requirements as the CQC Report for their area of responsibility. QC Specialist reports are to be prepared, signed and dated by the QC Specialists and shall be attached to the CQC Report prepared for the same day.

1.16.4 Testing Plan and Log

As tests are performed, the CA 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, per the paragraph "INFORMATION FOR THE CONTRACTING OFFICER". Provide a copy of the final "Testing Plan and Log" to the OMSI preparer for inclusion into the OMSI documentation.

1.16.5 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 reworked, the date the item was originally discovered, the date the item will be corrected by, and the date the item was corrected. There is no requirement to report a rework item that is corrected the same day it is discovered. Attach a copy of the "Rework Items List" to the last daily CQC Report of each month. The Contractor is responsible for including those items identified by the Contracting Officer.

1.16.6 As-Built Drawings

The QC Manager is required to 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. Ensure each deviation has been identified with the appropriate modifying documentation (e.g. PC No., Modification No., Request for Information No., etc.). 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.

1.17 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, shall be 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 claim for extension of time for excess costs or damages by the Contractor.

PART 2 PRODUCTS

Not Used

PART 3 EXECUTION

3.1 PREPARATION

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.

-- End of Section --

SECTION 01 50 00

TEMPORARY CONSTRUCTION FACILITIES AND CONTROLS
08/09

PART 1 GENERAL

1.1 REFERENCES

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

AMERICAN WATER WORKS ASSOCIATION (AWWA)

AWWA C511 (2007) Standard for Reduced-Pressure
Principle Backflow Prevention Assembly

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

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

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

NATIONAL FIRE PROTECTION ASSOCIATION (NFPA)

NFPA 241 (2013) Standard for Safeguarding
Construction, Alteration, and Demolition
Operations

NFPA 70 (2014; AMD 1 2013; Errata 1 2013; AMD 2
2013; Errata 2 2013; AMD 3 2014; Errata
3-4 2014; AMD 4-6 2014) National
Electrical Code

U.S. FEDERAL AVIATION ADMINISTRATION (FAA)

FAA AC 70/7460-1 (2007; Rev K) Obstruction Marking and
Lighting

U.S. FEDERAL HIGHWAY ADMINISTRATION (FHWA)

MUTCD (2009) Manual on Uniform Traffic Control
Devices

1.2 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are for Contractor Quality Control approval. Submit the following in accordance with Section 01 33 00 SUBMITTAL PROCEDURES:

SD-01 Preconstruction Submittals

Traffic control plan; G

SD-06 Test Reports

Backflow Preventer Tests; G

SD-07 Certificates

Backflow Tester Certification; G

Backflow Preventers Certificate of Full Approval

1.3 BACKFLOW PREVENTERS CERTIFICATE

Certificate of Full Approval from FCCCHR List, University of Southern California, attesting that the design, size and make of each backflow preventer has satisfactorily passed the complete sequence of performance testing and evaluation for the respective level of approval. Certificate of Provisional Approval will not be acceptable.

1.3.1 Backflow Tester Certificate

Prior to testing, submit to the Contracting Officer certification issued by the State or local regulatory agency attesting that the backflow tester has successfully completed a certification course sponsored by the regulatory agency. Tester must not be affiliated with any company participating in any other phase of this Contract.

1.3.2 Backflow Prevention Training Certificate

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

1.4 HURRICANE CONDITION OF READINESS

Unless directed otherwise, comply with:

- a. Condition FOUR (Sustained winds of 50 knots or greater expected within 72 hours): Normal daily jobsite cleanup and good housekeeping practices. Collect and store in piles or containers scrap lumber, waste material, and rubbish for removal and disposal at the close of each work day. Maintain the construction site including storage areas, free of accumulation of debris. Stack form lumber in neat piles less than 4 feet high. Remove all debris, trash, or objects that could become missile hazards. Contact Contracting Officer for Condition Requirements.
- b. Condition THREE (Sustained winds of 50 knots or greater expected within 48 hours): Maintain "Condition FOUR" requirements and commence securing operations necessary for "Condition ONE" which cannot be completed within 18 hours. Cease all routine activities which might interfere with securing operations. Commence securing and stow all gear and portable equipment. Make preparations for securing buildings. Review requirements pertaining to "Condition TWO" and continue action as necessary to attain "Condition THREE" readiness. Contact Contracting Officer for weather and COR updates and completion

of required actions.

- c. Condition TWO (Sustained winds of 50 knots or greater expected within 24 hours): Curtail or cease routine activities until securing operation is complete. Reinforce or remove form work and scaffolding. Secure machinery, tools, equipment, materials, or remove from the jobsite. Expend every effort to clear all missile hazards and loose equipment from general base areas. Contact Contracting Officer for weather and Condition of Readiness (COR) updates and completion of required actions.
- d. Condition ONE. (Sustained winds of 50 knots or greater expected within 12 hours): Secure the jobsite, and leave Government premises.

PART 2 PRODUCTS

2.1 TEMPORARY SIGNAGE

2.1.1 Bulletin Board

Immediately upon beginning of work, provide a weatherproof glass-covered bulletin board not less than 36 by 48 inches in size for displaying the Equal Employment Opportunity poster, a copy of the wage decision contained in the contract, Wage Rate Information poster, and other information approved by the Contracting Officer. Locate the bulletin board at the project site in a conspicuous place easily accessible to all employees, as approved by the Contracting Officer.

2.2 TEMPORARY TRAFFIC CONTROL

2.2.1 Haul Roads

Construct access and haul roads necessary for proper prosecution of the work under this contract. Construct with suitable grades and widths; sharp curves, blind corners, and dangerous cross traffic are to be avoided. Provide necessary lighting, signs, barricades, and distinctive markings for the safe movement of traffic. The method of dust control, although optional, must be adequate to ensure safe operation at all times. Location, grade, width, and alignment of construction and hauling roads are subject to approval by the Contracting Officer. Lighting must be adequate to assure full and clear visibility for full width of haul road and work areas during any night work operations.

2.2.2 Barricades

Erect and maintain temporary barricades to limit public access to hazardous areas. Whenever safe public access to paved areas such as roads, parking areas or sidewalks is prevented by construction activities or as otherwise necessary to ensure the safety of both pedestrian and vehicular traffic barricades will be required. Securely place barricades clearly visible with adequate illumination to provide sufficient visual warning of the hazard during both day and night.

2.2.3 Fencing

Provide fencing along the construction site at all open excavations and tunnels to control access by unauthorized people.

- a. The safety fencing must be a high visibility orange colored, high

density polyethylene grid or approved equal, a minimum of 42 inches high, supported and tightly secured to steel posts located on maximum 10 foot centers, constructed at the approved location. Install fencing to be able to restrain a force of at least 250 pounds against it.

2.2.4 Temporary Wiring

Provide temporary wiring in accordance with NFPA 241 and NFPA 70. Include frequent inspection of all equipment and apparatus.

2.2.5 Backflow Preventers

Reduced pressure principle type conforming to the applicable requirements AWWA C511. Provide backflow preventers complete with 150 pound flanged cast iron, bronze or brass mounted gate valve and strainer, 304 stainless steel or bronze, internal parts. The particular make, model/design, and size of backflow preventers to be installed must be included in the latest edition of the List of Approved Backflow Prevention Assemblies issued by the FCCCHR List and be accompanied by a Certificate of Full Approval from FCCCHR List. After installation conduct Backflow Preventer Tests and provide test reports verifying that the installation meets the FCCCHR Manual Standards. After installation, NAVFAC Hawaii Water Utilities shall test and certify backflow preventer. If the temporary water connection needs to be moved to another location during construction, the Contractor shall notify the Contracting Officer in writing a minimum of 5 working days prior to movement. The relocated backflow preventer shall be re-tested and re-certified by NAVFAC Hawaii Water Utilities.

PART 3 EXECUTION

3.1 EMPLOYEE PARKING

Contractor employees will park privately owned vehicles in an area designated by the Contracting Officer. This area will be within reasonable walking distance of the construction site. Contractor employee parking must not interfere with existing and established parking requirements of the government installation.

3.2 AVAILABILITY AND USE OF UTILITY SERVICES

3.2.1 Temporary Utilities

Provide temporary utilities required for construction. Materials may be new or used, must be adequate for the required usage, not create unsafe conditions, and not violate applicable codes and standards.

3.2.2 Payment for Utility Services

- a. The Government will make all reasonably required utilities available to the Contractor from existing outlets and supplies, as specified in the contract. Unless otherwise provided in the contract, the amount of each utility service consumed will be charged to or paid for by the Contractor at prevailing rates charged to the Government or, where the utility is produced by the Government, at reasonable rates determined by the Contracting Officer. Carefully conserve any utilities furnished without charge.

- b. Reasonable amounts of the following utilities will be made available to the Contractor at the prevailing rates.

Utility Services		
	Cost (\$) per	Unit
Electricity	Prevailing Rate	
Potable Water	Prevailing Rate	
Sanitary Sewer	Prevailing Rate	

- c. The point at which the Government will deliver such utilities or services and the quantity available is as indicated. Pay all costs incurred in connecting, converting, and transferring the utilities to the work. Make connections, including providing backflow-preventing devices on connections to domestic water lines; providing meters; and providing transformers; and make disconnections.

3.2.3 Meters and Temporary Connections

At the Contractors expense and in a manner satisfactory to the Contracting Officer, provide and maintain necessary temporary connections, distribution lines, and meter bases (Government will provide meters) required to measure the amount of each utility used for the purpose of determining charges. Notify the Contracting Officer, in writing, 5 working days before final electrical connection is desired so that a utilities contract can be established. The Government will provide a meter and make the final hot connection after inspection and approval of the Contractor's temporary wiring installation. The Contractor will not make the final electrical connection.

3.2.4 Advance Deposit

An advance deposit for utilities consisting of an estimated month's usage or a minimum of \$50.00 will be required. The last monthly bills for the fiscal year will normally be offset by the deposit and adjustments will be billed or returned as appropriate. Services to be rendered for the next fiscal year, beginning 1 October, will require a new deposit. Notification of the due date for this deposit will be mailed to the Contractor prior to the end of the current fiscal year.

3.2.5 Final Meter Reading

Before completion of the work and final acceptance of the work by the Government, notify the Contracting Officer, in writing, 5 working days before termination is desired. The Government will take a final meter reading, disconnect service, and remove the meters. Then remove all the temporary distribution lines, meter bases, and associated paraphernalia. Pay all outstanding utility bills before final acceptance of the work by the Government.

3.2.6 Sanitation

- a. Provide and maintain within the construction area minimum field-type sanitary facilities approved by the Contracting Officer and periodically empty wastes into a municipal, district, or station sanitary sewage system, or remove waste to a commercial facility.

Obtain approval from the system owner prior to discharge into any municipal, district, or commercial sanitary sewer system. Any penalties and / or fines associated with improper discharge will be the responsibility of the Contractor. Coordinate with the Contracting Officer and follow station regulations and procedures when discharging into the station sanitary sewer system. Maintain these conveniences at all times without nuisance. Include provisions for pest control and elimination of odors. Government toilet facilities will not be available to Contractor's personnel.

3.2.7 Telephone

Make arrangements and pay all costs for telephone facilities desired.

3.2.8 Obstruction Lighting of Cranes

Provide a minimum of 2 aviation red or high intensity white obstruction lights on temporary structures (including cranes) over 100 feet above ground level. Light construction and installation must comply with FAA AC 70/7460-1. Lights must be operational during periods of reduced visibility, darkness, and as directed by the Contracting Officer.

3.2.9 Fire Protection

Provide temporary fire protection equipment for the protection of personnel and property during construction. Remove debris and flammable materials daily to minimize potential hazards.

3.3 TRAFFIC PROVISIONS

3.3.1 Maintenance of Traffic

- a. Conduct operations in a manner that will not close any thoroughfare or interfere in any way with traffic on railways or highways except with written permission of the Contracting Officer at least 15 calendar days prior to the proposed modification date, and provide a Traffic Control Plan detailing the proposed controls to traffic movement for approval. The plan must be in accordance with State and local regulations and the MUTCD, Part VI. Make all notifications and obtain any permits required for modification to traffic movements outside Station's jurisdiction.. Contractor may move oversized and slow-moving vehicles to the worksite provided requirements of the highway authority have been met.
- b. Conduct work so as to minimize obstruction of traffic, and maintain traffic on at least half of the roadway width at all times. Obtain approval from the Contracting Officer prior to starting any activity that will obstruct traffic.
- c. Provide, erect, and maintain, at contractors expense, lights, barriers, signals, passageways, detours, and other items, that may be required by the Life Safety Signage, overhead protection authority having jurisdiction.

3.3.2 Protection of Traffic

Maintain and protect traffic on all affected roads during the construction period except as otherwise specifically directed by the Contracting Officer. Measures for the protection and diversion of traffic, including the provision of watchmen and flagmen, erection of barricades, placing of

lights around and in front of equipment the work, and the erection and maintenance of adequate warning, danger, and direction signs, will be as required by the State and local authorities having jurisdiction. Protect the traveling public from damage to person and property. Minimize the interference with public traffic on roads selected for hauling material to and from the site. Investigate the adequacy of existing roads and their allowable load limit. Contractor is responsible for the repair of any damage to roads caused by construction operations.

3.3.3 Rush Hour Restrictions

Do not interfere with the peak traffic flows preceding and during normal operations without notification to and approval by the Contracting Officer.

3.3.4 Dust Control

Dust control methods and procedures must be approved by the Contracting Officer. Treat dust abatement on access roads with applications of calcium chloride, water sprinklers, or similar methods or treatment.

3.4 CONTRACTOR'S TEMPORARY FACILITIES

Contractor-owned or -leased trailers must be identified by Government assigned numbers. Apply the number to the trailer within 14 calendar days of notification, or sooner, if directed by the Government.

3.4.1 Safety

Protect the integrity of any installed safety systems or personnel safety devices. If entrance into systems serving safety devices is required, the Contractor must obtain prior approval from the Contracting Officer. If it is temporarily necessary to remove or disable personnel safety devices in order to accomplish contract requirements, provide alternative means of protection prior to removing or disabling any permanently installed safety devices or equipment and obtain approval from the Contracting Officer.

3.4.2 Administrative Field Offices

Provide and maintain administrative field office facilities within the construction area at the designated site. Government office and warehouse facilities will not be available to the Contractor's personnel.

3.4.3 Storage Area

Construct a temporary 6 foot high chain link fence around trailers and materials. Include plastic strip inserts, colored brown, so that visibility through the fence is obstructed. Fence posts may be driven, in lieu of concrete bases, where soil conditions permit. Do not place or store Trailers, materials, or equipment outside the fenced area unless such trailers, materials, or equipment are assigned a separate and distinct storage area by the Contracting Officer away from the vicinity of the construction site but within the installation boundaries. Trailers, equipment, or materials must not be open to public view with the exception of those items which are in support of ongoing work on any given day. Do not stockpile materials outside the fence in preparation for the next day's work. Park mobile equipment, such as tractors, wheeled lifting equipment, cranes, trucks, and like equipment within the fenced area at the end of each work day.

3.4.4 Supplemental Storage Area

Upon Contractor's request, the Contracting Officer will designate another or supplemental area for the Contractor's use and storage of trailers, equipment, and materials. This area may not be in close proximity of the construction site but will be within the installation boundaries. Fencing of materials or equipment will not be required at this site; however, the Contractor is responsible for cleanliness and orderliness of the area used and for the security of any material or equipment stored in this area. Utilities will not be provided to this area by the Government.

3.4.5 Appearance of Trailers

- a. Trailers utilized by the Contractor for administrative or material storage purposes must present a clean and neat exterior appearance and be in a state of good repair. Trailers which, in the opinion of the Contracting Officer, require exterior painting or maintenance will not be allowed on installation property.
- b. Paint using suitable paint and maintain the temporary facilities. Failure to do so will be sufficient reason to require their removal.

3.4.6 Maintenance of Storage Area

- a. Keep fencing in a state of good repair and proper alignment. Grassed or unpaved areas, which are not established roadways, will be covered with a layer of gravel as necessary to prevent rutting and the tracking of mud onto paved or established roadways, should the Contractor elect to traverse them with construction equipment or other vehicles; gravel gradation will be at the Contractor's discretion. Mow and maintain grass located within the boundaries of the construction site for the duration of the project. Grass and vegetation along fences, buildings, under trailers, and in areas not accessible to mowers will be edged or trimmed neatly.

3.4.7 New Building

In the event a new building is constructed for the temporary project field office, it will be a minimum 12 feet in width, 16 feet in length and have a minimum of 7 feet headroom. Equip the building with approved electrical wiring, at least one double convenience outlet and the required switches and fuses to provide 110-120 volt power. Provide a work table with stool, desk with chair, two additional chairs, and one legal size file cabinet that can be locked. The building must be waterproof, supplied with a heater, have a minimum of two doors, electric lights, a telephone, a battery operated smoke detector alarm, a sufficient number of adjustable windows for adequate light and ventilation, and a supply of approved drinking water. Approved sanitary facilities must be furnished. Screen the windows and doors and provide the doors with dead bolt type locking devices or a padlock and heavy duty hasp bolted to the door. Door hinge pins will be non-removable. Arrange the windows to open and to be securely fastened from the inside. Protect glass panels in windows by bars or heavy mesh screens to prevent easy access. In warm weather, furnish air conditioning capable of maintaining the office at 50 percent relative humidity and a room temperature 20 degrees F below the outside temperature when the outside temperature is 95 degrees F. Any new building erected for a temporary field office must be maintained by the Contractor during the

life of the contract and upon completion and acceptance of the work become the property of the Contractor and removed from the site.

3.4.8 Security Provisions

Provide adequate outside security lighting at the Contractor's temporary facilities. The Contractor will be responsible for the security of its own equipment; in addition, the Contractor will notify the appropriate law enforcement agency requesting periodic security checks of the temporary project field office.

3.4.9 Storage Size and Location

The open site available for storage must be as indicated. square feet.

3.4.10 Storage in Existing Buildings

The Contractor will be working in or around existing buildings; the storage of material where indicated. Provide 8 foot high security fence with a lockable gate around the storage area. Remove at the completion of work.

3.4.11 Weather Protection of Temporary Facilities and Stored Materials

Take necessary precautions to ensure that roof openings and other critical openings in the building are monitored carefully. Take immediate actions required to seal off such openings when rain or other detrimental weather is imminent, and at the end of each workday. Ensure that the openings are completely sealed off to protect materials and equipment in the building from damage.

3.4.11.1 Building and Site Storm Protection

When a warning of gale force winds is issued, take precautions to minimize danger to persons, and protect the work and nearby Government property. Precautions must include, but are not limited to, closing openings; removing loose materials, tools and equipment from exposed locations; and removing or securing scaffolding and other temporary work. Close openings in the work when storms of lesser intensity pose a threat to the work or any nearby Government property.

3.5 TEMPORARY PROJECT SAFETY FENCING

As soon as practicable, but not later than 15 days after the date established for commencement of work, furnish and erect temporary project safety fencing at the work site. Maintain the safety fencing during the life of the contract and, upon completion and acceptance of the work, will become the property of the Contractor and be removed from the work site.

3.6 CLEANUP

Remove construction debris, waste materials, packaging material and the like from the work site daily. Any dirt or mud which is tracked onto paved or surfaced roadways must be cleaned away. Store any salvageable materials resulting from demolition activities within the fenced area described above or at the supplemental storage area. Neatly stack stored materials not in trailers, whether new or salvaged.

3.7 RESTORATION OF STORAGE AREA

Upon completion of the project remove the bulletin board, signs, barricades, haul roads, and any other temporary products from the site. After removal of trailers, materials, and equipment from within the fenced area, remove the fence that will become the property of the Contractor. Restore areas used by the Contractor for the storage of equipment or material, or other use to the original or better condition. Remove gravel used to traverse grassed areas and restore the area to its original condition, including top soil and seeding as necessary.

-- End of Section --

SECTION 01 57 19.00 20

TEMPORARY ENVIRONMENTAL CONTROLS

11/11

PART 1 GENERAL

1.1 REFERENCES

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

U.S. ENVIRONMENTAL PROTECTION AGENCY (EPA)

EPA 530/F-93/004	(1993; Rev O; Updates I, II, IIA, IIB, and III) Test Methods for Evaluating Solid Waste (Vol IA, IB, IC, and II) (SW-846)
EPA 833-R-060-04	(2007) Developing Your Storm Water Pollution Prevention Plan, a Guide for Construction Sites

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

29 CFR 1910	Occupational Safety and Health Standards
29 CFR 1910.120	Hazardous Waste Operations and Emergency Response
40 CFR 112	Oil Pollution Prevention
40 CFR 112.7	General Requirements for Spill Prevention, Control, and Countermeasure Plans
40 CFR 122.26	Storm Water Discharges (Applicable to State NPDES Programs, see section 123.25)
40 CFR 241	Guidelines for Disposal of Solid Waste
40 CFR 243	Guidelines for the Storage and Collection of Residential, Commercial, and Institutional Solid Waste
40 CFR 258	Subtitle D Landfill Requirements
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 266	Standards for the Management of Specific Hazardous Wastes and Specific Types of Hazardous Waste Management Facilities
40 CFR 268	Land Disposal Restrictions
40 CFR 270	EPA Administered Permit Programs: The Hazardous Waste Permit Program
40 CFR 271	Requirements for Authorization of State Hazardous Waste Programs
40 CFR 272	Approved State Hazardous Waste Management Programs
40 CFR 273	Standards For Universal Waste Management
40 CFR 279	Standards for the Management of Used Oil
40 CFR 280	Technical Standards and Corrective Action Requirements for Owners and Operators of Underground Storage Tanks (UST)
40 CFR 300	National Oil and Hazardous Substances Pollution Contingency Plan
40 CFR 355	Emergency Planning and Notification
40 CFR 372-SUBPART D	Specific Toxic Chemical Listings
40 CFR 60	Standards of Performance for New Stationary Sources
40 CFR 63	National Emission Standards for Hazardous Air Pollutants for Source Categories
40 CFR 761	Polychlorinated Biphenyls (PCBs) Manufacturing, Processing, Distribution in Commerce, and Use Prohibitions
40 CFR 82	Protection of Stratospheric Ozone
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 178

Specifications for Packagings

1.2 DEFINITIONS

1.2.1 Sediment

Soil and other debris that have eroded and have been transported by runoff water or wind.

1.2.2 Solid Waste

Garbage, refuse, debris, sludge, or other discharged material, including solid, liquid, semisolid, or contained gaseous materials resulting from domestic, industrial, commercial, mining, or agricultural operations. Types of solid waste typically generated at construction sites may include:

- a. Green waste: The vegetative matter from landscaping, land clearing and grubbing, including, but not limited to, grass, bushes, scrubs, small trees and saplings, tree stumps and plant roots. Marketable trees, grasses and plants that are indicated to remain, be re-located, or be re-used are not included.
- b. Surplus soil: Existing soil that is in excess of what is required for this work, including aggregates intended, but not used, for on-site mixing of concrete, mortars and paving. Contaminated soil meeting the definition of hazardous material or hazardous waste is not included.
- c. Debris: Non-hazardous solid material generated during the construction, demolition, or renovation of a structure which exceeds 2.5 inch particle size that is: a manufactured object; plant or animal matter; or natural geologic material (e.g. cobbles and boulders), broken or removed concrete, masonry, and rock asphalt paving; ceramics; roofing paper and shingles. Inert materials may be reinforced with or contain ferrous wire, rods, accessories and weldments. A mixture of debris and other material such as soil or sludge is also subject to regulation as debris if the mixture is comprised primarily of debris by volume, based on visual inspection.
- d. Wood: Dimension and non-dimension lumber, plywood, chipboard, hardboard. Treated and/or painted wood that meets the definition of lead contaminated or lead based contaminated paint is not included.
- e. Scrap metal: Scrap and excess ferrous and non-ferrous metals such as reinforcing steel, structural shapes, pipe and wire that are recovered or collected and disposed of as scrap. Scrap metal meeting the definition of hazardous material or hazardous waste is not included.
- f. Paint cans: Metal cans that are empty of paints, solvents, thinners and adhesives. If permitted by the paint can label, a thin dry film may remain in the can.
- g. Recyclables: Materials, equipment and assemblies such as doors, windows, door and window frames, plumbing fixtures, glazing and mirrors that are recovered and sold as recyclable. Metal meeting the definition of lead contaminated or lead based paint contaminated may not be included as recyclable if sold to a scrap metal company. Paint cans may not be included as recyclable if sold to a scrap metal company.

- h. Hazardous Waste: By definition, to be a hazardous waste a material must first meet the definition of a solid waste. Hazardous waste and hazardous debris are special cases of solid waste. They have additional regulatory controls and must be handled separately. They are thus defined separately in this document.

Material not regulated as solid waste are: nuclear source or byproduct materials regulated under the Federal Atomic Energy Act of 1954 as amended; suspended or dissolved materials in domestic sewage effluent or irrigation return flows, or other regulated point source discharges; regulated air emissions; and fluids or wastes associated with natural gas or crude oil exploration or production.

1.2.3 Hazardous Debris

As defined in Solid Waste paragraph, debris that contains listed hazardous waste (either on the debris surface, or in its interstices, such as pore structure) per 40 CFR 261; or debris that exhibits a characteristic of hazardous waste per 40 CFR 261.

1.2.4 Chemical Wastes

This includes salts, acids, alkalizes, herbicides, pesticides, and organic chemicals.

1.2.5 Garbage

Refuse and scraps resulting from preparation, cooking, dispensing, and consumption of food.

1.2.6 Hazardous Waste

Any discarded material, liquid, solid, or gas, which meets the definition of hazardous material or is designated hazardous waste by the Environmental Protection Agency or State Hazardous Control Authority as defined in 40 CFR 260, 40 CFR 261, 40 CFR 262, 40 CFR 263, 40 CFR 264, 40 CFR 265, 40 CFR 266, 40 CFR 268, 40 CFR 270, 40 CFR 271, 40 CFR 272, 40 CFR 273, 40 CFR 279, and 40 CFR 280.

1.2.7 Hazardous Materials

Hazardous materials as defined in 49 CFR 171 and listed in 49 CFR 172.

Hazardous material is any material that:

- a. Is regulated as a hazardous material per 49 CFR 173, or
- b. Requires a Material Safety Data Sheet (MSDS) per 29 CFR 1910.120, or
- c. During end use, treatment, handling, packaging, storage, transpiration, or disposal meets or has components that meet or have potential to meet the definition of a hazardous waste as defined by 40 CFR 261 Subparts A, B, C, or D.

Designation of a material by this definition, when separately regulated or controlled by other instructions or directives, does not eliminate the need for adherence to that hazard-specific guidance which takes precedence over this instruction for "control" purposes. Such material include ammunition,

weapons, explosive actuated devices, propellants, pyrotechnics, chemical and biological warfare materials, medical and pharmaceutical supplies, medical waste and infectious materials, bulk fuels, radioactive materials, and other materials such as asbestos, mercury, and polychlorinated biphenyls (PCBs). Nonetheless, the exposure may occur incident to manufacture, storage, use and demilitarization of these items.

1.2.8 Waste Hazardous Material (WHM)

Any waste material which because of its quantity, concentration, or physical, chemical, or infectious characteristics may pose a substantial hazard to human health or the environment and which has been so designated. Used oil not containing any hazardous waste, as defined above, falls under this definition.

1.2.9 Oily Waste

Those materials which are, or were, mixed with used oil and have become separated from that used oil. Oily wastes also means materials, including wastewaters, centrifuge solids, filter residues or sludges, bottom sediments, tank bottoms, and sorbents which have come into contact with and have been contaminated by, used oil and may be appropriately tested and discarded in a manner which is in compliance with other State and local requirements.

This definition includes materials such as oily rags, "kitty litter" sorbent clay and organic sorbent material. These materials may be land filled provided that:

- a. It is not prohibited in other State regulations or local ordinances
- b. The amount generated is "de minimus" (a small amount)
- c. It is the result of minor leaks or spills resulting from normal process operations
- d. All free-flowing oil has been removed to the practical extent possible

Large quantities of this material, generated as a result of a major spill or in lieu of proper maintenance of the processing equipment, are a solid waste. As a solid waste, a hazardous waste determination must be performed prior to disposal. As this can be an expensive process, it is recommended that this type of waste be minimized through good housekeeping practices and employee education.

1.2.10 Regulated Waste

Those solid wastes that have specific additional Federal, state, or local controls for handling, storage, or disposal.

1.2.11 Class I and II Ozone Depleting Substance (ODS)

Class I ODS is defined in Section 602(a) of The Clean Air Act and includes the following chemicals:

chlorofluorocarbon-11 (CFC-11)

chlorofluorocarbon-12 (CFC-12)
chlorofluorocarbon-13 (CFC-13)
chlorofluorocarbon-111 (CFC-111)
chlorofluorocarbon-112 (CFC-112)
chlorofluorocarbon-113 (CFC-113)
chlorofluorocarbon-114 (CFC-114)
chlorofluorocarbon-115 (CFC-115)
chlorofluorocarbon-211 (CFC-211)
chlorofluorocarbon-212 (CFC-212)
chlorofluorocarbon-213 (CFC-213)
chlorofluorocarbon-214 (CFC-214)
chlorofluorocarbon-215 (CFC-215)
chlorofluorocarbon-216 (CFC-216)
chlorofluorocarbon-217 (CFC-217)
chlorofluorocarbon-500 (CFC-500)
chlorofluorocarbon-502 (CFC-502)
chlorofluorocarbon-503 (CFC-503)
halon-1211
halon-1301
halon-2402
carbon tetrachloride
methyl bromide
methyl chloroform

Class II ODS is defined in Section 602(s) of The Clean Air Act and includes the following chemicals:

hydrochlorofluorocarbon-21 (HCFC-21)
hydrochlorofluorocarbon-22 (HCFC-22)

hydrochlorofluorocarbon-31 (HCFC-31)
hydrochlorofluorocarbon-121 (HCFC-121)
hydrochlorofluorocarbon-122 (HCFC-122)
hydrochlorofluorocarbon-123 (HCFC-123)
hydrochlorofluorocarbon-124 (HCFC-124)
hydrochlorofluorocarbon-131 (HCFC-131)
hydrochlorofluorocarbon-132 (HCFC-132)
hydrochlorofluorocarbon-133 (HCFC-133)
hydrochlorofluorocarbon-141 (HCFC-141)
hydrochlorofluorocarbon-142 (HCFC-142)
hydrochlorofluorocarbon-221 (HCFC-221)
hydrochlorofluorocarbon-222 (HCFC-222)
hydrochlorofluorocarbon-223 (HCFC-223)
hydrochlorofluorocarbon-224 (HCFC-224)
hydrochlorofluorocarbon-225 (HCFC-225)
hydrochlorofluorocarbon-226 (HCFC-226)
hydrochlorofluorocarbon-231 (HCFC-231)
hydrochlorofluorocarbon-232 (HCFC-232)
hydrochlorofluorocarbon-233 (HCFC-233)
hydrochlorofluorocarbon-234 (HCFC-234)
hydrochlorofluorocarbon-235 (HCFC-235)
hydrochlorofluorocarbon-251 (HCFC-251)
hydrochlorofluorocarbon-252 (HCFC-252)
hydrochlorofluorocarbon-253 (HCFC-253)
hydrochlorofluorocarbon-261 (HCFC-261)
hydrochlorofluorocarbon-262 (HCFC-262)
hydrochlorofluorocarbon-271 (HCFC-271)

1.2.12 Universal Waste

The universal waste regulations streamline collection requirements for certain hazardous wastes in the following categories: batteries, pesticides, mercury-containing equipment (e.g., thermostats) and lamps (e.g., fluorescent bulbs). The rule is designed to reduce hazardous waste in the municipal solid waste (MSW) stream by making it easier for universal waste handlers to collect these items and send them for recycling or proper disposal. These regulations can be found at 40 CFR 273.

1.3 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are for Contractor Quality Control approval. The following shall be submitted in accordance with Section 01 33 00 SUBMITTAL PROCEDURES:

SD-01 Preconstruction Submittals

Preconstruction Survey; G

Solid Waste Management Plan and Permit; G

Regulatory Notifications; G

Environmental Protection Plan; G

Storm Water Pollution Prevention Plan; G

Storm Water Notice of Intent (for NPDES coverage under the general permit for construction activities); G

Dirt and Dust Control Plan

Contractor Hazardous Material Inventory Log; G

SD-06 Test Reports

Laboratory Analysis

Disposal Requirements

Erosion and Sediment Control Inspection Reports

Storm Water Inspection Reports for General Permit

Solid Waste Management Report; G

SD-07 Certificates

Contractor 40 CFR employee training records; G

ECATTS certificate of completion

SD-11 Closeout Submittals

Some of the records listed below are also required as part of other submittals. For the "Records" submittal, maintain on-site a separate three-ring Environmental Records binder and submit at the

completion of the project. Make separate parts to the binder corresponding to each of the applicable sub items listed below.

Storm Water Pollution Prevention Plan compliance notebook; G

Waste Determination Documentation

Disposal Documentation for Hazardous and Regulated Waste

Contractor 40 CFR Employee Training Records

Solid Waste Management Permit

Solid Waste Management Report

Contractor Hazardous Material Inventory Log; G

Hazardous Waste/Debris Management

Regulatory Notifications

1.4 ENVIRONMENTAL PROTECTION REQUIREMENTS

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 normal construction practice. Plan for and provide environmental protective measures required to correct conditions that develop during the construction of permanent or temporary environmental features associated with the project. Comply with Federal, State, and local regulations pertaining to the environment, including water, air, solid waste, hazardous waste and substances, oily substances, and noise pollution.

The Contractor may be required to promptly conduct tests and procedures for the purpose of assessing whether construction operations are in compliance with Applicable Environmental Laws. Analytical work shall be done by qualified laboratories; and where required by law, the laboratories shall be certified.

1.4.1 Environmental Compliance Assessment Training and Tracking System (ECATTS)

The QC Manager is responsible for environmental compliance on projects unless an Environmental Manager is named. The QC Manager (and alternative QC Manager) or Environmental Manager must complete ECATTS training prior to starting respective portions of on-site work under this contract. If personnel changes occur for any of these positions after starting work, replacement personnel must complete ECATTS training within 14 days of assignment to the project

Submit an ECATTS certificate of completion for personnel who have completed the required "Environmental Compliance Assessment Training and Tracking System (ECATTS)" training. This training is web-based and can be accessed from any computer with Internet access using the following instructions.

Register for NAVFAC Environmental Compliance Training and Tracking System, by logging on to <http://navfac.ecatts.com/>. Obtain the password for registration from the Contracting Officer.

This training has been structured to allow contractor personnel to receive credit under this contract and also to carry forward credit to future contracts. Contractors shall ensure that the QC Manager (and alternate QC Manager) or Environmental Manager review their training plans for new modules or updated training requirements prior to beginning work. Some training modules are tailored for specific State regulatory requirements; therefore, Contractors working in multiple states will be required to re-take modules tailored to the state where the contract work is being performed.

ECATTS is available for use by all contractor and subcontractor personnel associated with this project. These other personnel are encouraged (but not required) to take the training and may do so at their discretion.

1.4.2 Conformance with the Environmental Management System

Perform work under this contract consistent with the policy and objectives identified in the installation's Environmental Management System (EMS). Perform work in a manner that conforms to objectives and targets, environmental programs and operational controls identified by the EMS. 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/or preventative actions. In addition, ensure that employees are aware of their roles and responsibilities under the EMS and how these EMS roles and responsibilities affect work performed under the contract.

Ensure that employees receive applicable environmental and occupational health and safety training, and keep up to date on regulatory required specific training for the type of work to be conducted onsite. All on-site Contractor personnel, and their subcontractor personnel, performing tasks that have the potential to cause a significant environmental impact shall be competent on the basis of appropriate education, training or experience. Upon contract award, the Contracting Officer's Representative will notify the installation's EMS coordinator to arrange EMS training. Refer to Section 01 57 19.01 20, SUPPLEMENTAL TEMPORARY ENVIRONMENTAL CONTROLS for additional site specific EMS requirements related to construction. The installation's EMS coordinator will 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 EMS coordinator must retain associated records.

1.5 QUALITY ASSURANCE

1.5.1 Preconstruction Survey

Perform a Preconstruction Survey of the project site with the Contracting Officer, and take photographs showing existing environmental conditions in and adjacent to the site. Submit a report for the record.

1.5.2 Regulatory Notifications

The Contractor is responsible for all regulatory notification requirements in accordance with Federal, State and local regulations. In cases where the Navy must also provide public notification (such as stormwater permitting), coordinate with the Contracting Officer. Submit copies of all

regulatory notifications to the Contracting Officer prior to commencement of work activities. Typically, regulatory notifications must be provided for the following (this listing is not all inclusive): demolition, renovation, NPDES defined site work, remediation of controlled substances (asbestos, hazardous waste, lead paint).

1.5.3 Environmental Brief

Attend an environmental brief to be included in the preconstruction meeting. Provide the following information: types, quantities, and use of hazardous materials that will be brought onto the activity; types and quantities of wastes/wastewater that may be generated during the contract. Discuss the results of the Preconstruction Survey at this time.

Prior to initiating any work on site, meet with the Contracting Officer and activity environmental staff to discuss the proposed Environmental Protection Plan. Develop a mutual understanding relative to the details of environmental protection, including measures for protecting natural resources, required reports, required permits, permit requirements, and other measures to be taken.

1.5.4 Environmental Manager

Appoint in writing an Environmental Manager for the project site. The Environmental Manager will be directly responsible for coordinating contractor compliance with Federal, State, local, and station requirements. The Environmental Manager will ensure compliance with Hazardous Waste Program requirements (including hazardous waste handling, storage, manifesting, and disposal); implement the Environmental Protection Plan; ensure that all environmental permits are obtained, maintained, and closed out; ensure compliance with Storm Water Program Management requirements; ensure compliance with Hazardous Materials (storage, handling, and reporting) requirements; and coordinate any remediation of regulated substances (lead, asbestos, PCB transformers). This can be a collateral position; however the person in this position must be trained to adequately accomplish the following duties: ensure waste segregation and storage compatibility requirements are met; inspect and manage Satellite Accumulation areas; ensure only authorized personnel add wastes to containers; ensure all Contractor personnel are trained in 40 CFR requirements in accordance with their position requirements; coordinate removal of waste containers; and maintain the Environmental Records binder and required documentation, including environmental permits compliance and close-out.

1.5.5 Contractor 40 CFR Employee Training Records

Prepare and maintain employee training records throughout the term of the contract meeting applicable 40 CFR requirements. Ensure every employee completes a program of classroom instruction or on-the-job training that teaches them to perform their duties in a way that ensures compliance with Federal, State and local regulatory requirements for RCRA Large Quantity Generator. Provide a Position Description for each employee, by subcontractor, based on the Davis-Bacon Wage Rate designation or other equivalent method, evaluating the employee's association with hazardous and regulated wastes. This Position Description will include training requirements as defined in 40 CFR 265 for a Large Quantity Generator facility. Submit these training records to the Contracting Officer at the conclusion of the project, unless otherwise directed.

1.6 ENVIRONMENTAL PROTECTION PLAN (EPP)

Prior to initiating any work on site, meet with the Contracting Officer to discuss the proposed Environmental Protection Plan and develop a mutual understanding relative to the details of environmental protection, including measures for protecting natural resources, required reports, and other measures to be taken. The Environmental Protection Plan must incorporate construction related objectives and targets from the installation's Environmental Management System. Submit the Environmental Protection Plan in the following format and include the elements specified below.

a. Description of the Environmental Protection Plan

(1) General overview and purpose

(a) A brief description of each specific plan required by environmental permit or elsewhere in this contract.

(b) The duties and level of authority assigned to the person(s) on the job site that oversee environmental compliance.

(c) A copy of any standard or project specific operating procedures that will be used to effectively manage and protect the environment on the project site.

(d) Communication and training procedures that will be used to convey environmental management requirements to contractor employees and subcontractors.

(e) Emergency contact information contact information (office phone number, cell phone number, and e-mail address).

(2) General site information

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

b. Management of Natural Resources

(1) Land resources

(2) Tree protection

(3) Replacement of damaged landscape features

(4) Temporary construction

(5) Stream crossings

(6) Fish and wildlife resources

(7) Wetland areas

c. Protection of Historical and Archaeological Resources

- (1) Objectives
 - (2) Methods
- d. Storm Water Management and Control
- (1) Ground cover
 - (2) Erodible soils
 - (3) Temporary measures
 - (a) Mechanical retardation and control of runoff
 - (b) Vegetation and mulch
 - (4) Effective selection, implementation and maintenance of Best Management Practices (BMPs).
- e. Protection of the Environment from Waste Derived from Contractor Operations
- (1) Control and disposal of solid and sanitary waste. If Section 01 74 19 CONSTRUCTION AND DEMOLITION WASTE MANAGEMENT is included in the contract, submit the plan required by that section as part of the Environmental Protection Plan.
 - (2) Control and disposal of hazardous waste (Hazardous Waste Management Section)

This item will consist of the management procedures for all hazardous waste to be generated. The elements of those procedures will coincide with the Activity Hazardous Waste Management Plan. A copy of the Activity Hazardous Waste Management Plan will be provided by the Contracting Officer. As a minimum, include the following:

 - (a) Procedures to be employed to ensure a written waste determination is made for appropriate wastes which are to be generated;
 - (b) Sampling/analysis plan;
 - (c) Methods of hazardous waste accumulation/storage (i.e., in tanks and/or containers);
 - (d) Management procedures for storage, labeling, transportation, and disposal of waste (treatment of waste is not allowed unless specifically noted);
 - (e) Management procedures and regulatory documentation ensuring disposal of hazardous waste complies with Land Disposal Restrictions (40 CFR 268);
 - (f) Management procedures for recyclable hazardous materials such as lead-acid batteries, used oil, and the like;
 - (g) Used oil management procedures in accordance with 40 CFR 279;

- (h) Pollution prevention\hazardous waste minimization procedures;
- (i) Plans for the disposal of hazardous waste by permitted facilities;
- (j) Procedures to be employed to ensure all required employee training records are maintained.

f. Prevention of Releases to the Environment

- (1) Procedures to prevent releases to the environment
- (2) Notifications in the event of a release to the environment

g. Regulatory Notification and Permits

List what notifications and permit applications must be made. Some permits require up to 90 days to obtain. Demonstrate that those permits have been obtained or applied for by including copies of all applicable, environmental permits. The Plan will not be approved until all permits have been obtained.

h. Clean Air Act Compliance

- (1) Identify air pollution generating equipment or processes that may require federal, state, or local permits under the clean air act.
- (2) Identify portable and stationary internal combustion engines (ICE's) that will be supplied, utilized or serviced. Address compliance with 40 CFR 60 Subpart IIII, 40 CFR 63 Subpart ZZZZ, and local regulations as applicable. At minimum, include the make, model, serial number, manufacture date, size (engine bhp), and EPA emission certification status of each engine.
- (3) Identify management practices to ensure that HVAC work involving refrigerants complies with 40 CFR 82 requirements.
- (4) Identify planned air pollution generating processes and management control measures (including but not limited to spray painting, abrasive blasting, demolition, material handling, fugitive dust, and fugitive emissions)

1.6.1 Environmental Protection Plan Review

Within thirty days after the Contract award date, submit the proposed Environmental Protection Plan for review and approval. Commencement of work will not begin until the environmental protection plan has been approved.

1.6.2 Licenses and Permits

Obtain licenses and permits pursuant to the "Permits and Responsibilities" FAR Clause 52.236-7.

No permits will be obtained by the Contracting Officer.

Where required by the State regulatory authority, the inspections and

certifications will be provided through the services of a Professional Engineer (PE), registered in the State where the work is being performed. Where a PE is not required, the individual must be otherwise qualified by other current State licensure, specific training and prior experience (minimum 5 years). As a part of the quality control plan, which is required by Section 01 45 00.00 20 QUALITY CONTROL, provide a sub item containing the name, appropriate professional registration or licence number, address, and telephone number of the professionals or other qualified persons who will be performing the inspections and certifications for each permit.

PART 2 PRODUCTS

Not Used

PART 3 EXECUTION

3.1 PROTECTION OF NATURAL RESOURCES

Preserve the natural resources within the project boundaries and outside the limits of permanent work. Restore to an equivalent or improved condition upon completion of work. Confine construction activities to within the limits of the work indicated or specified. If the work is near streams, lakes, or other waterways, conform to the national permitting requirements of the Clean Water Act.

Do not disturb fish and wildlife. Do not alter water flows or otherwise significantly disturb the native habitat adjacent to the project and critical to the survival of fish and wildlife, except as indicated or specified.

Except in areas to be cleared, do not remove, cut, deface, injure, or destroy trees or shrubs without the Contracting Officer's permission. Do not fasten or attach ropes, cables, or guys to existing nearby trees for anchorages unless authorized by the Contracting Officer. Where such use of attached ropes, cables, or guys is authorized, the Contractor will be responsible for any resultant damage.

Protect existing trees which are to remain and which may be injured, bruised, defaced, or otherwise damaged by construction operations. Remove displaced rocks from uncleared areas. By approved excavation, remove trees with 30 percent or more of their root systems destroyed. Remove trees and other landscape features scarred or damaged by equipment operations, and replace with equivalent, undamaged trees and landscape features. Obtain Contracting Officer's approval before replacement.

The Contracting Officer's approval is required before any equipment will be permitted to ford live streams. In areas where frequent crossings are required, install temporary culverts or bridges. Obtain Contracting Officer's approval prior to installation. Remove temporary culverts or bridges upon completion of work, and repair the area to its original condition unless otherwise required by the Contracting Officer.

3.1.1 Erosion and Sediment Control Measures

3.1.1.1 Burnoff

Burnoff of the ground cover is not permitted.

3.1.1.2 Protection of Erodible Soils

Immediately finish the earthwork brought to a final grade, as indicated or specified. Immediately protect the side slopes and back slopes upon completion of rough grading. Plan and conduct earthwork to minimize the duration of exposure of unprotected soils.

3.1.1.3 Temporary Protection of Erodible Soils

Use the following methods to prevent erosion and control sedimentation:

a. Mechanical Retardation and Control of Runoff

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

b. Sediment Basins

- (1) Trap sediment in temporary sediment basins. Select a basin size to accommodate the runoff of a local 50-year storm. Pump dry and remove the accumulated sediment, after each storm. Use a paved weir or vertical overflow pipe for overflow. Remove collected sediment from the site. Institute effluent quality monitoring programs.
- (2) Install, inspect, and maintain best management practices (BMPs) as required by the general permit. Prepare BMP Inspection Reports as required by the general permit. If required by the permit, include those inspection reports.

c. Vegetation and Mulch

- (1) Provide temporary protection on sides and back slopes as soon as rough grading is completed or sufficient soil is exposed to require erosion protection. Protect slopes by accelerated growth of permanent vegetation, temporary vegetation, mulching, or netting. Stabilize slopes by hydroseeding, anchoring mulch in place, covering with anchored netting, sodding, or such combination of these and other methods necessary for effective erosion control.
- (2) Seeding: Provide new seeding where ground is disturbed. Include topsoil or nutriment during the seeding operation necessary to establish or reestablish a suitable stand of grass.

3.1.2 Erosion and Sediment Control Inspection Reports

Submit "Erosion and Sediment Control Inspection Reports" (E&S) (form provided at the pre-construction conference) and Storm Water Inspection Reports for General Permit for General Permit to the Contracting Officer once every 7 calendar days and within 24 hours of a storm event that produces 0.5 inch or more of rain.

Note erosion control inspection reports may be compiled as part of a stormwater pollution prevention plan inspection reports if applicable.

3.1.2.1 Storm Water Notice of Intent for Construction Activities and Storm Water Pollution Prevention Plan

Submit a Storm Water Notice of Intent (for NPDES coverage under the general permit for construction activities) and a Storm Water Pollution Prevention Plan (SWPPP) for the project to the Contracting Officer prior and gain approval prior to the commencement of work. The SWPPP must meet the requirements of the EPA or State general permit for storm water discharges from construction sites. Submit the SWPPP along with any required Notice of Intents, Notice of Termination, and appropriate permit fees, via the Contracting Officer, to the appropriate Federal or State agency for approval, a minimum of 120 to 270 calendar days prior to the start of any land disturbing activities. Maintain an approved copy of the SWPPP at the construction on-site office, and continually update as regulations require, reflecting current site conditions. Additional requirements may be found in UFGS Section 01 57 19.01 20, SUPPLEMENTAL TEMPORARY ENVIRONMENTAL CONTROLS.

Coverage under this permit requires the contractor prepare a Storm Water Pollution Prevention Plan (SWPPP), prepare and submit a Registration Statement as a co-permittee with the Construction Officer, and provide the permit fee to the responsible state agency before any land disturbing activities begin. File for permit coverage on behalf of both the Construction Officer and themselves, and file a Notice of Termination once construction is complete and the site is stabilized with a final sustainable cover.

Under the terms and conditions of the permit, the Contractor may be required to install, inspect, maintain best management practices (BMPs), and submit stormwater BMP inspection reports and stormwater pollution prevention plan inspection reports. Ensure construction operations and management are constantly in compliance with the terms and conditions of the general permit for storm water discharges from construction activities.

a. The SWPPP shall:

- (1) Identify potential sources of pollution which may be reasonably expected to affect the quality of storm water discharge from the site.
- (2) Describe and ensure implementation of practices which will be used to reduce the pollutants in storm water discharge from the site.
- (3) Ensure compliance with terms of the EPA or State general permit for storm water discharge.
- (4) Select applicable best management practices from EPA 833-R-060-04.
- (5) Include a completed copy of the Registration Statement, BMP Inspection Report Template and Notice of Termination except for the effective date.
- (6) Storm Water Pollution Prevention Measures and Notice of Intent 40 CFR 122.26, EPA 833-R-060-04. Provide a "Storm Water Pollution Prevention Plan" (SWPPP) for the project. The SWPPP will meet the requirements of the EPA or State general permit for storm water discharges from construction sites. Submit the SWPPP along with any required Notice of Intents, Notice of Termination, and

appropriate permit fees, via the Contracting Officer, to the appropriate Federal or State agency for approval, a minimum of 14 calendar days prior to the start of construction. A copy of the approved SWPPP will be kept at the construction on-site office, and continually updated as regulations require reflecting current site conditions.

3.1.2.2 Storm Water Pollution Prevention Plan Compliance Notebook

Create and maintain a three ring binder of documents that demonstrate compliance with the Stormwater Construction Activity permit. The binder shall include a copy of the permit Registration Statement, proof of permit fee payment, SWPPP and SWPPP update amendments, inspection reports, copies of correspondence with the and a copy of the permit Notice of Termination. At the completion of the project the notebook shall become the property of the Government. Provide the compliance notebook to Contracting Officer. Provide an advance copy of the Registration Statement to the Contracting Officer immediately after the form is presented to the permitting agency.

3.1.3 Stormwater Drainage and Construction Dewatering

There will be no discharge of excavation ground water to the sanitary sewer, storm drains, or to the river without prior specific authorization of the Environmental Division in writing. Discharge of hazardous substances will not be permitted under any circumstances.

Construction site runoff will be prevented from entering any storm drain or the river directly by the use of straw bales or other method suitable to the Environmental Division. Contractor will provide erosion protection of the surrounding soils.

Construction Dewatering shall not be discharged to the sanitary sewer. If the construction dewatering is noted or suspected of being contaminated, it may only be released to the storm drain system if the discharge is specifically permitted. Authorization for any contaminated groundwater release shall be obtained in advance from the base Environmental Officer. Discharge of hazardous substances will not be permitted under any circumstances.

3.2 HISTORICAL AND ARCHAEOLOGICAL RESOURCES

Carefully protect in-place and report immediately to the Contracting Officer historical and archaeological items or human skeletal remains discovered in the course of work. Upon discovery, notify the Contracting Officer. Stop work in the immediate area of the discovery until directed by the Contracting Officer to resume work. The Government retains ownership and control over historical and archaeological resources.

3.3 SOLID WASTE MANAGEMENT PLAN and PERMIT

Provide to the contracting officer written notification of the quantity of solid waste/debris that is anticipated to be generated by construction. Include in the report the locations where various types of waste will be disposed or recycled. Include letters of acceptance or as applicable, submit one copy of a State and local Solid Waste Management Permit or license showing such agency's approval of the disposal plan before transporting wastes off Government property.

3.3.1 Solid Waste Management Report

Monthly, submit a solid waste disposal report to the Contracting Officer. For each waste, the report will state the classification (using the definitions provided in this section), amount, location, and name of the business receiving the solid waste.

Include copies of the waste handling facilities' weight tickets, receipts, bills of sale, and other sales documentation. In lieu of sales documentation, the Contractor may submit a statement indicating the disposal location for the solid waste which is signed by an officer of the Contractor firm authorized to legally obligate or bind the firm. The sales documentation or Contractor certification will include the receiver's tax identification number and business, EPA or State registration number, along with the receiver's delivery and business addresses and telephone numbers. For each solid waste retained by the Contractor for his own use, the Contractor will submit on the solid waste disposal report the information previously described in this paragraph. Prices paid or received will not be reported to the Contracting Officer unless required by other provisions or specifications of this Contract or public law.

3.3.2 Control and Management of Solid Wastes

Pick up solid wastes, and place in covered containers which are regularly emptied. Do not prepare or cook food on the project site. Prevent contamination of the site or other areas when handling and disposing of wastes. At project completion, leave the areas clean. Recycling is encouraged and can be coordinated with the Contracting Officer and the activity recycling coordinator. Remove all solid waste (including non-hazardous debris) from Government property and dispose off-site at an approved landfill. Solid waste disposal off-site must comply with most stringent local, State, and Federal requirements including 40 CFR 241, 40 CFR 243, and 40 CFR 258.

Manage spent hazardous material used in construction, including but not limited to, aerosol cans, waste paint, cleaning solvents, contaminated brushes, and used rags, as per environmental law.

3.3.2.1 Disposal Documentation for Hazardous and Regulated Waste

Manifest, pack, ship and dispose of hazardous or toxic waste and universal waste that is generated as a result of construction in accordance with the generating facilities generator status under the Resource Conservation and Recovery Act. Contact the Contracting Officer for the facility RCRA identification number that is to be used on each manifest.

Submit a copy of the applicable EPA and or State permit(s), manifest(s), or license(s) for transportation, treatment, storage, and disposal of hazardous and regulated waste by permitted facilities. Hazardous or toxic waste manifest must be reviewed, signed, and approved by the Navy before the Contractor may ship waste. To obtain specific disposal instructions coordinate with the Activity Environmental office. Refer to Section 01 57 19.01 20 SUPPLEMENTAL TEMPORARY ENVIRONMENTAL CONTROLS for the Activity Point of Contact information.

3.3.2.2 Dumpsters

Equip dumpsters with a secure cover and paint the standard base color. Keep cover closed at all times, except when being loaded with trash and

debris. Locate dumpsters behind the construction fence or out of the public view. Empty site dumpsters at least once a week, or as needed to keep the site free of debris and trash. If necessary, provide 55 gallon trash containers painted the darker base color to collect debris in the construction site area. Locate the trash containers behind the construction fence or out of the public view. Empty trash containers at least once a day. For large demolitions, large dumpsters without lids are acceptable but should not have debris higher than the sides before emptying.

3.4 WASTE DETERMINATION DOCUMENTATION

Complete a Waste Determination form (provided at the pre-construction conference) for all contractor derived wastes to be generated. Base the waste determination upon either a constituent listing from the manufacturer used in conjunction with consideration of the process by which the waste was generated, EPA approved analytical data, or laboratory analysis (Material Safety Data Sheets (MSDS) by themselves are not adequate). Attach all support documentation to the Waste Determination form. As a minimum, a Waste Determination form must be provided for the following wastes (this listing is not all inclusive): oil and latex based painting and caulking products, solvents, adhesives, aerosols, petroleum products, and all containers of the original materials.

3.5 POLLUTION PREVENTION/HAZARDOUS WASTE MINIMIZATION

Minimize the use of hazardous materials and the generation of hazardous waste. Include procedures for pollution prevention/ hazardous waste minimization in the Hazardous Waste Management Section of the Environmental Protection Plan. Consult with the activity Environmental Office for suggestions and to obtain a copy of the installation's pollution prevention/hazardous waste minimization plan for reference material when preparing this part of the plan. If no written plan exists, obtain information by contacting the Contracting Officer. Describe the types of the hazardous materials expected to be used in the construction when requesting information.

3.6 WASTE HAZARDOUS MATERIAL (WHM)/HAZARDOUS WASTE (HW) MATERIALS PROHIBITION

No waste hazardous material or hazardous waste shall be disposed of on government property. No hazardous material shall be brought onto government property that does not directly relate to requirements for the performance of this contract. The government is not responsible for disposal of Contractor's waste material brought on the job site and not required in the performance of this contract. The intent of this provision is to dispose of that waste identified as waste hazardous material/hazardous waste as defined herein that was generated as part of this contract and existed within the boundary of the Contract limits and not brought in from offsite by the Contractor. Incidental materials used to support the contract including, but not limited to aerosol cans, waste paint, cleaning solvents, contaminated brushes, rags, clothing, etc. are the responsibility of the Contractor. The list is illustrative rather than inclusive. The Contractor is not authorized to discharge any materials to sanitary sewer, storm drain, or to the river or conduct waste treatment or disposal on government property without written approval of the Contracting Officer.

3.7 HAZARDOUS MATERIAL MANAGEMENT

Include hazardous material control procedures in the Safety Plan. Address procedures and proper handling of hazardous materials, including the appropriate transportation requirements. No hazardous material shall be brought onto government property that does not directly relate to requirements for the performance of this contract. Submit a MSDS and estimated quantities to be used for each hazardous material to the Contracting Officer prior to bringing the material on base. Typical materials requiring MSDS and quantity reporting include, but are not limited to, oil and latex based painting and caulking products, solvents, adhesives, aerosol, and petroleum products. Ensure that hazardous materials are utilized in a manner that will minimize the amount of hazardous waste that is generated. Ensure that all containers of hazardous materials have NFPA labels or their equivalent. Certify that all hazardous materials removed from the site are hazardous materials and do not meet the definition of hazardous waste per 40 CFR 261.

3.7.1 Contractor Hazardous Material Inventory Log

Submit the "Contractor Hazardous Material Inventory Log" (found at: <http://www.wbdg.org/ccb/NAVGRAPH/graphdoc.pdf>), which provides information required by (EPCRA Sections 312 and 313) along with corresponding Material Safety Data Sheets (MSDS), to the Contracting Officer at the start and at the end of construction (30 days from final acceptance), and update no later than January 31 of each calendar year during the life of the contract. Keep copies of the MSDS for hazardous materials on site at all times. At the end of the project, provide the Contracting Officer with copies of all of these MSDS, and the maximum quantity of each material that was present at the site at any one time, the dates the material was present, the amount of each material that was used during the project, and how the material was used.

Documentation for any spills/releases, environmental reports or off-site transfers may be requested by the Contracting Officer.

3.8 PETROLEUM PRODUCTS AND REFUELING

Conduct the fueling and lubricating of equipment and motor vehicles in a manner that protects against spills and evaporation. Manage all used oil generated on site in accordance with 40 CFR 279. Determine if any used oil generated while on-site exhibits a characteristic of hazardous waste. Used oil containing 1000 parts per million of solvents will be considered a hazardous waste and disposed of at Contractor's expense. Used oil mixed with a hazardous waste will also be considered a hazardous waste.

3.8.1 Oily and Hazardous Substances

Prevent oil or hazardous substances from entering the ground, drainage areas, or navigable waters. In accordance with 40 CFR 112, surround all temporary fuel oil or petroleum storage tanks with a temporary berm or containment of sufficient size and strength to contain the contents of the tanks, plus 10 percent freeboard for precipitation. The berm will be impervious to oil for 72 hours and be constructed so that any discharge will not permeate, drain, infiltrate, or otherwise escape before cleanup occurs. Provide general secondary containment for oil transfer operations as required by 40 CFR 112.7.

3.8.2 Inadvertent Discovery of Petroleum Contaminated Soil or Hazardous Wastes

If petroleum contaminated soil or suspected hazardous waste is found during construction that was not identified in the contract documents, the contractor shall immediately notify the contracting officer. The contractor shall not disturb this material until authorized by the contracting officer.

3.9 FUEL TANKS

Petroleum products and lubricants required to sustain up to 30 days of construction activity may be kept on site. Storage and refilling practices shall comply with 40 CFR Part 112. Secondary containment shall be provided and be no less than 110 percent of the tank volume plus five inches of free-board. If a secondary berm is used for containment then the berm shall be impervious to oil for 72 hours and be constructed so that any discharge will not permeate, drain, infiltrate, or otherwise escape before cleanup occurs. Drips pans are required and the tanks must be covered during inclement weather.

3.10 RELEASES/SPILLS OF OIL AND HAZARDOUS SUBSTANCES

Exercise due diligence to prevent, contain, and respond to spills of hazardous material, hazardous substances, hazardous waste, sewage, regulated gas, petroleum, lubrication oil, and other substances regulated by environmental law. Maintain spill cleanup equipment and materials at the work site. In the event of a spill, take prompt, effective action to stop, contain, curtail, or otherwise limit the amount, duration, and severity of the spill/release. In the event of any releases of oil and hazardous substances, chemicals, or gases; immediately (within 15 minutes) notify the Base or Activity Fire Department, the activity's Command Duty Officer, and the Contracting Officer. If the contractor's response is inadequate, the Navy may respond. If this should occur, the contractor will be required to reimburse the government for spill response assistance and analysis.

The Contractor is responsible for verbal and written notifications as required by the federal 40 CFR 355, State, local regulations and Navy Instructions. Spill response will be in accordance with 40 CFR 300 and applicable State and local regulations. Contain and clean up these spills without cost to the Government. If Government assistance is requested or required, the Contractor will reimburse the Government for such assistance. Provide copies of the written notification and documentation that a verbal notification was made within 20 days.

Maintain spill cleanup equipment and materials at the work site. Clean up all hazardous and non-hazardous (WHM) waste spills. The Contractor shall reimburse the government for all material, equipment, and clothing generated during any spill cleanup. The Contractor shall reimburse the government for all costs incurred including sample analysis materials, equipment, and labor if the government must initiate its own spill cleanup procedures, for Contractor responsible spills, when:

- a. The Contractor has not begun spill cleanup procedure within one hour of spill discovery/occurrence, or
- b. If, in the government's judgment, the Contractor's spill cleanup is not adequately abating life threatening situation and/or is a threat to any

body of water or environmentally sensitive areas.

3.11 CONTROL AND MANAGEMENT OF ASBESTOS CONTAINING MATERIAL (ACM)

Items, components, or materials disturbed by or included in work under this contract may involve asbestos as indicated in each task order. Other materials in the general area around where work will be performed may contain asbestos. All thermal insulation, in all work areas, should be considered to be asbestos unless positively identified by conspicuous tags or previous laboratory analysis certifying them as asbestos free.

Inadvertent discovery of non-disclosed asbestos that will result in an abatement action requires a change in scope before proceeding. Upon discovery of asbestos containing material not identified in the contract documents, the Contractor shall immediately stop all work that would generate further damage to the material, evacuate the asbestos exposed area, and notify the Contracting Officer for resolution of the situation prior to resuming normal work activities in the affected area. Do not remove or perform work on any asbestos containing materials without the prior approval of the Contracting Officer. Do not engage in any activity, which would remove or damage such materials or cause the generation of fibers from such materials.

Manage and dispose of asbestos containing waste in accordance with applicable environmental law. Asbestos containing waste shall be manifested and the manifest provided to the Contracting Officer.

3.12 CONTROL AND MANAGEMENT OF HAZARDOUS WASTES

3.12.1 Facility Hazardous Waste Generator Status

Joint Base Pearl Harbor Hickam is designated as a Large Quantity Generator. All work conducted within the boundaries of this activity must meet the regulatory requirements of this generator designation. Comply with all provisions of Federal, State and local regulatory requirements applicable to this generator status regarding training and storage, handling, and disposal of all construction derived wastes.

3.12.2 Hazardous Waste/Debris Management

Identify all construction activities which will generate hazardous waste/debris. Provide a documented waste determination for all resultant waste streams. Hazardous waste/debris will be identified, labeled, handled, stored, and disposed of in accordance with all Federal, State, and local regulations including 40 CFR 261, 40 CFR 262, 40 CFR 263, 40 CFR 264, 40 CFR 265, 40 CFR 266, and 40 CFR 268.

Hazardous waste will also be managed in accordance with the approved Hazardous Waste Management Section of the Environmental Protection Plan. Store hazardous wastes in approved containers in accordance with 49 CFR 173 and 49 CFR 178. Hazardous waste generated within the confines of Government facilities will be identified as being generated by the Government.

Prior to removal of any hazardous waste from Government property, all hazardous waste manifests must be signed by activity personnel from the Station Environmental Office. No hazardous waste must be brought onto Government property. Provide to the Contracting Officer a copy of waste determination documentation for any solid waste streams that have any

potential to be hazardous waste or contain any chemical constituents listed in 40 CFR 372-SUBPART D. For hazardous wastes spills, verbally notify the Contracting Officer immediately.

3.12.2.1 Regulated Waste Storage/Satellite Accumulation/90 Day Storage Areas

If the work requires the temporary storage/collection of regulated or hazardous wastes, the Contractor will request the establishment of a Regulated Waste Storage Area, a Satellite Accumulation Area, or a 90 Day Storage Area at the point of generation. The Contractor must submit a request in writing to the Contracting Officer providing the following information:

<u>Contract Number</u>	
<u>Contractor</u>	
<u>Haz/Waste or Regulated Waste POC</u>	
<u>Phone Number</u>	
<u>Type of Waste</u>	
<u>Source of Waste</u>	
<u>Emergency POC</u>	
<u>Phone Number</u>	
<u>Location of the Site</u>	

(Attach Site Plan to the Request)

Attach a waste determination form. Allow ten working days for processing this request. The designated area where waste is being stored shall be barricaded and a sign identifying as follows:

"DANGER - UNAUTHORIZED PERSONNEL KEEP OUT"

3.12.2.2 Sampling and Analysis of Hazardous Waste (HW)

a. Waste Sampling

Sample waste in accordance with EPA 530/F-93/004. Each sampled drum or container will be clearly marked with the Contractor's identification number and cross referenced to the chemical analysis performed.

b. Laboratory Analysis

Follow the analytical procedure and methods in accordance with the 40 CFR 261. The Contractor will provide all analytical results and reports performed to the Contracting Officer

c. Analysis Type

Identify waste hazardous material/hazardous waste by analyzing for

the following properties as a minimum: ignitability, corrosiveness, total chlorides, BTU value, PCBs, TCLP for heavy metals, and cyanide.

3.12.2.3 Hazardous Waste Disposal

No hazardous, toxic, or universal waste shall be disposed or hazardous material abandoned on government property. And unless otherwise noted in this contract, the government is not responsible for disposal of Contractor generated waste material. The disposal of incidental materials used to accomplish the work including, but not limited to aerosol cans, waste paint, cleaning solvents, contaminated brushes, rags, clothing, etc. are the responsibility of the Contractor. The list is illustrative rather than inclusive.

The Contractor is not authorized to discharge any materials to sanitary sewer, storm drain, or water way or conduct waste treatment or disposal on government property without written approval of the Contracting Officer.

Control of stored waste, packaging, sampling, analysis, and disposal will be determined by the details in the contract. The requirements for jobs in the following paragraphs will be used as the guidelines for disposal of any hazardous waste generated.

a. Responsibilities for Contractor's Disposal

Contractor responsibilities include any generation of WHM/HW requiring Contractor disposal of solid waste or liquid.

(1) Provide all service necessary for the final treatment/disposal of the hazardous material/waste in accordance with all local, State and Federal laws and regulations, and the terms and conditions of the contract within sixty (60) days after the materials have been generated. These services will include all necessary personnel, labor, transportation, packaging, detailed analysis (if required for disposal, and/or transportation, including manifesting or completing waste profile sheets, equipment, and the compilation of all documentation is required).

(2) Contain all waste in accordance with 40 CFR 260, 40 CFR 261, 40 CFR 262, 40 CFR 263, 40 CFR 264, 40 CFR 265, 40 CFR 266, 40 CFR 268, 40 CFR 270, 40 CFR 272, 40 CFR 273, 40 CFR 279, 40 CFR 280, and 40 CFR 761.

(3) Obtain a representative sample of the material generated for each job done to provide waste stream determination.

(4) Analyze each sample taken and providing analytical results to the Contracting Officer. Provide two copies of the results.

(5) Determine the DOT proper shipping names for all waste (each container requiring disposal) and will demonstrate how this determination is developed and supported by the sampling and analysis requirements contained herein to the Contracting Officer.

Contractor Disposal Turn-In Requirements

For any waste hazardous materials or hazardous waste generated which

requires the Contractor to dispose of, the following conditions must be complied with in order to be acceptable for disposal:

- (1) Drums compatible with waste contents and drums meet DOT requirements for 49 CFR 173 for transportation of materials.
- (2) Drums banded to wooden pallets. No more than three (3) 55 gallon drums to a pallet, or two (2) 85 gallon over packs.
- (3) Band using 1-1/4 inch minimum band on upper third of drum.
- (4) Recovery materials label (provided by Code 106.321) located in middle of drum, filled out to indicate actual volume of material, name of material manufacturer, other vendor information as available.
- (5) Always have three (3) to five (5) inches of empty space above volume of material. This space is called 'outage'.

3.12.2.4 Universal Waste/e-Waste Management

Universal waste including but not limited to some mercury containing building products such florescent lamps, mercury vapor lamps, high pressure sodium lamps, CRTs, batteries, aerosol paint containers, electrical equipment containing PCBs, and consumed electronic devices, shall be managed in accordance with applicable environmental law and installation instructions.

3.12.3 Class I and II ODS Prohibition

Class I and II ODS in pure or blended form as defined and identified herein must not be used in the performance of this contract, nor be provided as part of the equipment except for the use of servicing existing government owned equipment. This prohibition will be considered to prevail over any other provision, specification, drawing, or referenced documents.

3.12.3.1 Recycling Requirements

Recycle used refrigerants and ozone depleting substances generated during the performance of this contract to the maximum extent practicable to minimize used refrigerant and ozone depleting substance disposal as HW.

Test, collect, transfer, recycle, and/or arrange for shipping and proper disposal of used refrigerants and ozone depleting substances generated during the performance of work under this contract. The Contractor is responsible for all associated costs.

Any and all Class I ODS and R-22 recovered by the Contractor as part of this contract shall be packaged and turned over to the Government for recycling upon the completion of the work covered by this contract. The Contractor shall arrange for recycling of used refrigerants not turned over to the government, at a licensed refrigerant recycler approved by the Contracting Officer.

3.12.3.2 EPA Certification Requirements

Heating and air conditioning technicians must be certified through an EPA-approved program. Copies of certifications shall be maintained at the

employees' place of business and be carried as a wallet card by the technician, as provided by environmental law. .

3.12.3.3 Accidental Venting of Refrigerant

Accidental venting of a refrigerant is a release and must be reported to the Contracting Officer

3.13 DUST CONTROL

Keep dust down at all times, including during nonworking periods. Sprinkle or treat, with dust suppressants, the soil at the site, haul roads, and other areas disturbed by operations. Dry power brooming will not be permitted. Instead, use vacuuming, wet mopping, wet sweeping, or wet power brooming. Air blowing will be permitted only for cleaning nonparticulate debris such as steel reinforcing bars. Only wet cutting will be permitted for cutting concrete blocks, concrete, and bituminous concrete. Do not unnecessarily shake bags of cement, concrete mortar, or plaster.

3.13.1 Dirt and Dust Control Plan

Submit truck and material haul routes along with a plan for controlling dirt, debris, and dust on base roadways. As a minimum, identify in the plan the subcontractor and equipment for cleaning along the haul route and measures to reduce dirt, dust, and debris from roadways.

3.14 ABRASIVE BLASTING

3.14.1 Blasting Operations

The use of silica sand is prohibited in sandblasting.

Provide tarpaulin drop cloths and windscreens to enclose abrasive blasting operations to confine and collect dust, abrasive, agent, paint chips, and other debris in accordance with the requirements specified. Perform work involving removal of hazardous material in accordance with 29 CFR 1910.

3.14.2 Disposal Requirements

Submit analytical results of the debris generated from abrasive blasting operations per Laboratory Analysis in paragraph SAMPLING AND ANALYSIS OF HW. Hazardous waste generated from blasting operations will be managed in accordance with paragraph CONTROL AND MANAGEMENT OF HAZARDOUS WASTE and with the approved HWMP. Disposal of non-hazardous abrasive blasting debris will be in accordance with paragraph CONTROL AND DISPOSAL OF SOLID WASTES.

3.15 NOISE

Make the maximum use of low-noise emission products, as certified by the EPA. Blasting or use of explosives will not be permitted without written permission from the Contracting Officer, and then only during the designated times. Confine pile-driving operations to the period between 8 a.m. and 4 p.m., Monday through Friday, exclusive of holidays, unless otherwise specified.

3.16 MERCURY MATERIALS

Mercury is prohibited in the construction of this facility, unless specified otherwise, and with the exception of mercury vapor lamps and

fluorescent lamps. Dumping of mercury-containing materials and devices such as mercury vapor lamps, fluorescent lamps, and mercury switches, in rubbish containers is prohibited. Remove without breaking, pack to prevent breakage, and transport out of the activity in an unbroken condition for disposal as directed. Immediately report to the Environmental Office and the Contracting Officer instances of breakage or mercury spillage. Clean mercury spill area to the satisfaction of the Contracting Officer.

Cleanup of a mercury spill shall not be recycled and shall be managed as a hazardous waste for disposal.

-- End of Section --

SECTION 01 57 19.01 20

SUPPLEMENTAL TEMPORARY ENVIRONMENTAL CONTROLS

02/10

PART 1 GENERAL

1.1 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are for Contractor Quality Control approval. The following shall be submitted in accordance with Section 01 33 00 SUBMITTAL PROCEDURES:

SD-01 Preconstruction Submittals

Excavation Permits; G

Storage Inventory Form; G

1.2 PACIFIC

a. Control and Disposal of Ionization Smoke Detectors/Tritium Exit Signs

(1.) Material Bagging

Remove existing ionization smoke detectors and tritium exit signs, and place like types, together; i.e. same manufacturer and model number, in a plastic bag. Provide a label on the bag with the following data:

Manufacturer:	Activity:
MODEL No.:	Contract No.:
Isotope/Quantity (if known):	

(2.) Material Storage

Store plastic bags in 55-gallon covered drum(s). Do not seal the drum(s). Provide a label entitled "RADIOACTIVE" and storage inventory form applied to exterior surface of the cover and side of the drum(s). Provide a record copy, with the following data (example), for each drum storage inventory to the Contracting Officer, the RASO at COMNAVREG Pearl Harbor, and .

(3.) Storage Site and Disposal

Deliver drums to MCBH Bunker 709, Sumner Road for storage and disposal of ionization smoke detectors and tritium exit signs as directed by the Contracting Officer.

(4.) Storage and Disposal by Contractor

The Contractor will be responsible for storage and disposal of ionization smoke detectors and tritium exit signs in accordance with Federal, State and local laws and regulations.

1.2.1 Hawaii

PART 2 PRODUCTS

Not Used

PART 3 EXECUTION

Not Used

-- End of Section --

SECTION 01 74 19

CONSTRUCTION AND DEMOLITION WASTE MANAGEMENT
01/07

PART 1 GENERAL

1.1 REFERENCES

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

U.S. GREEN BUILDING COUNCIL (USGBC)

LEED NC (2009) Leadership in Energy and Environmental Design (tm) New Construction Rating System

1.2 GOVERNMENT POLICY

Government policy is to apply sound environmental principles in the design, construction and use of facilities. As part of the implementation of that policy: (1) practice efficient waste management when sizing, cutting, and installing products and materials and (2) use all reasonable means to divert construction and demolition waste from landfills and incinerators and to facilitate their recycling or reuse. A minimum of 50 percent by weight of total project solid waste shall be diverted from the landfill.

1.3 MANAGEMENT

Develop and implement a waste management program. Take a pro-active, responsible role in the management of construction and demolition waste and require all subcontractors, vendors, and suppliers to participate in the effort. Construction and demolition waste includes products of demolition or removal, excess or unusable construction materials, packaging materials for construction products, and other materials generated during the construction process but not incorporated into the work. In the management of waste consideration shall be given to the availability of viable markets, the condition of the material, the ability to provide the material in suitable condition and in a quantity acceptable to available markets, and time constraints imposed by internal project completion mandates. The Contractor is responsible for implementation of any special programs involving rebates or similar incentives related to recycling of waste. Revenues or other savings obtained for salvage, or recycling accrue to the Contractor. Appropriately permit firms and facilities used for recycling, reuse, and disposal for the intended use to the extent required by federal, state, and local regulations. Also, 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 project.

1.4 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are for Contractor Quality Control approval. The following shall be submitted in accordance with Section 01 33 00 SUBMITTAL PROCEDURES:

SD-01 Preconstruction Submittals

Waste Management Plan; G; (LEED NC)

SD-11 Closeout Submittals

Records; (LEED NC)

1.5 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 Waste Management Plan and to develop a mutual understanding relative to the details of waste management. The requirements for this meeting may be fulfilled during the coordination and mutual understanding meeting outlined in Section 01 45 00.00 20 QUALITY CONTROL. At a minimum, environmental and waste management goals and issues shall be discussed at the following additional meetings:

- a. Pre-bid meeting.
- b. Preconstruction meeting.
- c. Regular site meetings.
- d. Work safety meetings.

1.6 WASTE MANAGEMENT PLAN

A waste management plan shall be submitted within 15 days after contract award and not less than 10 days before the preconstruction meeting. The plan shall demonstrate how the project waste diversion goal shall be met and shall include the following:

- a. Name of individuals on the Contractor's staff responsible for waste prevention and management.
- 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 wastes.
- e. Characterization, including estimated types and quantities, of the waste to be generated.
- f. Name of landfill and/or incinerator to be used and the estimated costs for use, assuming that there would be no salvage or recycling on the project.
- g. Identification of local and regional reuse programs, including non-profit organizations such as schools, local housing agencies, and

organizations that accept used materials such as materials exchange networks and Habitat for Humanity. Include the name, location, and phone number for each reuse facility to be used, and provide a copy of the permit or license for each facility.

- h. List of specific waste materials that will be salvaged for resale, salvaged and reused on the current project, salvaged and stored for reuse on a future project, or recycled. Recycling facilities that will be used shall be identified by name, location, and phone number, including a copy of the permit or license for each facility.
- i. Identification of materials that cannot be recycled/reused with an explanation or justification, to be approved by the Contracting Officer.
- j. Description of the means by which any waste materials identified in item (h) above will be protected from contamination.
- k. 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).
- l. Anticipated net cost savings determined by subtracting Contractor program management costs and the cost of disposal from the revenue generated by sale of the materials and the incineration and/or landfill cost avoidance.

Revise and resubmit Plan as required by the Contracting Officer. Approval of Contractor's Plan will not relieve the Contractor of responsibility for compliance with applicable environmental regulations or meeting project cumulative waste diversion requirement. Distribute copies of the Waste Management Plan to each subcontractor, the Quality Control Manager, and the Contracting Officer.

1.7 RECORDS

Records shall be maintained to document the quantity of waste generated; the quantity of waste diverted through sale, reuse, or recycling; and the quantity of waste disposed by landfill or incineration. Quantities may be measured by weight or by volume, but must be consistent throughout. List each type of waste separately noting the disposal or diversion date. Identify the landfill, recycling center, waste processor, or other organization used to process or receive the solid waste. Provide explanations for any waste not recycled or reused. With each application for payment, submit updated documentation for solid waste disposal and diversion, and submit manifests, weight tickets, receipts, and invoices specifically identifying the project and waste material. The records shall be made available to the Contracting Officer during construction, and a copy of the records shall be delivered to the Contracting Officer upon completion of the construction.

1.8 COLLECTION

Separate, store, protect, and handle at the site identified recyclable and salvageable waste products in a manner that maximizes recyclability and salvagability of identified materials. Provide the necessary containers, bins and storage areas to facilitate effective waste management and clearly and appropriately identify them. Provide materials for barriers and enclosures around recyclable material storage areas which are nonhazardous

and recyclable or reusable. Locate out of the way of construction traffic. Provide adequate space for pick-up and delivery and convenience to subcontractors. Recycling and waste bin areas are to be kept neat and clean, and recyclable materials shall be handled to prevent contamination of materials from incompatible products and materials. Clean contaminated materials prior to placing in collection containers. Use cleaning materials that are nonhazardous and biodegradable. Handle hazardous waste and hazardous materials in accordance with applicable regulations.

1.8.1 Source Separated Method.

Waste products and materials that are recyclable shall be separated from trash and sorted as described below into appropriately marked separate containers and then transported 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 following category types as appropriate to the project waste and to the available recycling and reuse programs in the project area:

- a. Land clearing debris.
- b. Asphalt.
- c. Concrete and masonry.
- d. Metal (e.g. banding, stud trim, ductwork, piping, rebar, roofing, other trim, steel, iron, galvanized, stainless steel, aluminum, copper, zinc, lead brass, bronze).
 - (1) Ferrous.
 - (2) Non-ferrous.
- e. Wood (nails and staples allowed).
- f. Debris.
- g. Glass (colored glass allowed).
- h. Paper.
 - (1) Bond.
 - (2) Newsprint.
 - (3) Cardboard and paper packaging materials.
- i. Plastic.

Type	
1	Polyethylene Terephthalate (PET, PETE)
2	High Density Polyethylene (HDPE)

Type	
3	Vinyl (Polyvinyl Chloride or PVC)
4	Low Density Polyethylene (LDPE)
5	Polypropylene (PP)
6	Polystyrene (PS)
7.	Other. Use of this code indicates that the package in question is made with a resin other than the six listed above, or is made of more than one resin listed above, and used in a multi-layer combination.

- j. Gypsum.
- k. Non-hazardous paint and paint cans.
- l. Carpet.
- m. Ceiling tiles.
- n. Insulation.
- o. Beverage containers.

1.8.2 Co-Mingled Method.

Waste products and recyclable materials shall be placed into a single container and then transported to a recycling facility where the recyclable materials are sorted and processed.

1.8.3 Other Methods.

Other methods proposed by the Contractor may be used when approved by the Contracting Officer.

1.9 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. Except as otherwise specified in other sections of the specifications, disposal shall be in accordance with the following:

1.9.1 Reuse.

First consideration shall be given to salvage for reuse since little or no re-processing is necessary for this method, and less pollution is created when items are reused in their original form. Coordinate reuse with the Contracting Officer. Reuse materials as indicated on the drawings. Sale or donation of waste suitable for reuse shall be considered.

1.9.2 Recycle.

Waste materials not suitable for reuse, but having value as being recyclable, shall be made available for recycling. All fluorescent lamps, HID lamps, and mercury-containing thermostats removed from the site shall be recycled. Arrange for timely pickups from the site or deliveries to recycling facilities in order to prevent contamination of recyclable materials.

1.9.3 Compost

Consider composting on site if a reasonable amount of compostable material will be available. Compostable materials include plant material, sawdust, and certain food scraps.

1.9.4 Waste.

Materials with no practical use or economic benefit shall be disposed at a landfill or incinerator.

1.9.5 Return

Set aside and protect misdelivered and substandard products and materials and return to supplier for credit.

PART 2 PRODUCTS

Not used.

PART 3 EXECUTION

Not used. -- End of Section --

SECTION 01 78 00

CLOSEOUT SUBMITTALS

08/11

PART 1 GENERAL

1.1 REFERENCES

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

ASTM INTERNATIONAL (ASTM)

ASTM E1971 (2005; R 2011) Stewardship for the Cleaning of Commercial and Institutional Buildings

GREEN SEAL (GS)

GS-37 (2012) Cleaning Products for Industrial and Institutional Use

U.S. DEPARTMENT OF DEFENSE (DOD)

UFC 1-300-08 (2009, with Change 2) Criteria for Transfer and Acceptance of DoD Real Property

1.2 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are for Contractor Quality Control approval. Submit the following in accordance with Section 01 33 00 SUBMITTAL PROCEDURES:

SD-03 Product Data

As-Built Record of Equipment and Materials
Warranty Management Plan
Warranty Tags
Final Cleaning
Spare Parts Data

SD-08 Manufacturer's Instructions

Preventative Maintenance
Condition Monitoring (Predictive Testing)
Inspection
Posted Instructions

SD-11 Closeout Submittals

Record Drawings

Certification of EPA Designated Items; G
Interim Form DD1354; G
Checklist for Form DD1354; G

1.3 PROJECT RECORD DOCUMENTS

1.3.1 Record Drawings

Drawings showing final as-built conditions of the project. This paragraph covers record drawings complete, as a requirement of the contract. The terms "drawings," "contract drawings," "drawing files," "working record drawings" and "final record drawings" refer to contract drawings which are revised to be used for final record drawings showing as-built conditions. The final CAD record drawings must consist of one set of electronic CAD drawing files in the specified format, 2 sets of prints, and one set of the approved working Record drawings.

1.3.1.1 Government Furnished Materials

One set of electronic CADD files in the specified software and format revised to reflect all bid amendments will be provided by the Government at the preconstruction conference for projects requiring CADD file record drawings.

1.3.1.2 Working Record and Final Record Drawings

Revise 2 sets of paper drawings by red-line process to show the as-built conditions during the prosecution of the project. Keep these working as-built marked drawings current on a weekly basis and at least one set available on the jobsite at all times. Changes from the contract plans which are made in the work 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. Prepare final record (as-built) drawings after the completion of each definable feature of work as listed in the Contractor Quality Control Plan (Foundations, Utilities, Structural Steel, etc., as appropriate for the project). The working as-built marked prints and final record (as-built) drawings will be jointly reviewed for accuracy and completeness by the Contracting Officer and the Contractor prior to submission of each monthly pay estimate. If the Contractor fails to maintain the working and final record drawings as specified herein, the Contracting Officer will deduct from the monthly progress payment an amount representing the estimated cost of maintaining the record drawings. This monthly deduction will continue until an agreement can be reached between the Contracting Officer and the Contractor regarding the accuracy and completeness of updated drawings. Show on the working and final record 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. Correct grade, elevations, cross section, or alignment of roads, earthwork, structures or utilities if any changes were made from contract plans.
- d. Changes in details of design or additional information obtained from working drawings specified to be prepared and/or furnished by the Contractor; including but not limited to fabrication, erection, installation plans and placing details, pipe sizes, insulation material, dimensions of equipment foundations, etc.
- e. The topography, invert elevations and grades of drainage installed or affected as part of the project construction.
- f. Changes or modifications which result from the final inspection.
- g. Where contract drawings or specifications present options, show only the option selected for construction on the final as-built prints.
- h. 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.
- i. Systems designed or enhanced by the Contractor, such as HVAC controls, fire alarm, fire sprinkler, and irrigation systems.
- j. Modifications (include within change order price the cost to change working and final record drawings to reflect modifications) and compliance with the following procedures.
 - (1) Follow directions in the modification for posting descriptive changes.
 - (2) Place a Modification Circle at the location of each deletion.
 - (3) For new details or sections which are added to a drawing, place a Modification Circle by the detail or section title.
 - (4) For minor changes, place a Modification Circle by the area changed on the drawing (each location).
 - (5) For major changes to a drawing, place a Modification Circle by the title of the affected plan, section, or detail at each location.
 - (6) For changes to schedules or drawings, place a Modification Circle either by the schedule heading or by the change in the schedule.
 - (7) The Modification Circle size shall be 1/2 inch diameter unless the area where the circle is to be placed is crowded. Smaller size circle shall be used for crowded areas.

1.3.1.3 Drawing Preparation

Modify the record drawings as may be necessary to correctly show the features of the project as it has been constructed by bringing the contract set into agreement with approved working as-built prints, and adding such

additional drawings as may be necessary. These working as-built marked prints must be neat, legible and accurate. These drawings are part of the permanent records of this project and must be returned to the Contracting Officer after approval by the Government. Any drawings damaged or lost by the Contractor must be satisfactorily replaced by the Contractor at no expense to the Government.

1.3.1.4 Computer Aided Design and Drafting (CADD) Drawings

Only employ personnel proficient in the preparation of CADD drawings to modify the contract drawings or prepare additional new drawings. 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 be the same as the original line colors, line weights, lettering, layering conventions, and symbols. If additional drawings are required, prepare them using the specified electronic file format applying the same graphic standards specified for original drawings. 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 CADD files. The Contractor will be furnished "as-designed" drawings in AutoCad Release 2010 format compatible with a Windows 7 operating system. The electronic files will be supplied on optical disk. Provide all program files and hardware necessary to prepare final record drawings. The Contracting Officer will review final record drawings for accuracy and return them to the Contractor for required corrections, changes, additions, and deletions.

- a. Provide CADD "base" colors of red, green, and blue. Color code for changes as follows:
 - (1) Deletions (Red) - Over-strike deleted graphic items (lines), lettering in notes and leaders.
 - (2) Additions (Green) - Added items, lettering in notes and leaders.
 - (3) Special (Blue) - Items requiring special information, coordination, or special detailing or detailing notes.
- b. Rename the Contract Drawing files in a manner related to the contract number (i.e., 98-C-10.DGN) as instructed in the Pre-Construction conference. Use only those renamed files for the Marked-up changes. All changes shall be made on the layer/level as the original item.
- c. When final revisions have been completed, show the wording "RECORD DRAWINGS / AS-BUILT CONDITIONS" followed by the name of the Contractor in letters at least 3/16 inch high on the cover sheet drawing. Mark all other contract drawings either "Record" drawing denoting no revisions on the sheet or "Revised Record" denoting one or more revisions. Date original contract drawings in the revision block.
- d. Within 10 days for contracts less than \$5 million and 20 days for contracts \$5 million and above after Government approval of all of the working record drawings for a phase of work, prepare the final CADD record drawings for that phase of work and submit two sets of blue-lined prints of these drawings for Government review and approval. The Government will promptly return one set of prints annotated with any necessary corrections. Within 7 days for contracts less than \$5 million and 10 days for contracts \$5 million and above

revise the CADD files accordingly at no additional cost and submit one set of final prints for the completed phase of work to the Government. Within 10 days for contracts less than \$5 million and 20 days for contracts \$5 million and above of substantial completion of all phases of work, submit the final record drawing package for the entire project. Submit one set of electronic files on optical disk, one set of mylars, two sets of blue-line prints and one set of the approved working record drawings. They must be complete in all details and identical in form and function to the contract drawing files supplied by the Government. Any transactions or adjustments necessary to accomplish this is the responsibility of the Contractor. The Government reserves the right to reject any drawing files it deems incompatible with the customer's CADD system. Paper prints, drawing files and storage media submitted will become the property of the Government upon final approval. Failure to submit final record drawing files and marked prints as specified will be cause for withholding any payment due the Contractor under this contract. Approval and acceptance of final record drawings must be accomplished before final payment is made to the Contractor.

1.3.1.5 Payment

No separate payment will be made for record drawings required under this contract, and all costs accrued in connection with such drawings are considered a subsidiary obligation of the Contractor.

1.3.2 As-Built Record of Equipment and Materials

Furnish one copy 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

1.3.3 Final Approved Shop Drawings

Furnish final approved project shop drawings 30 days after transfer of the completed facility.

1.3.4 Construction Contract Specifications

Furnish final record (as-built) construction contract specifications, including modifications thereto, 30 days after transfer of the completed facility.

1.3.5 Real Property Equipment

Furnish a list of installed equipment furnished under this contract. Include all information usually listed on manufacturer's name plate. In

the "EQUIPMENT-IN-PLACE LIST" include, as applicable, the following for each piece of equipment installed: description of item, location (by room number), model number, serial number, capacity, name and address of manufacturer, name and address of equipment supplier, condition, spare parts list, manufacturer's catalog, and warranty. Furnish a draft list at time of transfer. Furnish the final list 30 days after transfer of the completed facility.

1.4 SPARE PARTS DATA

Submit two copies of the Spare Parts Data list.

- a. Indicate manufacturer's name, part number, nomenclature, and stock level required for maintenance and repair. List those items that may be standard to the normal maintenance of the system.

1.5 PREVENTATIVE MAINTENANCE

Submit Preventative Maintenance, Condition Monitoring (Predictive Testing) and Inspection schedules with instructions that state when systems should be retested.

- a. Define the anticipated length of each test, test apparatus, number of personnel identified by responsibility, and a testing validation procedure permitting the record operation capability requirements within the schedule. Provide a signoff blank for the Contractor and Contracting Officer for each test feature; e.g., gpm, rpm, psi. Include a remarks column for the testing validation procedure referencing operating limits of time, pressure, temperature, volume, voltage, current, acceleration, velocity, alignment, calibration, adjustments, cleaning, or special system notes. Delineate procedures for preventative maintenance, inspection, adjustment, lubrication and cleaning necessary to minimize corrective maintenance and repair.
- b. Repair requirements must inform operators how to check out, troubleshoot, repair, and replace components of the system. Include electrical and mechanical schematics and diagrams and diagnostic techniques necessary to enable operation and troubleshooting of the system after acceptance.

1.6 CERTIFICATION OF EPA DESIGNATED ITEMS

Submit the Certification of EPA Designated Items as required by FAR 52.223-9, "Certification and Estimate of Percentage of Recovered Material Content for EPA Designated Items". Include on the certification form the following information: project name, project number, Contractor name, license number, Contractor address, and certification. The certification will read as follows and be signed and dated by the Contractor. "I hereby certify the information provided herein is accurate and that the requisition/procurement of all materials listed on this form comply with current EPA standards for recycled/recovered materials content. The following exemptions may apply to the non-procurement of recycled/recovered content materials: 1) The product does not meet appropriate performance standards; 2) The product is not available within a reasonable time frame; 3) The product is not available competitively (from two or more sources); 4) The product is only available at an unreasonable price (compared with a comparable non-recycled content product)." Record each product used in the project that has a requirement or option of containing recycled or biobased

content, noting total price, total value of post-industrial recycled content, total value of post-consumer recycled content, total value of biobased content, exemptions (1, 2, 3, or 4, as indicated), and comments. Recycled and biobased content values may be determined by weight or volume percent, but must be consistent throughout.

1.7 WARRANTY MANAGEMENT

1.7.1 Warranty Management Plan

Develop a warranty management plan which contains information relevant to the clause Warranty of Construction. At least 30 days before the planned pre-warranty conference, submit one set of the warranty management plan. Include within the warranty management plan all required actions and documents to assure that the Government receives all warranties to which it is entitled. The plan must be in narrative form and contain sufficient detail to render it suitable for use by future maintenance and repair personnel, whether tradesmen, or of engineering background, not necessarily familiar with this contract. The term "status" as indicated below must include due date and whether item has been submitted or was accomplished. Warranty information made available during the construction phase must be submitted to the Contracting Officer for approval prior to each monthly pay estimate. Assemble approved information in a binder and turn over to the Government upon acceptance of the work. The construction warranty period will begin on the date of project acceptance and continue for the full product warranty period. A joint 4 month and 9 month warranty inspection will be conducted, measured from time of acceptance, by the Contractor, Contracting Officer and the Customer Representative. Include within the warranty management plan , but not limited to, the following:

- a. Roles and responsibilities of all personnel associated with the warranty process, including points of contact and telephone numbers within the organizations of the Contractors, subContractors, manufacturers or suppliers involved.
- b. Furnish with each warranty the name, address, and telephone number of each of the guarantor's representatives nearest to the project location.
- c. Listing and status of delivery of all Certificates of Warranty for extended warranty items, to include roofs, HVAC balancing, pumps, motors, transformers, and for all commissioned systems such as fire protection and alarm systems, sprinkler systems, lightning protection systems, etc.
- d. A list for each warranted equipment, item, feature of construction or system indicating:
 - (1) Name of item.
 - (2) Model and serial numbers.
 - (3) Location where installed.
 - (4) Name and phone numbers of manufacturers or suppliers.
 - (5) Names, addresses and telephone numbers of sources of spare parts.
 - (6) Warranties and terms of warranty. Include one-year overall warranty of construction, including the starting date of warranty of construction. Items which have extended warranties must be indicated with separate warranty expiration dates.
 - (7) Cross-reference to warranty certificates as applicable.
 - (8) Starting point and duration of warranty period.
 - (9) Summary of maintenance procedures required to continue the

warranty in force.

- (10) Cross-reference to specific pertinent Operation and Maintenance manuals.
- (11) Organization, names and phone numbers of persons to call for warranty service.
- (12) Typical response time and repair time expected for various warranted equipment.

- e. The Contractor's plans for attendance at the 4 and 9 month post-construction warranty inspections conducted by the Government.
- f. Procedure and status of tagging of all equipment covered by extended warranties.
- g. Copies of instructions to be posted near selected pieces of equipment where operation is critical for warranty and/or safety reasons.

1.7.2 Performance Bond

The Contractor's Performance Bond must remain effective throughout the construction period .

- a. In the event the Contractor fails to commence and diligently pursue any construction warranty work required, the Contracting Officer will have the work performed by others, and after completion of the work, will charge the remaining construction warranty funds of expenses incurred by the Government while performing the work, including, but not limited to administrative expenses.
- b. In the event sufficient funds are not available to cover the construction warranty work performed by the Government at the Contractor's expense, the Contracting Officer will have the right to recoup expenses from the bonding company.
- c. Following oral or written notification of required construction warranty repair work, respond in a timely manner. Written verification will follow oral instructions. Failure of the Contractor to respond will be cause for the Contracting Officer to proceed against the Contractor.

1.7.3 Pre-Warranty Conference

Prior to contract completion, and at a time designated by the Contracting Officer, meet with the Contracting Officer to develop a mutual understanding with respect to the requirements of this section. Communication procedures for Contractor notification of construction warranty defects, priorities with respect to the type of defect, reasonable time required for Contractor response, and other details deemed necessary by the Contracting Officer for the execution of the construction warranty will be established/reviewed at this meeting. In connection with these requirements and at the time of the Contractor's quality control completion inspection, furnish the name, telephone number and address of a licensed and bonded company which is authorized to initiate and pursue construction warranty work action on behalf of the Contractor. This point of contact will be located within the local service area of the warranted construction, be continuously available, and be responsive to Government inquiry on warranty work action and status. This requirement does not relieve the Contractor of any of its responsibilities in connection with other portions of this provision.

1.7.4 Warranty Tags

At the time of installation, tag each warranted item with a durable, oil and water resistant tag approved by the Contracting Officer. Attach each tag with a copper wire and spray with a silicone waterproof coating. Also, submit two record copies of the warranty tags showing the layout and design. The date of acceptance and the QC signature must remain blank until the project is accepted for beneficial occupancy. Show the following information on the tag.

Type of product/material	
Model number	
Serial number	
Contract number	
Warranty period from/to	
Inspector's signature	
Construction Contractor	
Address	
Telephone number	
Warranty contact	
Address	
Telephone number	
Warranty response time priority code	
WARNING - PROJECT PERSONNEL TO PERFORM ONLY OPERATIONAL MAINTENANCE DURING THE WARRANTY PERIOD.	

1.8 CLEANUP

Provide final cleaning in accordance with ASTM E1971 and submit two copies of the listing of completed final clean-up items. Leave premises "broom clean." Comply with GS-37 for general purpose cleaning and bathroom cleaning. Use only nonhazardous cleaning materials, including natural cleaning materials, in the final cleanup. Clean interior and exterior glass surfaces exposed to view; remove temporary labels, stains and foreign substances; polish transparent and glossy surfaces; vacuum carpeted and soft surfaces. Clean equipment and fixtures to a sanitary condition. Clean filters of operating equipment and comply with the Indoor Air Quality (IAQ) Management Plan. Clean debris from roofs, gutters, downspouts and drainage systems. Sweep paved areas and rake clean landscaped areas. Remove waste and surplus materials, rubbish and construction facilities from the site. Recycle, salvage, and return construction and demolition waste from project in accordance with the Waste Management Plan. Promptly and legally

transport and dispose of any trash. Do not burn, bury, or otherwise dispose of trash on the project site.

1.9 REAL PROPERTY RECORD

Near the completion of Project, but a minimum of 60 days prior to final acceptance of the work, complete, update draft DD Form 1354 attached to this section, and submit an accounting of all installed property with Interim Form DD1354 "Transfer and Acceptance of Military Real Property." Include any additional assets/improvements/alterations from the Draft DD Form 1354. Contact the Contracting Officer for any project specific information necessary to complete the DD Form 1354. Refer to UFC 1-300-08 for instruction on completing the DD Form 1354. For information purposes, a blank DD Form 1354 (fill-able) in ADOBE (PDF) may be obtained at the following web site:

<http://www.dtic.mil/whs/directives/infomgt/forms/eforms/dd1354.pdf>

Submit the completed Checklist for Form DD1354 of Installed Building Equipment items. Attach this list to the updated DD Form 1354.

PART 2 PRODUCTS

Not Used

PART 3 EXECUTION

Not Used

-- End of Section --

SECTION 02 41 00

DEMOLITION
05/10

PART 1 GENERAL

1.1 REFERENCES

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

AMERICAN ASSOCIATION OF STATE HIGHWAY AND TRANSPORTATION OFFICIALS
(AASHTO)

AASHTO M 145 (1991; R 2008) Standard Specification for Classification of Soils and Soil-Aggregate Mixtures for Highway Construction Purposes

AASHTO T 180 (2010) 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 ENGINEERS (ASSE/SAFE)

ASSE/SAFE A10.6 (2006) Safety Requirements for Demolition Operations

U.S. ARMY CORPS OF ENGINEERS (USACE)

EM 385-1-1 (2008; Errata 2011) Safety and Health Requirements Manual

U.S. FEDERAL AVIATION ADMINISTRATION (FAA)

FAA AC 70/7460-1 (2007; Rev K) Obstruction Marking and Lighting

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

40 CFR 61 National Emission Standards for Hazardous Air Pollutants

1.2 PROJECT DESCRIPTION

1.2.1 Demolition/Deconstruction Plan

Prepare a Demolition Plan and submit proposed salvage, demolition, and removal procedures for approval before work is started. Include in the plan procedures for careful removal and disposition of materials specified to be salvaged, coordination with other work in progress. Identify components and materials to be salvaged for reuse or recycling with reference to paragraph Existing Facilities to be Removed. Append tracking forms for all removed materials indicating type, quantities, condition, destination, and end use. Coordinate with Waste Management Plan. Provide

procedures for safe conduct of the work in accordance with EM 385-1-1. Plan shall be approved by Contracting Officer prior to work beginning.

1.2.2 General Requirements

Do not begin demolition or deconstruction until authorization is received from the Contracting Officer. The work of this section is to be performed in a manner that maximizes the value derived from the salvage and recycling of materials. Remove rubbish and debris from the project site; do not allow accumulations inside or outside the buildings. In the interest of occupational safety and health, perform the work in accordance with EM 385-1-1, Section 23, Demolition, and other applicable Sections.

1.3 ITEMS TO REMAIN IN PLACE

Take necessary precautions to avoid damage to existing items to remain in place, to be reused, or to remain the property of the Government. Repair or replace damaged items as approved by the Contracting Officer. Coordinate the work of this section with all other work indicated. Do not overload pavements to remain.

1.3.1 Existing Construction Limits and Protection

Do not disturb existing construction beyond the extent indicated or necessary for installation of new construction. Provide temporary shoring and bracing for support of building components to prevent settlement or other movement. Provide protective measures to control accumulation and migration of dust and dirt in all work areas. Remove dust, dirt, and debris from work areas daily.

1.3.2 Weather Protection

For portions of the building to remain, protect building interior and materials and equipment from the weather at all times. Where removal of existing roofing is necessary to accomplish work, have materials and workmen ready to provide adequate and temporary covering of exposed areas.

1.3.3 Trees

Protect trees within the project site which might be damaged during demolition or deconstruction, and which are indicated to be left in place, by a 6 foot high fence. Erect and secure fence a minimum of 5 feet from the trunk of individual trees or follow the outer perimeter of branches or clumps of trees. Replace any tree designated to remain that is damaged during the work under this contract with like-kind or as approved by the Contracting Officer.

1.3.4 Utility Service

Maintain existing utilities indicated to stay in service and protect against damage during demolition and deconstruction operations.

1.3.5 Facilities

Protect electrical and mechanical services and utilities. Where removal of existing utilities and pavement is specified or indicated, provide approved barricades, temporary covering of exposed areas, and temporary services or connections for electrical and mechanical utilities. 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. Where burning is permitted, adhere to federal, state, and local regulations.

1.5 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are for Contractor Quality Control approval. Submit the following in accordance with Section 01 33 00 SUBMITTAL PROCEDURES:

SD-01 Preconstruction Submittals

Existing Conditions; G

SD-07 Certificates

Demolition Plan; G

Notification

Notification of Demolition and Renovation form; G

1.6 QUALITY ASSURANCE

Submit timely notification of demolition projects to Federal, State, regional, and local authorities in accordance with 40 CFR 61, Subpart M. Notify the 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. Comply with federal, state, and local hauling and disposal regulations. In addition to the requirements of the "Contract Clauses," conform to the safety requirements contained in ASSE/SAFE A10.6. Comply with the Environmental Protection Agency requirements specified. Use of explosives will not be permitted.

1.6.1 Hawaii Requirements

Complete and submit Notification of Demolition and Renovation form to Federal and State authorities and Contracting Officer, postmarked or delivered at least ten working days prior to commencement of work, in accordance with 40 CFR 61, Subpart M. Complete paragraphs I, II, III.B, III.C (if applicable), IX, and XVI of form. Complete paragraphs I, II, III.B, III.C (if applicable), VIII, and IX thru XIX of form. Copy of form is attached at end of this section.

1.6.2 Dust and Debris Control

Prevent the spread of dust and debris to occupied portions of the building and avoid the creation of a nuisance or hazard in the surrounding area. Do not use water if it results in hazardous or objectionable conditions such as, but not limited to, ice, flooding, or pollution.

1.7 PROTECTION

1.7.1 Traffic Control Signs

a. Where pedestrian and driver safety is endangered in the area of removal work, use traffic barricades with flashing lights. Anchor barricades in a manner to prevent displacement by wind, jet or prop blast. Notify the Contracting Officer prior to beginning such work.

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

1.7.2 Protection of Personnel

Before, during and after the demolition work continuously evaluate the condition of the structure being demolished and take immediate action to protect all personnel working in and around the project site.

1.8 FOREIGN OBJECT DAMAGE (FOD)

Aircraft and aircraft engines are subject to FOD from debris and waste material lying on airfield pavements. Remove all such materials that may appear on operational aircraft pavements due to the Contractor's operations. If necessary, the Contracting Officer may require the Contractor to install a temporary barricade at the Contractor's expense to control the spread of FOD potential debris. The barricade shall include a fence covered with a fabric designed to stop the spread of debris. Anchor the fence and fabric to prevent displacement by winds or jet/prop blasts. Remove barricade when no longer required.

1.9 RELOCATIONS

Perform the removal and reinstallation of relocated items as indicated with workmen skilled in the trades involved. Repair or replace items to be relocated which are damaged by the Contractor with new undamaged items as approved by the Contracting Officer.

1.10 EXISTING CONDITIONS

Before beginning any demolition or deconstruction work, survey the site and examine the drawings and specifications to determine the extent of the work. Record existing conditions in the presence of the Contracting Officer showing the condition of structures and other facilities adjacent to areas of alteration or removal. Photographs sized 4 inch will be acceptable as a record of existing conditions. Include in the record the elevation of the top of foundation walls, finish floor elevations, possible conflicting electrical conduits, plumbing lines, alarms systems, the location and extent of existing cracks and other damage and description of surface conditions that exist prior to before starting work. It is the Contractor's responsibility to verify and document all required outages

which will be required during the course of work, and to note these outages on the record document. Submit survey results.

PART 2 PRODUCTS

2.1 FILL MATERIAL

- a. Comply with excavating, backfilling, and compacting procedures for soils used as backfill material to fill basements, voids, depressions or excavations resulting from demolition or deconstruction of structures. Fill material shall be waste products from demolition or deconstruction until all waste appropriate for this purpose is consumed.
- b. Fill material shall conform to the definition of satisfactory soil material as defined in AASHTO M 145, Soil Classification Groups A-1, A-2-4, A-2-5 and A-3. In addition, fill material shall be free from roots and other organic matter, trash, debris, frozen materials, and stones larger than 2 inches in any dimension.
- c. Proposed fill material must be sampled and tested by an approved soil testing laboratory, as follows:

Soil classification	AASHTO M 145
Moisture-density relations	AASHTO T 180, Method B or D

PART 3 EXECUTION

3.1 EXISTING FACILITIES TO BE REMOVED

Inspect and evaluate existing structures onsite for reuse. Existing construction scheduled to be removed for reuse shall be disassembled. Dismantled and removed materials are to be separated, set aside, and prepared as specified, and stored or delivered to a collection point for reuse, remanufacture, recycling, or other disposal, as specified. Materials shall be designated for reuse onsite whenever possible.

3.1.1 Utilities and Related Equipment

3.1.1.1 General Requirements

Do not interrupt existing utilities serving occupied or used facilities, except when authorized in writing by the Contracting Officer. Do not interrupt existing utilities serving facilities occupied and used by the Government except when approved in writing and then only after temporary utility services have been approved and provided. Do not begin demolition or deconstruction work until all utility disconnections have been made. Shut off and cap utilities for future use, as indicated.

3.1.2 Paving and Slabs

Remove ground concrete and asphaltic concrete paving and slabs to existing adjacent or new finish grade. Provide neat sawcuts at limits of pavement removal as indicated. Pavement and slabs not to be used in this project shall be removed from the Installation at Contractor's expense.

3.1.3 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.

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 and other hazardous openings.

3.3 DISPOSITION OF MATERIAL

3.3.1 Title to Materials

Except for salvaged items specified in related Sections, and for materials or equipment scheduled for salvage, all materials and equipment removed and not reused or salvaged, shall become the property of the Contractor and shall be removed from Government property. Title to materials resulting from demolition and deconstruction, and materials and equipment to be removed, is vested in the Contractor upon approval by the Contracting Officer of the Contractor's demolition, deconstruction, and removal procedures, and authorization by the Contracting Officer to begin demolition and deconstruction. The Government will not be responsible for the condition or loss of, or damage to, such property after contract award. Showing for sale or selling materials and equipment on site is prohibited.

3.3.2 Reuse of Materials and Equipment

Remove and store materials and equipment indicated to be reused or relocated to prevent damage, and reinstall as the work progresses.

3.3.3 Salvaged Materials and Equipment

Remove materials and equipment that are indicated to be removed by the Contractor and that are to remain the property of the Government, and deliver to a storage site, as directed.

- 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. On site sales of salvaged material is prohibited.

3.4 CLEANUP

Remove debris and rubbish from basement and similar excavations. Remove and transport the debris in a manner that prevents spillage on streets or adjacent areas. Apply local regulations regarding hauling and disposal.

3.5 DISPOSAL OF REMOVED MATERIALS

3.5.1 Regulation of Removed Materials

Dispose of debris, rubbish, scrap, and other nonsalvageable materials

resulting from removal operations with all applicable federal, state and local regulations as contractually specified in the Waste Management Plan .

3.5.2 Burning on Government Property

Burning of materials removed from demolished and deconstructed structures will not be permitted on Government property .

3.5.3 Removal to Spoil Areas on Government Property

Transport noncombustible materials removed from demolition and deconstruction structures to designated spoil areas on Government property.

3.5.4 Removal from Government Property

Transport waste materials removed from demolished and deconstructed structures, except waste soil, from Government property for legal disposal. Dispose of waste soil as directed.

3.6 REUSE OF SALVAGED ITEMS

Recondition salvaged materials and equipment designated for reuse before installation. Replace items damaged during removal and salvage operations or restore them as necessary to usable condition.

-- End of Section --

SECTION 02 61 23

REMOVAL AND DISPOSAL OF PCB CONTAMINATED SOILS

04/06

PART 1 GENERAL

1.1 REFERENCES

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

ASTM INTERNATIONAL (ASTM)

ASTM D4397 (2010) Standard Specification for Polyethylene Sheeting for Construction, Industrial, and Agricultural Applications

U.S. ENVIRONMENTAL PROTECTION AGENCY (EPA)

EPA 530/F-93/004 (1993; Rev O; Updates I, II, IIA, IIB, and III) Test Methods for Evaluating Solid Waste (Vol IA, IB, IC, and II) (SW-846)

EPA 560/5-86-017 (1986) Field Manual for Grid Sampling of PCB Spill Sites to Verify Cleanup

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

29 CFR 1910.1000 Air Contaminants

29 CFR 1910.120 Hazardous Waste Operations and Emergency Response

29 CFR 1910.145 Accident Prevention Signs and Tags

40 CFR 761 Polychlorinated Biphenyls (PCBs) Manufacturing, Processing, Distribution in Commerce, and Use Prohibitions

40 CFR 761.75 Chemical Waste Landfills

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

49 CFR 176 Carriage by Vessel

49 CFR 177	Carriage by Public Highway
49 CFR 178	Specifications for Packagings
49 CFR 179	Specifications for Tank Cars

1.2 DEFINITIONS

1.2.1 PCB and PCBs (Polychlorinated Biphenyls)

40 CFR 761. PCB and PCBs means any chemical substance that is limited to the biphenyl molecule that has been chlorinated to varying degrees or any combination of substances which contain such substance.

1.2.2 PCB Contaminated Soil

Soils containing concentrations greater than 10 parts per million (ppm) PCBs when tested as specified herein.

1.2.3 PCB Contaminated Water

Water containing greater than 1.5 parts per billion (ppb) when tested as specified herein.

1.2.4 PCB Surface Contaminated Solids

Soils containing concentrations greater than 10 micrograms PCB per square centimeter when tested as specified herein.

1.2.5 Permissible Exposure Limits (PEL)

PEL for PCBs is 3.10 E-08 pound per cubic feet on an 8-hour time weighted average basis.

1.3 DESCRIPTION OF WORK

The work includes removal and disposal of PCB contaminated soils. Perform work in accordance with 40 CFR 761, 29 CFR 1910.120, and the requirements specified herein. Excavate to the horizontal and vertical limits of the identified contaminated soil as indicated. After removing contaminated soil as indicated, sample, test, and excavate as specified until clean soil is encountered.

1.4 QUALITY ASSURANCE

1.4.1 Training

Instruct employees on the dangers of PCB exposure, on respirator use, decontamination, and applicable OSHA and EPA regulations.

1.4.2 Certified Industrial Hygienist (CIH)

Obtain the services of an industrial hygienist certified by the American Board of Industrial Hygiene to certify training, and review and approve the PCB removal plan, including determination of the need for personnel protective equipment (PPE) in performing PCB removal work.

1.4.3 Regulation Documents

Maintain at the job site one readily available copy each of 29 CFR 1910.1000, 40 CFR 761, and all contractor prepared plans required under "Submittals" paragraphs.

1.4.4 Protection Plan

Prepare and submit a protection plan, prepared by the CIH, covering protection of workers and the environment from PCB hazards. Specific protection requirements shall be determined by the CIH and, as a minimum, as specified herein.

1.4.5 PCB Contaminated Soil Removal Plan

Prepare and submit, 15 calendar days prior to initiating work, plan describing methods, techniques, and phases of dealing with the contaminated soil, including: a schedule to be employed in the excavation, a sequence of operations, the method of excavation, hauling, and handling of the contaminated materials, and the proposed equipment. Define the Contractor's source for fill and method for importing the fill material. Ensure that work operations or processes involving PCB-contaminated materials are conducted in accordance with 40 CFR 761 and the applicable requirements of this section, including but not limited to:

- a. Obtaining advance approval of PCB storage sites.
- b. Notifying Contracting Officer prior to commencing the operation.
- c. Reporting leaks and spills to the Contracting Officer.
- d. Cleaning up spills.
- e. Maintaining an access log of employees working in a PCB control area and providing a copy to the Contracting Officer upon completion of the operation.
- f. Inspecting PCB and PCB-contaminated items and waste containers for leaks and forwarding copies of inspection reports to the Contracting Officer.
- g. Maintaining a spill kit.
- h. Maintaining inspection, inventory, and spill records.

1.4.6 PCB Contaminated Water Handling Plan

Prepare and submit plan detailing methods and techniques for collection of PCB contaminated water.

1.4.7 Sampling and Testing Plan

Prepare and submit sampling and testing plan. Include the names of testing laboratories to be used to accomplish analysis of contaminated soil and water. Describe field and laboratory sampling procedures, testing methods, and quality control procedures. For sample reports, show sample identification for location, date, time, sample method, contamination level, name of individual sampler, identification of laboratory, and quality control procedures.

1.4.8 Training Certification

Submit certificates signed and dated by the CIH and by each employee stating that the employee has received training.

1.4.9 CIH Qualifications

Submit the name, address, and telephone number of the industrial hygienist selected to perform the duties in paragraph entitled "Certified Industrial Hygienist." Submit proper documentation that the industrial hygienist is certified, including certification number and date of certification and recertification.

1.4.10 PCB Disposal Plan

Submit a PCB Disposal Plan within 45 calendar days after award of contract for Contracting Officer's approval. Comply with applicable requirements of Federal, State, and local PCB waste regulations and address:

- a. Identification of PCB wastes associated with the work.
- b. Estimated quantities of wastes to be generated and disposed of.
- c. Names and qualifications of each Contractor that will be transporting, storing, treating, and disposing of the wastes. Include the facility location and a 24-hour point of contact. Furnish two copies of EPA State and local PCB waste permits and EPA identification numbers.
- d. Names and qualifications (experience and training) of personnel who will be working on-site with PCB 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 to be implemented.
- g. Location of state certified weigh station.
- h. Work plan and schedule for PCB waste containment, removal, and disposal. Clean up and containerize wastes daily.

1.4.11 Vehicle Decontamination Verification

Provide documentation verifying that vehicles and containers were decontaminated prior to leaving the disposal site, were properly operating, and were covered, within 24 hours after removal of waste from the site.

1.4.12 Closeout Report

Prepare closeout report containing following items: test results including readings and locations, a diagram of the limits of the excavated area with sample locations indicated (indicate reference benchmark used), chain of custody forms, certificates of disposal, truck manifests, and description of the work completed.

1.5 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are for Contractor Quality Control approval. The following shall be submitted in accordance with Section 01 33 00 SUBMITTAL PROCEDURES:

SD-03 Product Data

Field Screening Test

SD-07 Certificates

Protection Plan; G

PCB Contaminated Soil Removal Plan; G

PCB Contaminated Water Handling Plan; G

Sampling and Testing Plan; G

Confirmatory Grid Sampling Plan; G

Training certification

CIH qualifications; G

PCB Disposal Plan; G

Shipping documentation

Vehicle decontamination verification

Borrow site testing

Certificate of Disposal

SD-11 Closeout Submittals

Closeout Report; G

PART 2 PRODUCTS

2.1 PLASTIC SHEETING

ASTM D4397.

2.2 FIELD SCREENING TEST

Field test capable of detecting PCBs down to at least 1 ppm, with less than 5 percent false negatives, and providing on site results within 2 hours of taking sample.

PART 3 EXECUTION

3.1 PROTECTION OF WORKERS AND THE ENVIRONMENT

Protect workers and the environment from PCB hazards in accordance with the PCB protection plan and, as a minimum, as specified herein.

3.1.1 Worker Safety

Provide portable decontamination and shower rooms. Workers shall wear and use PPE, as recommended by the industrial hygienist, upon entering a PCB control area. If PPE is not required by the CIH, specify in the PCB removal work plan. Keep work footwear inside work area until completion of the job. Have available one set of PPE required for use by Contracting Officer for inspection of work. Do not carry out PCB handling operations in confined spaces. Do not delay aid to a seriously injured worker for reasons of decontamination.

3.1.2 PCB Control Area

Establish a PCB control area to prevent unauthorized entry of personnel. Rope off area and provide 29 CFR 1910.145 signs at approaches and around perimeter. Locate signs at such a distance that personnel may read the sign and take the necessary precautions before entering the area. Allow only personnel briefed on the elements and trained as specified herein into the area. Do not permit food, drink, or smoking materials in the control area. Smoking is not permitted within 50 feet of the PCB control area. Provide "No Smoking" signs as directed by the Contracting Officer.

3.1.3 Air Quality

Include provisions to ensure that airborne PCB concentrations below the PEL of air defined herein are not exceeded outside of the PCB control area or by workers inside the PCB control area. Provide air monitoring, personnel monitoring, and sampling to ensure workers safety as determined by the CIH and as specified herein. As a minimum, sample the air daily at the following locations: at locations being disturbed, within the breathing zone of workers, and at the downwind border of the control area. Measure using instrument capable of detecting airborne PCBs at concentrations below OSHA PEL, or use a direct reading total particulate meter correlated to a worst case amount of PCBs attached to the particulate. When airborne concentrations exceed PEL at the breathing zone of workers, provide respirators and additional worker protection as dictated in the Site Health and Safety Plan. If airborne concentration exceeds PEL at boundary of control area, immediately stop work and notify the Contracting Officer.

3.1.4 Special Hazards

- a. Do not expose PCBs to open flames or other high temperature sources since toxic decomposition by-products may be produced.
- b. Do not heat PCBs to temperatures of 135 degrees F or higher without Contracting Officer's concurrence.

3.2 PCB SPILL PREVENTION

Use appropriate vehicles and operating practices to prevent spillage or leakage of contaminated materials from occurring during operations. Inspect vehicles leaving the contaminated soil removal site to ensure that no contaminated soil adheres to the wheels or undercarriage. Immediately report any spills to the Contracting Officer and provide cleanup in accordance with 40 CFR 761, Subpart G.

3.3 EXCAVATION PROCEDURES

Notify the Contracting Officer at least 48 hours prior to the start of excavation of contaminated soils. Use methods and equipment that result in minimal disturbance to remaining soil beyond the excavation limits. Remove and dispose of any material that becomes contaminated as a result of the Contractor's operation at no additional cost to the Government. Stage operations to minimize the time the contaminated soil is exposed to the weather. Provide protection measures around the area of contaminated soils to divert runoff of water from within the excavation boundaries.

3.3.1 Underground Utilities

Location of the existing utilities indicated is approximate and other underground utilities may be present. Scan the construction site with electromagnetic and sonic equipment and mark the surface of the ground where existing underground utilities are discovered. Physically verify the location and elevation of the existing utilities indicated prior to starting construction. If utilities other than those indicated are found, stop work and contact the Contracting Officer. Protect existing utilities from damage and intrusion of PCBs.

3.3.2 Dust Control

Maintain strict dust control at all times to prevent dust particles with PCB attached from becoming airborne. Sprinkle or treat the soil at the site and other areas disturbed by operations with dust suppressants or water.

3.3.3 Washdown of Solid Material

Remove asphalt pavement, concrete slabs, and structures encountered above or below the ground surface within the excavation limits. Brush to remove soil materials and clean to limit defined herein for PCB surface contaminated solids by double rinsing, and place in the adjacent rubble pile. Collect and dispose of washdown water as contaminated water. Sample each type of solid material using either wipe samples or destructive samples at locations as directed by the Contracting Officer. Analyze samples for PCBs in accordance with EPA 530/F-93/004, Method 8080. Collect and test field blanks and replicates in accordance with EPA protocol. Repeat cleaning process and testing until PCBs are below the limits specified herein.

3.3.3.1 Wipe Samples

40 CFR 761. A 10 cm by 10 cm template gauze pad or glass wool of known size which has been saturated in the laboratory with hexane and stored in sealed glass vials. Wipe immediately after exposing medium to air. Place sample in precleaned glass bottle, cap, label, and place in ice chest until analyzed.

3.3.3.2 Destructive Samples

EPA 560/5-86-017. Remove sufficient sample for analysis using chisel, hole saw, drills, etc. Take samples less than 3/8 inch deep and place in glass precleaned sample bottle, cap, label, and place in ice chest.

3.3.4 Excavation Limits

Remove contaminated soil to the horizontal and vertical limits as indicated. Verify the limits of clean soils by testing and sampling. Handle and dispose of material within this area as PCB contaminated. After excavation to the indicated limits, conduct an analysis of the excavation to determine if any remaining PCB contaminated soils exist. Collect samples and test by field screening. When field screening results show PCB concentrations below the contamination level, test using confirmation sampling and testing. If groundwater is encountered prior to reaching the vertical limits, notify the Contracting Officer.

3.3.4.1 Field Screening

Collect soil samples at the same interval as determined for the confirmatory grid sampling plan along the bottom and along the sidewalls of the excavation, and test using field screening test.

3.3.4.2 Confirmation Sampling and Testing

When field screening results show PCB concentrations below the contaminated level, test using confirmation sampling and testing. Sample along the bottom and sidewalls of excavation. Use sampling grid scheme and number of samples as defined in EPA 560/5-86-017. Compositing of samples for analysis shall not be allowed. Submit and receive approval of Confirmatory Grid Sampling Plan scheme prior to starting work. Analyze samples in accordance with EPA 530/F-93/004, Method 8080 for PCBs. Determine moisture content of the sample in accordance with EPA Method 160.3. Provide quality control in accordance with EPA guidelines, and as a minimum as follows:

- a. Duplicate samples - collect and analyze duplicate soil samples at the rate of 10 percent of the total number of samples (rounded to the next highest number).
- b. Matrix spike and matrix spike duplicate - collect one matrix spike sample for every 20 samples collected (rounded to the next highest number). Split the matrix spike sample, and analyze both the matrix spike and the matrix spike duplicate.

3.3.5 Additional Excavations

If field screening results indicate the PCB contaminated soils remain, notify the Contracting Officer. Where directed, continue excavation horizontal and vertical limits as directed by the Contracting Officer. Collect and analyze additional confirmation samples in the new excavation areas. Screen and analyze after each excavation episode as required. Payment for additional excavation and testing will be made in accordance with the Changes Clause of the contract.

3.3.6 Stockpiled Material

Place soil removed from the excavation in a temporary containment area near the excavation area. Divert water from the containment area. Cover containment area with 30 mil polyethylene sheeting. Place excavated soil on the impervious barrier and cover with 6 mil polyethylene sheeting. Provide straw bale berm around the outer limits of the containment area and cover with polyethylene sheets. Secure edges of sheets to keep the polyethylene sheeting in place. Cover excavated contaminated soil at all times when not being worked. Maintain sheeting and replace when worn or

ripped.

3.3.6.1 Composite Testing of Stockpiled Material

Take composite samples from stockpiled material prior to removing from site. Analyze a minimum of one composite sample for every 100 cubic yards or fraction thereof of soil to be disposed of from any one site. To develop a composite sample of the size necessary to run the required tests, take several samples from different areas along the surface and in the center of the stockpile. Combine these samples and thoroughly mix to develop the composite sample.

3.4 CONTAMINATED WATER

Collect washwater. Collect ground, surface, and rain water contaminated by operations including water collected in the open excavation pit or temporary containment. Soak up with absorbent material so that no free liquid is present. Containerize, sample, and analyze PCB absorbed material and dispose of as specified for contaminated soils.

3.5 TRANSPORTATION AND DISPOSAL

Furnish labor, materials, and equipment necessary to store, transport, and dispose of PCB contaminated material in accordance with Federal, State, and local requirements. Prepare and maintain waste shipment records and manifests required by the Resource Conservation and Recovery Act (RCRA), U.S. Federal Department of Transportation (DOT), and State transportation department.

3.5.1 Transportation

49 CFR 171, 49 CFR 172, 49 CFR 173, 49 CFR 174, 49 CFR 176, 49 CFR 177, 49 CFR 178 49 CFR 179. Transport PCB contaminated soils in vehicles designed to carry PCB contaminated soils in accordance with Federal and State requirements. Transport PCB contaminated solid material, articles, or equipment in DOT Specification 5, 5B, or 17C containers with removable heads. Store liquid PCBs in DOT Specification 17E containers. In addition to those requirements:

- a. Inspect and document vehicles and containers for proper operation and covering. Repair or replace damaged containers.
- b. Inspect vehicles and containers for proper markings, manifest documents, and other requirements for waste shipment.
- c. Perform and document decontamination procedures prior to leaving the worksite and again before leaving the disposal site.

3.5.1.1 Weight Certification

Weigh vehicles transporting PCB contaminated materials at a State-certified weigh scale within 15 miles of the project site.

3.5.1.2 Shipping Documentation

40 CFR 761. Before transporting the PCB waste, sign and date the manifest acknowledging acceptance of the PCB waste from the Government. Return a signed copy to the Government before leaving the job site. Ensure that the manifest accompanies the PCB waste at all times. Submit transporter

certification of notification to EPA of their PCB waste activities and EPA identification numbers. Within 35 days from shipment date, the transporter shall provide a copy of the manifest signed and dated by the disposer.

3.5.1.3 Payment Upon Furnishing Certificate of Disposal of PCBs

Payment will not be made until the certificate of disposal has been furnished to the Contracting Officer.

3.5.2 Disposal

Dispose of PCB contaminated soils in accordance with 40 CFR 761 at a TSCA regulated landfill meeting the requirements of 40 CFR 761.75. The disposer shall forward a copy of the manifest to the Contracting Officer within 30 days of receipt of PCBs.

3.5.2.1 Certificate of Disposal

Submit certificate of disposal to the Government within 30 calendar days of the date that the disposal of the PCB waste identified on the manifest was completed. Include:

- a. The identity of the disposal facility, by name, address, and EPA identification number.
- b. The identity of the PCB waste affected by the Certificate of Disposal including reference to the manifest number for the shipment.
- c. A statement certifying the fact of disposal of the identified PCB waste, including the date(s) of disposal, and identifying the disposal process used.
- d. A certification as defined in 40 CFR 761, Section 3.

3.6 CLEANUP

Maintain surfaces of the PCB control area free of accumulations of PCBs. Restrict the spread of dust and debris; keep waste from being distributed over work area. Do not remove the PCB control area and warning signs prior to the Contracting Officer's approval. Reclean areas showing residual PCBs.

3.6.1 Solvent Cleaning

Clean contaminated tools, containers, etc., after use by rinsing three times with an appropriate solvent or by wiping down three times with a solvent wetted rag. Suggested solvents are stoddard solvent or hexane.

3.7 REPORTS

Prepare and submit a remediation closeout report at the completion of the work.

3.8 BACKFILLING, GRADING, TOPSOILING, AND SEEDING

Commence backfilling of the excavation within 10 calendar days after receiving confirmatory test results that indicate no further PCB contamination is present. Soils brought in from off site for use as backfill shall contain less than one part per million (ppm) PCBs. Provide borrow site testing for PCBs from composite sample of material from borrow

site, with at least one test from each borrow site. Material shall not be brought on site until tests have been approved by the Contracting Officer. Provide backfill, compaction, grading, and seeding. Line the excavation with two plastic sheets before backfilling.

-- End of Section --

SECTION 31 05 19

GEOTEXTILE
08/08

PART 1 GENERAL

1.1 PAYMENT

Geotextile installed and accepted will be paid for at the respective contract unit price in the bidding schedule. This unit price will include the cost of materials, equipment, installation, testing, and other costs associated with placement of the geotextile.

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 D4354	(2012) Sampling of Geosynthetics for Testing
ASTM D4355/D4355M	(2014) Deterioration of Geotextiles from Exposure to Light, Moisture and Heat in a Xenon-Arc Type Apparatus
ASTM D4491	(1999a; R 2014; E 2014) Water Permeability of Geotextiles by Permittivity
ASTM D4533	(2011) Trapezoid Tearing Strength of Geotextiles
ASTM D4632/D4632M	(2008; R 2013; E 2013; E 2014) Grab Breaking Load and Elongation of Geotextiles
ASTM D4751	(2012) Determining Apparent Opening Size of a Geotextile
ASTM D4759	(2011) Determining the Specification Conformance of Geosynthetics
ASTM D4873	(2002; R 2009) Identification, Storage, and Handling of Geosynthetic Rolls and Samples
ASTM D6241	(2014) Standard Test Method for the Static Puncture Strength of Geotextiles and Geotextile-Related Products Using a 50-mm Probe

1.3 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are for Contractor Quality Control

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

SD-03 Product Data

Thread
Manufacturing Quality Control Sampling and Testing

SD-04 Samples

Quality Assurance Samples and Tests

SD-07 Certificates

Geotextile

1.4 DELIVERY, STORAGE, AND HANDLING

Deliver, store, and handle geotextile in accordance with ASTM D4873.

1.4.1 Delivery

Notify the Contracting Officer a minimum of 24 hours prior to delivery and unloading of geotextile rolls packaged in an opaque, waterproof, protective plastic wrapping. The plastic wrapping shall not be removed until deployment. If quality assurance samples are collected, immediately rewrap rolls with the plastic wrapping. Geotextile or plastic wrapping damaged during storage or handling shall be repaired or replaced, as directed. Label each roll with the manufacturer's name, geotextile type, roll number, roll dimensions (length, width, gross weight), and date manufactured.

1.4.2 Storage

Protect rolls of geotextile from construction equipment, chemicals, sparks and flames, temperatures in excess of 160 degrees F, or any other environmental condition that may damage the physical properties of the geotextile. To protect geotextile from becoming saturated, either elevate rolls off the ground or place them on a sacrificial sheet of plastic in an area where water will not accumulate.

1.4.3 Handling

Handle and unload geotextile rolls with load carrying straps, a fork lift with a stinger bar, or an axial bar assembly. Rolls shall not be dragged along the ground, lifted by one end, or dropped to the ground.

PART 2 PRODUCTS

2.1 RAW MATERIALS

A minimum of 7 days prior to scheduled use, submit manufacturer's certificate of compliance stating that the geotextile meets the requirements of this section. For needle punched geotextiles, the manufacturer shall also certify that the geotextile has been continuously inspected using permanent on-line full-width metal detectors and does not contain any needles which could damage other geosynthetic layers. The certificate of compliance shall be attested to by a person having legal authority to bind the geotextile manufacturer.

2.1.1 Geotextile

Provide geotextile that is a woven or nonwoven pervious sheet of polymeric material consisting of long-chain synthetic polymers composed of at least 95 percent by weight polyolefins, polyesters, or polyamides. The use of woven slit film geotextiles (i.e. geotextiles made from yarns of a flat, tape-like character) will not be allowed. Add stabilizers and/or inhibitors to the base polymer, as needed, to make the filaments resistant to deterioration by ultraviolet light, oxidation, and heat exposure. Regrind material, which consists of edge trimmings and other scraps that have never reached the consumer, may be used to produce the geotextile. Post-consumer recycled material may also be used. Geotextile shall be formed into a network such that the filaments or yarns retain dimensional stability relative to each other, including the edges. Geotextiles shall meet the requirements specified in Table 1. Where applicable, Table 1 property values represent minimum average roll values (MARV) in the weakest principal direction. Values for AOS represent maximum average roll values.

TABLE 1 MINIMUM PHYSICAL REQUIREMENTS FOR DRAINAGE GEOTEXTILE			
PROPERTY	UNITS	ACCEPTABLE VALUES	TEST METHOD
GRAB STRENGTH	LBS	160	ASTM D4632/D4632M
SEAM STRENGTH	LBS	1250	ASTM D4632/D4632M
PUNCTURE	LBS	55	ASTM D6241
TRAPEZOID TEAR	LBS	55	ASTM D4533
APPARENT OPENING SIZE	U.S. SIEVE	30	ASTM D4751
PERMITTIVITY	SEC -1	0.7	ASTM D4491
ULTRAVIOLET DEGRADATION	PERCENT	50 AT 500 HRS	ASTM D4355/D4355M

2.1.2 Thread

A minimum of 7 days prior to scheduled use, submit proposed thread type for sewn seams along with data sheets showing the physical properties of the thread. Construct sewn seams with high-strength polyester, nylon, or other approved thread type. Thread shall have ultraviolet light stability equivalent to the geotextile and the color shall contrast with the geotextile.

2.2 MANUFACTURING QUALITY CONTROL SAMPLING AND TESTING

The Manufacturer is responsible for establishing and maintaining a quality control program to assure compliance with the requirements of the specification. A minimum of 7 days prior to scheduled use, submit

manufacturer's quality control manual. Documentation describing the quality control program shall be made available upon request. Perform manufacturing quality control sampling and testing in accordance with the manufacturer's approved quality control manual. As a minimum, geotextiles shall be randomly sampled for testing in accordance with ASTM D4354, Procedure A. Acceptance of geotextile shall be in accordance with ASTM D4759. Tests not meeting the specified requirements will result in the rejection of applicable rolls.

PART 3 EXECUTION

3.1 QUALITY ASSURANCE SAMPLES AND TESTS

3.1.1 Quality Assurance Samples

Provide assistance to the Contracting Officer in the collection of quality assurance samples for quality assurance testing; assign 7 days in the schedule to allow for testing. Collect samples upon delivery to the site at the request of the Contracting Officer. . Identify samples with a waterproof marker by manufacturer's name, product identification, lot number, roll number, and machine direction. The date and a unique sample number shall also be noted on the sample. Discard the outer layer of the geotextile roll prior to sampling a roll. Samples shall then be collected by cutting the full-width of the geotextile sheet a minimum of 3 feet long in the machine direction. Rolls which are sampled shall be immediately resealed in their protective covering.

3.1.2 Quality Assurance Tests

Provide quality assurance samples to an Independent Laboratory. Samples will be tested to verify that geotextile meets the requirements specified in Table 1. Test method ASTM D4355/D4355M shall not be performed on the collected samples. Geotextile product acceptance shall be based on ASTM D4759. Tests not meeting the specified requirements will result in the rejection of applicable rolls.

3.2 INSTALLATION

3.2.1 Subgrade Preparation

The surface underlying the geotextile shall be smooth and free of ruts or protrusions which could damage the geotextile.

3.2.2 Placement

Notify the Contracting Officer a minimum of 24 hours prior to installation of geotextile. Geotextile rolls which are damaged or contain imperfections shall be repaired or replaced as directed. The geotextile shall be laid flat and smooth so that it is in direct contact with the subgrade. The geotextile shall also be free of tensile stresses, folds, and wrinkles. On slopes steeper than 10 horizontal on 1 vertical, lay the geotextile with the machine direction of the fabric parallel to the slope direction.

3.3 SEAMS

3.3.1 Overlap Seams

Continuously overlap geotextile panels a minimum of 12 inches at all longitudinal and transverse joints. Where seams must be oriented across

the slope, lap the upper panel over the lower panel. If approved, sewn seams may be used instead of overlapped seams.

3.3.2 Sewn Seams

Factory and field seams shall be continuously sewn on all slopes steeper than 1 vertical on 4 horizontal. The stitch type used shall be a 401 locking chain stitch or as recommended by the manufacturer. For field and factory seams which are sewn, provide at least a 2-meter sample of sewn seam before the geotextile is installed. For seams that are field sewn, the seams shall be sewn using the same equipment and procedures as will be used for the production seams. If seams are sewn in both the machine and cross machine direction, provide samples of seams from both directions. Provide Quality Assurance seam samples to the Government at the request of the Contracting Officer. Seam strength shall meet the minimum requirements specified in Table 1. The thread at the end of each seam run shall be tied off to prevent unraveling. Skipped stitches or discontinuities shall be sewn with an extra line of stitching with a minimum of 18 inches of overlap.

3.4 PROTECTION

Protect the geotextile during installation from clogging, tears, and other damage. Damaged geotextile shall be repaired or replaced as directed. Use adequate ballast (e.g. sand bags) to prevent uplift by wind. The geotextile shall not be left uncovered for more than 14 days after installation.

3.5 REPAIRS

Repair torn or damaged geotextile. Clogged areas of geotextile shall be removed. Perform repairs by placing a patch of the same type of geotextile over the damaged area. The patch shall extend a minimum of 12 inches beyond the edge of the damaged area. Patches shall be continuously fastened using approved methods. The machine direction of the patch shall be aligned with the machine direction of the geotextile being repaired. Remove and replace geotextile rolls which cannot be repaired. Repairs shall be performed at no additional cost to the Government.

3.6 PENETRATIONS

Construct engineered penetrations of the geotextile by methods recommended by the geotextile manufacturer.

3.7 COVERING

Do not cover geotextile prior to inspection and approval by the Contracting Officer. Place cover soil in a manner that prevents soil from entering the geotextile overlap zone, prevents tensile stress from being mobilized in the geotextile, and prevents wrinkles from folding over onto themselves. On side slopes, soil backfill shall be placed from the bottom of the slope upward. Cover soil shall not be dropped onto the geotextile from a height greater than 3 feet. No equipment shall be operated directly on top of the geotextile without approval of the Contracting Officer. Use equipment with ground pressures less than 7 psi to place the first lift over the geotextile. A minimum of 12 inches of soil shall be maintained between full-scale construction equipment and the geotextile. Equipment placing cover soil shall not stop abruptly, make sharp turns, spin their wheels, or travel at speeds exceeding 5 mph.

-- End of Section --

SECTION 31 05 21

GEOGRID SOIL REINFORCEMENT
08/08

PART 1 GENERAL

1.1 REFERENCES

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

ASTM INTERNATIONAL (ASTM)

ASTM D 4355	(2007) Deterioration of Geotextiles from Exposure to Light, Moisture and Heat in a Xenon-Arc Type Apparatus
ASTM D 4873	(2002; R 2009) Identification, Storage, and Handling of Geosynthetic Rolls and Samples
ASTM D 6637	(2010) Standard Test Method for Determining Tensile Properties of Geogrids by the Single or Multi-Rib Tensile Method

GEOSYNTHETIC RESEARCH INSTITUTE (GRI)

GRI-GG1	(1987) Geogrid Rib Strength
GRI-GG2	(1987) Geogrid Junction Strength

U.S. ENVIRONMENTAL PROTECTION AGENCY (EPA)

EPA 9090A	(1992) Compatibility Test for Wastes and Membrane Liners
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1.2 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are for Contractor Quality Control approval. Submit the following in accordance with Section 01 33 00 SUBMITTAL PROCEDURES:

SD-03 Product Data

Geogrid Reinforcement

Manufacturer product specification.

1.3 DELIVERY, STORAGE, AND HANDLING

Check products upon delivery to ensure that the proper material has been received and is dry and undamaged. Protect the materials from damage and exposure following the guidelines presented in ASTM D 4873.

1.3.1 Labeling

Label each roll with the manufacturer's name, product identification, roll dimensions, lot number, and date manufactured.

1.3.2 Handling

Handle and unload geogrid rolls by hand, or with load carrying straps, a fork lift with a stinger bar, or an axial bar assembly. Geosynthetic rolls shall not be dragged, lifted by one end, lifted by cables or chains, or dropped to the ground.

1.3.3 Storage

Protect geogrid from deleterious materials, chemicals, sparks and flames, temperatures in excess of 160 degrees F, and any other environmental condition that may degrade the physical properties. If stored outdoors, the rolls shall be elevated from the ground surface. Protect geogrids, except for extruded grids, with an opaque waterproof cover.

PART 2 PRODUCTS

2.1 GEOGRID REINFORCEMENT

Provide a geogrid that is a geosynthetic manufactured for reinforcement applications and a regular network of integrally connected polymer tensile elements with aperture geometry sufficient to permit significant mechanical interlock with the surrounding soil, aggregate, or other fill materials. The geogrid structure shall be dimensionally stable and able to retain its geometry under manufacture, transport and installation. The geogrid shall be manufactured with resin consisting of polyethylene, polypropylene, polyester, or other approved material. Polyethylene and polypropylene shall be stabilized with long term antioxidants.

2.1.1 Geogrid Reinforcement Properties

The reinforcement shown on the contract drawings shall meet the property requirements listed in Table 1. Reinforcement strength requirements represent minimum average roll values in the machine direction.

TABLE 1

PROPERTY	REQUIREMENT
Radial Stiffness at 5% strain	15,430 lb/ft
UV Resistance	100 percent
Chemical Resistance	100 percent
Junction efficiency	93 percent

2.1.1.1 Radial Stiffness

Radial stiffness is determined from tensile stiffness measured in any in-plane axis from testing in accordance with ASTM D 6637.

2.1.1.2 UV Resistance

Resistance to loss of load capacity or structural integrity when subjected to 500 hours of ultraviolet light and aggressive weathering in accordance with ASTM D 4355.

2.1.1.3 Chemical Resistance

Resistance to loss of load capacity or structural integrity when subjected to chemically aggressive environments in accordance with EPA 9090A immersion testing.

2.1.1.4 Junction Efficiency

Load transfer capability determined in accordance with GRI-GG1 and GRI-GG2, expressed as a percentage of ultimate strength.

PART 3 EXECUTION

3.1 INSTALLATION

3.1.1 Subgrade Preparation

Smooth grade and compact soil per Manufacturer's recommendations. Grade as indicated.

3.1.2 Placement

Install the geogrid in accordance with the Manufacturer's recommendations. Unroll the geogrid in the direction of travel. For very soft subgrades, transverse or perpendicular direction may be preferred if lateral spreading and separation of overlaps may occur. Geogrid damaged during placement and covering shall be removed and replaced at no additional cost to the Government.

3.1.3 Overlaps

Overlap adjacent rolls of geogrid per Manufacturer's recommendations. Overlap in direction of advancing fill.

3.1.4 Aggregate Fill

Provide compacted aggregate fill over geogrid in accordance with the Manufacturer's recommendations.

-- End of Section --

SECTION 31 11 00

CLEARING AND GRUBBING
08/08

PART 1 GENERAL

1.1 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are for Contractor Quality Control approval. Submit the following in accordance with Section 01 33 00 SUBMITTAL PROCEDURES:

SD-03 Product Data

Nonsaleable Materials; G

SD-04 Samples

Tree wound paint
Herbicide

1.2 DELIVERY, STORAGE, AND HANDLING

Deliver materials to store at the site, and handle in a manner which will maintain the materials in their original manufactured or fabricated condition until ready for use.

PART 2 PRODUCTS

2.1 TREE WOUND PAINT

Submit samples in cans with manufacturer's label of bituminous based paint of standard manufacture specially formulated for tree wounds.

2.2 HERBICIDE

Comply with Federal Insecticide, Fungicide, and Rodenticide Act (Title 7 U.S.C. Section 136) for requirements on Contractor's licensing, certification and record keeping. Contact the command Pest Control Coordinator prior to starting work. Submit samples in cans with manufacturer's label.

PART 3 EXECUTION

3.1 PROTECTION

3.1.1 Roads and Walks

Keep roads and walks free of dirt and debris at all times.

3.1.2 Trees, Shrubs, and Existing Facilities

Protect trees and vegetation to be left standing from damage incident to clearing, grubbing, and construction operations by the erection of barriers or by such other means as the circumstances require.

3.1.3 Utility Lines

Protect existing utility lines that are indicated to remain from damage. Notify the Contracting Officer immediately of damage to or an encounter with an unknown existing utility line. The Contractor is responsible for the repairs of damage to existing utility lines that are indicated or made known to the Contractor prior to start of clearing and grubbing operations. When utility lines which are to be removed are encountered within the area of operations, notify the Contracting Officer in ample time to minimize interruption of the service. Refer to Section 01 30 00, ADMINISTRATIVE REQUIREMENTS and Section 01 57 19.00 20, TEMPORARY ENVIRONMENTAL CONTROLS for additional utility protection.

3.2 CLEARING

Clearing shall consist of the felling, trimming, and cutting of trees into sections and the satisfactory disposal of the trees and other vegetation designated for removal, including downed timber, snags, brush, and rubbish occurring within the areas to be cleared. Clearing shall also include the removal and disposal of structures that obstruct, encroach upon, or otherwise obstruct the work. Trees, stumps, roots, brush, and other vegetation in areas to be cleared shall be cut off flush with or below the original ground surface, except such trees and vegetation as may be indicated or directed to be left standing. Trees designated to be left standing within the cleared areas shall be trimmed of dead branches 1-1/2 inches or more in diameter and shall be trimmed of all branches the heights indicated or directed. Limbs and branches to be trimmed shall be neatly cut close to the bole of the tree or main branches. Cuts more than 1-1/2 inches in diameter shall be painted with an approved tree-wound paint. Apply herbicide in accordance with the manufacturer's label to the top surface of stumps designated not to be removed.

3.3 TREE REMOVAL

Where indicated or directed, trees and stumps that are designated as trees shall be removed from areas outside those areas designated for clearing and grubbing. This work shall include the felling of such trees and the removal of their stumps and roots as specified in paragraph GRUBBING. Trees shall be disposed of as specified in paragraph DISPOSAL OF MATERIALS.

3.4 PRUNING

Prune trees designated to be left standing within the cleared areas of dead branches 1-1/2 inches or more in diameter; and trim branches to heights and in a manner as indicated. Neatly cut limbs and branches to be trimmed close to the bole of the tree or main branches. Paint cuts more than 1-1/4 inches in diameter with an approved tree wound paint.

3.5 GRUBBING

Grubbing consists of the removal and disposal of stumps, roots larger than 3 inches in diameter, and matted roots from the designated grubbing areas. Remove material to be grubbed, together with logs and other organic or metallic debris not suitable for foundation purposes, to a depth of not less than 18 inches below the original surface level of the ground in areas indicated to be grubbed and in areas indicated as construction areas under this contract, such as areas for buildings, and areas to be paved. Fill depressions made by grubbing with suitable material and compact to make the

surface conform with the original adjacent surface of the ground.

3.6 DISPOSAL OF MATERIALS

3.6.1 Saleable Timber

1. All timber on the project site noted for clearing and grubbing shall become the property of the Contractor, and shall be removed from the project site and disposed of off stations.

3.6.2 Nonsaleable Materials

Written permission to dispose of such products on private property shall be filed with the Contracting Officer. Logs, stumps, roots, brush, rotten wood, and other refuse from the clearing and grubbing operations, except for salable timber, shall be disposed of outside the limits of Government-controlled land at the Contractor's responsibility, except when otherwise directed in writing. Such directive will state the conditions covering the disposal of such products and will also state the areas in which they may be placed.

-- End of Section --

SECTION 31 23 00.00 20

EXCAVATION AND FILL

02/11

PART 1 GENERAL

1.1 REFERENCES

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

AMERICAN WATER WORKS ASSOCIATION (AWWA)

AWWA C600 (2010) Installation of Ductile-Iron Water Mains and Their Appurtenances

ASTM INTERNATIONAL (ASTM)

ASTM C136 (2006) Standard Test Method for Sieve Analysis of Fine and Coarse Aggregates

ASTM C33/C33M (2013) Standard Specification for Concrete Aggregates

ASTM D1140 (2000; R 2006) Amount of Material in Soils Finer than the No. 200 (75-micrometer) Sieve

ASTM D1556 (2007) Density and Unit Weight of Soil in Place by the Sand-Cone Method

ASTM D1557 (2012) Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Modified Effort (56,000 ft-lbf/ft³) (2700 kN-m/m³)

ASTM D2321 (2014; E 2014) Standard Practice for Underground Installation of Thermoplastic Pipe for Sewers and Other Gravity-Flow Applications

ASTM D2434 (1968; R 2006) Permeability of Granular Soils (Constant Head)

ASTM D2487 (2011) Soils for Engineering Purposes (Unified Soil Classification System)

ASTM D3786/D3786M (2013) Hydraulic Bursting Strength of Textile Fabrics-Diaphragm Bursting Strength Tester Method

ASTM D4318 (2010; E 2014) Liquid Limit, Plastic Limit, and Plasticity Index of Soils

ASTM D4355/D4355M (2014) Deterioration of Geotextiles from Exposure to Light, Moisture and Heat in a

Xenon-Arc Type Apparatus

ASTM D4491	(1999a; R 2014; E 2014) Water Permeability of Geotextiles by Permittivity
ASTM D4533	(2011) Trapezoid Tearing Strength of Geotextiles
ASTM D4632/D4632M	(2008; R 2013; E 2013; E 2014) Grab Breaking Load and Elongation of Geotextiles
ASTM D4751	(2012) Determining Apparent Opening Size of a Geotextile
ASTM D4759	(2011) Determining the Specification Conformance of Geosynthetics
ASTM D4833/D4833M	(2007; E 2013; R 2013) Index Puncture Resistance of Geotextiles, Geomembranes, and Related Products
ASTM D6938	(2010) Standard Test Method for In-Place Density and Water Content of Soil and Soil-Aggregate by Nuclear Methods (Shallow Depth)
ASTM D698	(2012; E 2014) Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400 ft-lbf/cu. ft. (600 kN-m/cu. m.))

U.S. ARMY CORPS OF ENGINEERS (USACE)

EM 385-1-1	(2008; Errata 2011) Safety and Health Requirements Manual
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U.S. ENVIRONMENTAL PROTECTION AGENCY (EPA)

EPA SW-846.3-3	(1999, Third Edition, Update III-A) Test Methods for Evaluating Solid Waste: Physical/Chemical Methods
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1.2 DEFINITIONS

1.2.1 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.

1.2.2 Degree of Compaction

Degree of compaction is expressed as a percentage of the maximum density obtained by the test procedure presented in ASTM D698 or ASTM D1557, for general soil types, abbreviated as percent laboratory maximum density.

1.2.3 Hard Materials

Weathered rock, dense consolidated deposits, or conglomerate materials which are not included in the definition of "rock" but which usually require the use of heavy excavation equipment, ripper teeth, or jack hammers for removal.

1.2.4 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.

1.2.5 Pile Supported Structure

As used herein, a structure where both the foundation and floor slab are pile supported.

1.3 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are for Contractor Quality Control approval. Submit the following in accordance with Section 01 33 00 SUBMITTAL PROCEDURES:

Submit 15 days prior to starting work.

SD-06 Test Reports

Borrow Site Testing; G

Fill and backfill test

Select material test

Density tests

Copies of all laboratory and field test reports within 24 hours of the completion of the test.

1.4 DELIVERY, STORAGE, AND HANDLING

Perform in a manner to prevent contamination or segregation of materials.

1.5 REQUIREMENTS FOR OFF SITE SOIL

Soils brought in from off site needs to come from a clean commercial source or it needs to be tested for suspected contaminants and meet State of

Hawaii Environmental Action Levels for unrestricted use and proximity less than 500 ft. from surface water. Backfill shall be tested for petroleum hydrocarbons, BTEX, PCBs and HW characteristics (including toxicity, ignitability, corrosivity, and reactivity). Backfill shall not contain concentrations of these analytes above the appropriate State and/or EPA criteria, and shall pass the tests for HW characteristics. Determine petroleum hydrocarbon concentrations by using appropriate State protocols. Determine BTEX concentrations by using EPA SW-846.3-3 Method 5035/8260B. Perform complete TCLP in accordance with EPA SW-846.3-3 Method 1311. Perform HW characteristic tests for ignitability, corrosivity, and reactivity in accordance with accepted standard methods. Perform PCB testing in accordance with accepted standard methods for sampling and analysis of bulk solid samples. Provide borrow site testing for petroleum hydrocarbons and BTEX from a grab sample of material from the area most likely to be contaminated at the borrow site (as indicated by visual or olfactory evidence), with at least one test from each borrow site. For each borrow site, provide borrow site testing for HW characteristics from a composite sample of material, collected in accordance with standard soil sampling techniques. Do not bring material onsite until tests results have been received and approved by the Contracting Officer.

1.6 QUALITY ASSURANCE

1.6.1 1.6.2 Utilities

Movement of construction machinery and equipment over pipes and utilities during construction shall be at the Contractor's risk. Perform work adjacent to non-Government utilities as indicated in accordance with procedures outlined by utility company. Excavation made with power-driven equipment is not permitted within two feet of known Government-owned utility or subsurface construction. For work immediately adjacent to or for excavations exposing a utility or other buried obstruction, excavate by hand. Start hand excavation on each side of the indicated obstruction and continue until the obstruction is uncovered or until clearance for the new grade is assured. Support uncovered lines or other existing work affected by the contract excavation until approval for backfill is granted by the Contracting Officer. Report damage to utility lines or subsurface construction immediately to the Contracting Officer.

PART 2 PRODUCTS

2.1 SOIL MATERIALS

2.1.1 Satisfactory Materials

Any materials classified by ASTM D2487 as GW, GP, GM, GP-GM, GW-GM, GC, GP-GC, GM-GC, SW, SP, free of debris, roots, wood, scrap material, vegetation, refuse, soft unsound particles, and deleterious, or objectionable materials. Unless specified otherwise, the maximum particle diameter shall be one-half the lift thickness at the intended location.

2.1.2 Unsatisfactory Materials

Materials which do not comply with the requirements for satisfactory materials. Unsatisfactory materials also include man-made fills, trash, refuse, or backfills from previous construction. Unsatisfactory material also includes material classified as satisfactory which contains root and other organic matter, frozen material, and stones larger than 3 inches. The Contracting Officer shall be notified of any contaminated materials.

2.1.3 Cohesionless and Cohesive Materials

Cohesionless materials include materials classified in ASTM D2487 as GW, GP, SW, and SP. Cohesive materials include materials classified as GC, SC, ML, CL, MH, and CH. Materials classified as GM, GP-GM, GW-GM, SW-SM, SP-SM, and SM shall be identified as cohesionless only when the fines are nonplastic (plasticity index equals zero). Materials classified as GM and SM will be identified as cohesive only when the fines have a plasticity index greater than zero.

2.1.4 Common Fill

Approved, unclassified soil material with the characteristics required to compact to the soil density specified for the intended location.

2.1.5 Backfill and Fill Material

ASTM D2487, classification GW, GP, GM, SW, SP, SM, with a maximum ASTM D4318 liquid limit of 35 , maximum ASTM D4318 plasticity index of 12 , and a maximum of 25 percent by weight passing ASTM D1140, No. 200 sieve.

2.1.6 Select Material

Provide materials classified as GW, GP, SW, SP, or SM by ASTM D2487 where indicated. The liquid limit of such material shall not exceed 35 percent when tested in accordance with ASTM D4318. The plasticity index shall not be greater than 12 percent when tested in accordance with ASTM D4318, and not more than 35 percent by weight shall be finer than No. 200 sieve when tested in accordance with ASTM D1140. Coefficient of permeability shall be a minimum of 0.002 feet per minute when tested in accordance with ASTM D2434.

2.1.7 Topsoil

Natural, friable soil representative of productive, well-drained soils in the area, free of subsoil, stumps, rocks larger than one inch diameter, brush, weeds, toxic substances, and other material detrimental to plant growth. Amend topsoil pH range to obtain a pH of 5.5 to 7.

2.2 POROUS FILL FOR CAPILLARY WATER BARRIER

ASTM C33/C33M fine aggregate grading with a maximum of 3 percent by weight passing ASTM D1140, No. 200 sieve, or and conforming to the general soil material requirements specified in paragraph entitled "Satisfactory Materials."

2.3 UTILITY BEDDING MATERIAL

Except as specified otherwise in the individual piping section, provide bedding for buried piping in accordance with AWWA C600, Type 4, except as specified herein. Backfill to top of pipe shall be compacted to 95 percent of ASTM D698 maximum density. Plastic piping shall have bedding to spring line of pipe. Provide ASTM D2321 materials as follows:

- a. Class I: Angular, 0.25 to 1.5 inches, graded stone, including a number of fill materials that have regional significance such as coral, slag, cinders, crushed stone, and crushed shells.

- b. Class II: Coarse sands and gravels with maximum particle size of 1.5 inches, 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.

2.4 BORROW

Obtain borrow materials required in excess of those furnished from excavations from sources outside of Government property.

2.5 FILTER FABRIC

Provide a pervious sheet of polyester, nylon, glass or polypropylene , ultraviolet resistant filaments woven, spun bonded, fused, or otherwise manufactured into a nonraveling fabric with uniform thickness and strength. Fabric shall have the following manufacturer certified minimum average roll properties as determined by ASTM D4759:

	<u>Class A</u>	<u>Class B</u>
a. Grab tensile strength (ASTM D4632/D4632M) machine and transversed direction	min. 180	80 lbs.
b. Grab elongation (ASTM D4632/D4632M) machine and transverse direction	min. 15	15 percent
c. Puncture resistance (ASTM D4833/D4833M)	min. 80	25 lbs.
d. Mullen burst strength (ASTM D3786/D3786M)	min. 290	130 psi
e. Trapezoidal Tear (ASTM D4533)	min. 50	25 lbs.
f. Apparent Opening Size (ASTM D4751)	See Criteria Below	
(1) Soil with 50 percent or less particles by weight passing US No. 200 Sieve, AOS less than 0.6 mm (greater than #30 US Std. Sieve)		
(2) Soil with more than 50 percent particles by weight passing US No. 200 Sieve, AOS less than 0.297 mm (greater than #50 US Std. Sieve)		
g. Permeability (ASTM D4491)	k fabric greater than k Soil	

	<u>Class A</u>	<u>Class B</u>
h. Ultraviolet Degradation (ASTM D4355/D4355M)	70 percent Strength retained at 150 hours	

2.6 MATERIAL FOR RIP-RAP

for construction indicated.

2.7 BURIED WARNING AND IDENTIFICATION TAPE

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 inch minimum width, color coded as specified below for the intended utility with warning and identification imprinted in bold black letters continuously over the entire tape length. Warning and identification to read, "CAUTION, BURIED (intended service) LINE BELOW" or similar wording. Color and printing shall be permanent, unaffected by moisture or soil.

Warning Tape Color Codes	
Red:	Electric
Yellow:	Gas, Oil; Dangerous Materials
Orange:	Telephone and Other Communications
Blue:	Potable Water Systems
Green:	Sewer Systems

2.7.1 Warning Tape for Metallic Piping

Acid and alkali-resistant polyethylene plastic tape conforming to the width, color, and printing requirements specified above. Minimum thickness of tape shall be 0.003 inch. Tape shall have a minimum strength of 1500 psi lengthwise, and 1250 psi crosswise, with a maximum 350 percent elongation.

2.7.2 Detectable Warning Tape for Non-Metallic Piping

Polyethylene plastic tape conforming to the width, color, and printing requirements specified above. Minimum thickness of the tape shall be 0.004 inch. Tape shall have a minimum strength of 1500 psi lengthwise and 1250 psi crosswise. Tape shall be manufactured with integral wires, foil backing, or other means of enabling detection by a metal detector when tape

is buried up to 3 feet deep. Encase metallic element of the tape in a protective jacket or provide with other means of corrosion protection.

2.8 DETECTION WIRE FOR NON-METALLIC PIPING

Detection wire shall be insulated single strand, solid copper with a minimum of 12 AWG.

PART 3 EXECUTION

3.1 PROTECTION

3.1.1 Shoring and Sheeting

Provide shoring where indicated. In addition to Section 25 A and B of EM 385-1-1, include provisions in the shoring and sheeting plan that will accomplish the following:

- a. Prevent undermining of pavements, foundations and slabs.
- b. Prevent slippage or movement in banks or slopes adjacent to the excavation.

3.1.2 Drainage and Dewatering

Provide for the collection and disposal of surface and subsurface water encountered during construction.

3.1.2.1 Drainage

So that construction operations progress successfully, completely drain construction site during periods of construction to keep soil materials sufficiently dry. The Contractor shall establish/construct storm drainage features (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/or provide temporary ditches, swales, and other drainage features and equipment as required to maintain dry soils, prevent erosion and undermining of foundations. When unsuitable working platforms for equipment operation and unsuitable soil support for subsequent construction features develop, remove unsuitable material and provide new soil material as specified herein. It is the responsibility of the Contractor to assess the soil and ground water conditions presented by the plans and specifications and to employ necessary measures to permit construction to proceed. Excavated slopes and backfill surfaces shall be protected to prevent erosion and sloughing. Excavation shall be performed so that the site, the area immediately surrounding the site, and the area affecting operations at the site shall be continually and effectively drained.

3.1.2.2 Dewatering

Groundwater flowing toward or into excavations shall be controlled to prevent sloughing of excavation slopes and walls, boils, uplift and heave in the excavation and to eliminate interference with orderly progress of construction. French drains, sumps, ditches or trenches will not be permitted within 3 feet of the foundation of any structure, except with specific written approval, and after specific contractual provisions for restoration of the foundation area have been made. Control measures shall be taken by the time the excavation reaches the water level in order to

maintain the integrity of the in situ material. While the excavation is open, the water level shall be maintained continuously, at least 2 feet below the working level.

3.1.3 Underground Utilities

Location of the existing utilities indicated is approximate. The Contractor shall physically verify the location and elevation of the existing utilities indicated prior to starting construction. The Contractor shall contact the Public Works Department for assistance in locating existing utilities. The Contractor shall scan the construction site with electromagnetic and sonic equipment and mark the surface of the ground where existing underground utilities are discovered.

3.1.4 Machinery and Equipment

Movement of construction machinery and equipment over pipes during construction shall be at the Contractor's risk. Repair, or remove and provide new pipe for existing or newly installed pipe that has been displaced or damaged.

3.2 SURFACE PREPARATION

3.2.1 Clearing and Grubbing

Unless indicated otherwise, remove trees, stumps, logs, shrubs, brush and vegetation and other items that would interfere with construction operations within the clearing limits. Remove stumps entirely. Grub out matted roots and roots over 2 inches in diameter to at least 18 inches below existing surface.

3.2.2 Stripping

Strip suitable soil from the site where excavation or grading is indicated and stockpile separately from other excavated material. Material unsuitable for use as topsoil shall be stockpiled and used for backfilling. Locate topsoil so that the material can be used readily for the finished grading. Where sufficient existing topsoil conforming to the material requirements is not available on site, provide borrow materials suitable for use as topsoil. Protect topsoil and keep in segregated piles until needed.

3.2.3 Unsuitable Material

Remove vegetation, debris, decayed vegetable matter, sod, mulch, and rubbish underneath paved areas or concrete slabs.

3.3 EXCAVATION

Excavate to contours, elevation, and dimensions indicated. Reuse excavated materials that meet the specified requirements for the material type required at the intended location. Keep excavations free from water. Excavate soil disturbed or weakened by Contractor's operations, soils softened or made unsuitable for subsequent construction due to exposure to weather. Excavations below indicated depths will not be permitted except to remove unsatisfactory material. Unsatisfactory material encountered below the grades shown shall be removed as directed. Refill with

satisfactory material and compact to 95 percent of ASTM D698 or ASTM D1557 maximum density. Unless specified otherwise, refill excavations cut below indicated depth with satisfactory material and compact to 95 percent of ASTM D698 or ASTM D1557 maximum density. Satisfactory material removed below the depths indicated, without specific direction of the Contracting Officer, shall be replaced with satisfactory materials to the indicated excavation grade; except as specified for spread footings. Determination of elevations and measurements of approved overdepth excavation of unsatisfactory material below grades indicated shall be done under the direction of the Contracting Officer.

3.3.1 Structures With Spread Footings

Ensure that footing subgrades have been inspected and approved by the Contracting Officer prior to concrete placement. Fill over excavations with concrete during foundation placement.

3.3.2 Pile Cap Excavation and Backfilling

Excavate to bottom of pile cap prior to placing or driving piles, unless authorized otherwise by the Contracting Officer. Backfill and compact overexcavations and changes in grade due to pile driving operations to 95 percent of ASTM D698 maximum density.

3.3.3 Pipe Trenches

Excavate to the dimension indicated. Grade bottom of trenches to provide uniform support for each section of pipe after pipe bedding placement. Tamp if necessary to provide a firm pipe bed. Recesses shall be excavated to accommodate bells and joints so that pipe will be uniformly supported for the entire length. Rock, where encountered, shall be excavated to a depth of at least 6 inches below the bottom of the pipe.

3.3.4 Excavated Materials

Satisfactory excavated material required for fill or backfill shall be placed in the proper section of the permanent work required or shall be separately stockpiled if it cannot be readily placed. Satisfactory material in excess of that required for the permanent work and all unsatisfactory material shall be disposed of as specified in Paragraph "DISPOSITION OF SURPLUS MATERIAL."

3.3.5 Final Grade of Surfaces to Support Concrete

Excavation to final grade shall not be made until just before concrete is to be placed. Only excavation methods that will leave the foundation rock in a solid and unshattered condition shall be used. Approximately level surfaces shall be roughened, and sloped surfaces shall be cut as indicated into rough steps or benches to provide a satisfactory bond. Shales shall be protected from slaking and all surfaces shall be protected from erosion resulting from ponding or flow of water.

3.4 SUBGRADE PREPARATION

Unsatisfactory material in surfaces to receive fill or in excavated areas shall be removed and replaced with satisfactory materials as directed by the Contracting Officer. The surface shall be scarified to a depth of 6 inches before the fill is started. Sloped surfaces steeper than 1 vertical to 4 horizontal shall be plowed, stepped, benched, or broken up so that the

fill material will bond with the existing material. When subgrades are less than the specified density, the ground surface shall be broken up to a minimum depth of 6 inches, pulverized, and compacted to the specified density. When the subgrade is part fill and part excavation or natural ground, the excavated or natural ground portion shall be scarified to a depth of 12 inches and compacted as specified for the adjacent fill. Material shall not be placed on surfaces that are muddy, frozen, or contain frost. Compaction shall be accomplished by sheepsfoot rollers, pneumatic-tired rollers, steel-wheeled rollers, or other approved equipment well suited to the soil being compacted. Material shall be moistened or aerated as necessary to provide the moisture content that will readily facilitate obtaining the specified compaction with the equipment used. Minimum subgrade density shall be as specified herein.

3.4.1 Proof Rolling

Proof rolling shall be done on an exposed subgrade free of surface water (wet conditions resulting from rainfall) which would promote degradation of an otherwise acceptable subgrade. Proof roll the existing subgrade of the roadway with six passes of a 15 ton, pneumatic-tired roller. Operate the roller in a systematic manner to ensure the number of passes over all areas, and at speeds between 2 1/2 to 3 1/2 miles per hour. Notify the Contracting Officer a minimum of 3 days prior to proof rolling. Proof rolling shall be performed in the presence of the Contracting Officer. Rutting or pumping of material shall be undercut as directed by the Contracting Officer and replaced with fill and backfill material.

3.5 SUBGRADE FILTER FABRIC

Place synthetic fiber filter fabric as indicated directly on prepared subgrade free of vegetation, stumps, rocks larger than 2 inches 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.

3.6 FILLING AND BACKFILLING

Fill and backfill to contours, elevations, and dimensions indicated. Compact each lift before placing overlaying lift.

3.6.1 Backfill and Fill Material Placement

Provide for paved areas and under concrete slabs, except where select material is provided. Place in 6 inch lifts. Do not place over wet or frozen areas. Place backfill material adjacent to structures as the structural elements are completed and accepted. Backfill against concrete only when approved. Place and compact material to avoid loading upon or against the structure.

3.6.2 Backfill and Fill Material Placement Over Pipes and at Walls

Backfilling shall not begin 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. Backfill shall be brought 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 1 foot above other utility lines shall be free from stones larger than 1 inch in any dimension. Heavy equipment for spreading and compacting backfill shall not be operated closer to foundation or retaining walls than a distance equal to the height of backfill above the top of footing; the area remaining shall be compacted in layers not more than 4 inches in compacted thickness with power-driven hand tampers suitable for the material being compacted. Backfill shall be placed carefully around pipes or tanks to avoid damage to coatings, wrappings, or tanks. Backfill shall not be placed against foundation walls prior to 7 days after completion of the walls. As far as practicable, backfill shall be brought up evenly on each side of the wall and sloped to drain away from the wall.

3.6.3 Porous Fill Placement

Provide under floor and area-way slabs on a compacted subgrade. Place in 4 inch lifts with a minimum of two passes of a hand-operated plate-type vibratory compactor.

3.6.4 Trench Backfilling

Backfill as rapidly as construction, testing, and acceptance of work permits. Place and compact backfill under structures and paved areas in 6 inch lifts to top of trench and in 6 inch lifts to one foot over pipe outside structures and paved areas.

3.7 BORROW

Where satisfactory materials are not available in sufficient quantity from required excavations, approved borrow materials shall be obtained as specified herein.

3.8 BURIED WARNING AND IDENTIFICATION TAPE

Provide buried utility lines with utility identification tape. Bury tape 12 inches below finished grade; under pavements and slabs, bury tape 6 inches below top of subgrade.

3.9 BURIED DETECTION WIRE

Bury detection wire directly above non-metallic piping at a distance not to exceed 12 inches above the top of pipe. The wire shall extend continuously and unbroken, from manhole to manhole. The ends of the wire shall terminate inside the manholes at each end of the pipe, with a minimum of 3 feet of wire, coiled, remaining accessible in each manhole. The wire shall remain insulated over its entire length. The wire shall enter manholes between the top of the corbel and the frame, and extend up through the chimney seal between the frame and the chimney seal. For force mains, the wire shall terminate in the valve pit at the pump station end of the pipe.

3.10 COMPACTION

Determine in-place density of existing subgrade; if required density exists, no compaction of existing subgrade will be required.

3.10.1 General Site

Compact underneath areas designated for vegetation and areas outside the 5

foot line of the paved area or structure to 85 percent of ASTM D698 or ASTM D1557.

3.10.2 Structures, Spread Footings, and Concrete Slabs

Compact top 12 inches of subgrades to 95 percent of ASTM D698 or ASTM D1557. Compact fill and backfill material to 95 percent of ASTM D698 or ASTM D1557.

3.10.3 Adjacent Area

Compact areas within 5 feet of structures to 90 percent of ASTM D698 or ASTM D1557.

3.10.4 Paved Areas

Compact top 12 inches of subgrades to 95 percent of ASTM D698 or ASTM D1557. Compact fill and backfill materials to 95 percent of ASTM D698 or ASTM D1557.

3.11 FINISH OPERATIONS

3.11.1 Grading

Finish grades as indicated within one-tenth of one foot. Grade areas to drain water away from structures. Maintain areas free of trash and debris. For existing grades that will remain but which were disturbed by Contractor's operations, grade as directed.

3.11.2 Topsoil and Seed

Scarify existing subgrade. Provide 4 inches of topsoil for newly graded finish earth surfaces and areas disturbed by the Contractor. Topsoil shall not be placed when the subgrade is frozen, excessively wet, extremely dry, or in a condition otherwise detrimental to seeding, planting, or proper grading. Seed shall match existing vegetation. Provide seed at 5 pounds per 1000 square feet. Provide granular controlled release fertilizer.

Provide mulch and water to establish an acceptable stand of grass.

3.11.3 Protection of Surfaces

Protect newly backfilled, graded, and topsoiled areas from traffic, erosion, and settlements that may occur. Repair or reestablish damaged grades, elevations, or slopes.

3.12 DISPOSITION OF SURPLUS MATERIAL

Remove from Government property surplus or other soil material not required or suitable for filling or backfilling, and brush, refuse, stumps, roots, and timber. Surplus soil shall be disposed of at an approved landfill. Contractor is not allowed to resell or take ownership of surplus soil materials.

3.13 FIELD QUALITY CONTROL

3.13.1 Sampling

Take the number and size of samples required to perform the following tests.

3.13.2 Testing

Perform one of each of the following tests for each material used. Provide additional tests for each source change.

3.13.2.1 Fill and Backfill Material Testing

Test fill and backfill material in accordance with ASTM C136 for conformance to ASTM D2487 gradation limits; ASTM D1140 for material finer than the No. 200 sieve; ASTM D4318 for liquid limit and for plastic limit; ASTM D698 or ASTM D1557 for moisture density relations, as applicable.

3.13.2.2 Select Material Testing

Test select material in accordance with ASTM C136 for conformance to ASTM D2487 gradation limits; ASTM D1140 for material finer than the No. 200 sieve; ASTM D698 or ASTM D1557 for moisture density relations, as applicable.

3.13.2.3 Porous Fill Testing

Test porous fill in accordance with ASTM C136 for conformance to gradation specified in ASTM C33/C33M.

3.13.2.4 Density Tests

Test density in accordance with ASTM D1556, or ASTM D6938. When ASTM D6938 density tests are used, verify density test results by performing an ASTM D1556 density test at a location already ASTM D6938 tested as specified herein. Perform an ASTM D1556 density test at the start of the job, and for every 10 ASTM D6938 density tests thereafter. Test each lift at randomly selected locations every 2000 square feet of existing grade in fills for structures and concrete slabs, and every 2500 square feet for other fill areas and every 2000 square feet of subgrade in cut. Include density test results in daily report.

-- End of Section --

SECTION 32 01 13

BITUMINOUS SEAL AND FOG COATS
08/08

PART 1 GENERAL

1.1 REFERENCES

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

AMERICAN ASSOCIATION OF STATE HIGHWAY AND TRANSPORTATION OFFICIALS
(AASHTO)

AASHTO T 40 (2002; R 2006) Sampling Bituminous Materials

ASTM INTERNATIONAL (ASTM)

ASTM C131/C131M (2014) Standard Test Method for Resistance to Degradation of Small-Size Coarse Aggregate by Abrasion and Impact in the Los Angeles Machine

ASTM C136 (2006) Standard Test Method for Sieve Analysis of Fine and Coarse Aggregates

ASTM C142/C142M (2010) Standard Test Method for Clay Lumps and Friable Particles in Aggregates

ASTM C29/C29M (2009) Standard Test Method for Bulk Density ("Unit Weight") and Voids in Aggregate

ASTM D140/D140M (2014) Standard Practice for Sampling Bituminous Materials

ASTM D2397/D2397M (2013) Standard Specification for Cationic Emulsified Asphalt

ASTM D2995 (1999; R 2009) Determining Application Rate of Bituminous Distributors

ASTM D3625/D3625M (2012) Standard Practice for Effect of Water on Bituminous-Coated Aggregate Using Boiling Water

ASTM D4791 (2010) Flat Particles, Elongated Particles, or Flat and Elongated Particles in Coarse Aggregate

ASTM D75/D75M (2014) Standard Practice for Sampling Aggregates

ASTM D977 (2013; E 2014) Emulsified Asphalt

U.S. FEDERAL HIGHWAY ADMINISTRATION (FHWA)

MUTCD

(2009) Manual on Uniform Traffic Control
Devices

1.2 SYSTEM DESCRIPTION

1.2.1 Equipment, Plant and Tools

Equipment, plant and tools used in the work are subject to approval and shall be maintained in a satisfactory working condition at all times. Provide equipment which is adequate and has the capability of producing the results specified. Provide calibrated equipment, such as asphalt distributors, scales, batching equipment, spreaders and similar equipment, that has been recalibrated by an approved calibration laboratory within 12 months prior to commencing work. Submit an equipment list with calibration reports.

1.2.2 Bituminous Distributors

Provide distributors that have pneumatic tires of sufficient size and number to prevent rutting, shoving, or otherwise damaging any part of the pavement structure. Design and equip the distributor to distribute the bituminous material in a uniform double or triple lap at the specified temperature, at readily determined and controlled rates from 0.05 to 2.0 gallons/square yard, with a pressure range of 25 to 75 psi with an allowable variation from the specified rate of not more than plus or minus 5 percent, and at variable widths. Include in the distributor equipment a separate power unit for the bitumen pump, full-circulation spray bars, 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-held hose attachment suitable for applying bituminous material manually to areas inaccessible to the distributor. Equip the distributor to circulate and agitate the bituminous material during the heating process. Provide distributor with an adjustable, both horizontally and vertically, spray nozzle bar. Make normal width of bar application at least 12 feet, with provisions for lesser or larger width when necessary. Equip distributor with a meter having a dial registering feet of travel/min. Make both dials visible to the distributor driver. Provide a thermometer and well, not in contact with any heating tubes, for accurately indicating temperature of asphalt emulsion.

1.2.3 Aggregate Spreader

The aggregate-spreading equipment shall be adjustable and capable of uniformly spreading aggregate at the specified rate in a single-pass operation over the surface to be sealed.

1.2.4 Pneumatic-Tired Roller

Provide a pneumatic-tired roller of sufficient size to seat the cover aggregate into the bituminous material without fracturing the aggregate particles. The rollers shall have a total compacting width of not less than 5 feet. The gross weight shall be adjustable within 200 to 350 psi of compacting width.

1.2.5 Power Brooms and Power Blowers

Provide power brooms and power blowers suitable for cleaning surfaces to be treated .

1.2.6 Storage Tanks

Provide tanks capable of heating the bituminous material, under effective and positive control at all times, to the required temperature. Accomplish heating by steam coils, hot oil, or electricity. Affix to the tank an armored thermometer with a range from 100 to 300 degrees F so that the temperature of the bituminous material may be read at all times.

1.2.7 Power Rollers

Provide self-propelled tandem and three-wheel type rollers, weighing not less than 5 tons and suitable for rolling bituminous pavements. The wheels of the rollers shall be equipped with adjustable scrapers. Equip the rollers with water tanks and sprinkling apparatus for keeping the wheels wet in order to prevent adherence of the bituminous material to the wheels.

1.2.8 Single-Pass, Surface-Treatment Machines

Provide machines capable of spraying bituminous material and spreading aggregate in one pass; of distributing the bituminous material uniformly, at even heat, and in controlled amounts; and immediately spreading aggregates uniformly, in controlled amounts, over the surface to be sealed.

1.2.9 Vacuum Sweepers for Fog Seal

Provide self-propelled, vacuum pickup sweeper capable of removing loose sand, water, and debris from pavement surface.

1.3 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are for Contractor Quality Control approval. Submit the following in accordance with Section 01 33 00 SUBMITTAL PROCEDURES:

SD-03 Product Data

Equipment List
Inspection Reports

SD-04 Samples

Bituminous Materials
Aggregates
Fog Seal; G

SD-06 Test Reports

Tests

1.4 QUALITY ASSURANCE

Perform sampling and testing using an approved commercial testing

laboratory or facilities furnished by the Contractor. No work requiring testing will be permitted until the facilities have been inspected and approved. The first inspection will be at the expense of the Government. Costs incurred for any subsequent inspection will be charged to the Contractor. Perform tests in sufficient numbers, and at the location and times directed, to ensure that the materials meet specified requirements.

1.4.1 Samples

Take aggregate samples for laboratory tests in accordance with ASTM D75/D75M. Take samples of bituminous material in accordance with AASHTO T 40 or ASTM D140/D140M.

1.4.2 Aggregates Source

Select sources from which aggregates are to be obtained and notify the Contracting Officer within 15 days after the award of the Contract. Submit a 50 pound sample of aggregate for each aggregate size. Perform tests for the evaluation of aggregates by using an approved commercial laboratory at no expense to the Government. Tests for determining the suitability of aggregate shall include, but not limited to: gradation in accordance with ASTM C136, abrasion resistance in accordance with ASTM C131/C131M, clay lumps and friable particles in accordance with ASTM C142/C142M, unit weight and voids in accordance with ASTM C29/C29M, and flat and elongated particles in accordance with ASTM D4791. The use of an antistripping agent is subject to approval by the Contracting Officer.

1.4.3 Bituminous Material Source

Select sources from which bituminous materials are to be obtained and notify the Contracting Officer within 15 days after the award of the contract. From each source of supply, submit a one gallon sample of bituminous material.

1.4.4 Equipment Calibration

Furnish all equipment, materials and labor necessary to calibrate the bituminous distributor and the aggregate spreader. Perform all calibrations with the approved job materials and prior to applying the specified coatings to the prepared surface. Perform calibration of the bituminous distributor in accordance with ASTM D2995. Inspect all equipment prior to application of fog seal. Perform work to calibrate tank and measuring devices of the distributor. Perform inspection and calibration at the beginning of the work and at least once a day during construction.

1.5 DELIVERY, STORAGE, AND HANDLING

Deliver emulsified asphalt (fog seal) to the site in a homogenous and undamaged condition. Inspect the materials for contamination and damage. Unload and store the materials with a minimum of handling. Protect stored aggregate from contamination and segregation. Replace defective or damaged materials.

1.6 ENVIRONMENTAL REQUIREMENTS

Apply the coating when the existing surface is dry, and when the weather is not foggy, rainy, or when the wind velocity will prevent the uniform application of the bitumen .

PART 2 PRODUCTS

2.1 BITUMINOUS MATERIAL FOR SEAL COAT

Bituminous material shall conform to AASHTO M 81, AASHTO M 82 or ASTM D977 , .

2.2 AGGREGATE FOR SEAL COAT

Provide aggregate consisting of crushed stone, crushed gravel, crushed slag, sand and screenings. The moisture content of the aggregate shall be not greater than 1 percent such that the aggregate will readily bond with the bituminous material. Drying may be required, as directed. The aggregate shall conform to the gradation shown in TABLE I. The aggregate gradation shall be allowed the tolerances given in TABLE II.

TABLE I. AGGREGATE GRADATIONS (Percent by Weight Passing Square-Mesh Sieves)			
Sieve Size	Gradation No. 1	Gradation No. 2	Gradation No. 3
1/2 inch	100	---	---
3/8 in	85-100	100	---
No. 4	10-30	85-100	100
No. 8	0-10	10-40	10-40
No. 16	0-5	0-10	0-10
No. 50	---	0-5	0-5

TABLE II. AGGREGATE GRADATION TOLERANCES	
Material	Tolerances
Aggregate passing the 3/8 inch sieve and larger sieves	Plus or minus 5 percent
Aggregate passing the No. 4 and smaller sieves	Plus or minus 3 percent

2.2.1 Coarse Aggregate

Coarse aggregate shall consist of clean, sound, durable particles meeting the following requirements.

2.2.1.1 Film Retention

The aggregate shall exhibit not less than 95 percent retention of bituminous film.

2.2.1.2 Particle Shapes

The quantity of flat and elongated particles on any sieve shall not exceed 20 percent by weight when determined in accordance with ASTM D4791. 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.

2.2.1.3 Weight Loss

The percent weight loss shall not exceed 40 after 500 revolutions, as determined in accordance with ASTM C131/C131M.

2.2.1.4 Friable Particles

The amount of friable particles shall not exceed 0.1 percent of the total weight of aggregate sample when tested in accordance with ASTM C142/C142M.

2.2.1.5 Crushed Slag

The dry weight of crushed slag shall not be less than 75 pcf, as determined in accordance with ASTM C29/C29M.

2.2.1.6 Crushed Aggregate

Crushed aggregate retained on the No. 4 sieve and each coarser sieve shall contain at least 75 percent by weight of crushed pieces having one or more fractured faces with the area of each face equal to at least 75 percent of the smaller midsectional area of the aggregate particle. When two fractures are contiguous, the angle between the planes of fractures shall be at least 30 degrees to count as two fractured faces.

2.2.2 Fine Aggregate

Fine aggregate shall consist of clean, sound, durable particles of crushed stone, durable particles of crushed stone, slag, or gravel. The aggregate shall meet its requirements for stripping, abrasion resistance and percent friable particles as specified for coarse aggregate.

2.3 ANTISTRIPPING AGENT

The use of antistripping agent is subject to prior approval by the Contracting Officer.

2.4 EMULSIFIED ASPHALT FOR FOG SEAL

Emulsified asphalt for Fog Seal shall conform to ASTM D977, SS-1 or SS-1h for anionic and ASTM D2397/D2397MCSS-1 or CSS-1h for cationic materials. Submit in accordance with paragraph titled "Sample Application", for approval and selection of one of the trial application rates.

2.5 WATER

Provide fresh, clean, and potable water.

PART 3 EXECUTION

3.1 PREPARATION OF SURFACE

Repair damaged surface and fill cracks before starting work. Immediately before starting work, remove all loose material, dirt, clay, or other objectionable material from the surface to be treated with power brooms or power blowers, if needed. Paint firmly bonded to the surface that has the chalk removed may remain. Material removed from the surface shall not be mixed with the cover aggregate.

3.2 SEAL COAT APPLICATION

3.2.1 Rate

Spread the bituminous material in the quantities shown in TABLE III. The exact quantities within the range specified, which may be varied to suit field conditions, will be determined by the Contractor and approved by the Contracting Officer prior to use.

Gradation No.	Bitumen, gallons	Aggregate, pounds
1	0.15-0.20	15-20
2	0.10-0.15	10-15
3	0.10-0.15	10-15

3.2.2 Application of Bituminous Material

Following the preparation and inspection of the pavement surface, apply the seal coat material at the specified rates. Uniformly apply the bituminous material in a single pass of the distributor and with either a double or triple lap spray over the surface to be sealed. Spread building paper on the surface for a sufficient distance back from the ends of each application so that flow through the spray bar may be started and stopped on the paper and so that all sprays will be operating at the proper pressure on the surface to be sealed. Immediately after the application, remove the building paper. Properly treat with bituminous material spots missed by the distributor. No smoking, fires, or flames, other than the heaters that are a part of the equipment, will be permitted within 25 feet of heating, distributing, and transferring operations of bituminous material other than bituminous emulsions.

3.2.3 Aggregate Application Rate

Spread the aggregate in the quantities shown in TABLE III. The exact quantities within the range specified, which may be varied to suit field conditions, will be determined by the Contractor, and approved by the Contracting Officer prior to use. The aggregate weights shown in this table are those of aggregate having a specific gravity of 2.65. If the specific gravity of the aggregate to be used is less than 2.55 or greater than 2.75, make adjustments in the number of pounds of aggregate required per square yard to insure a constant volume of aggregate per square yard of treatment.

3.2.4 Application of Aggregate

Spread the specified quantity of cover aggregate uniformly over the bituminous material. Before the bituminous material is applied, sufficient aggregate to cover the distributor load of bituminous material shall be on trucks at the site of the work. No bituminous material shall be down more than 3 minutes before it is covered with aggregate. Spreading shall be done uniformly with aggregate-spreading equipment. Trucks spreading aggregate shall be operated backwards, covering the bituminous material

ahead of the truck wheels. Areas having insufficient cover shall be lightly recovered with additional aggregate by hand during the operations whenever necessary.

3.2.5 Rolling and Brooming

Begin rolling operations immediately following the application of cover aggregate. Perform rolling using pneumatic-tired rollers. Operate the rollers at a speed that will not displace the aggregate. Continue rolling until the aggregate is uniformly distributed and keyed into the bituminous material. All surplus aggregate shall be swept off the surface and removed not less than 24 hours nor more than 4 days after rolling is completed.

3.3 FIELD QUALITY CONTROL - SEAL COAT

3.3.1 Tests

Perform field tests in sufficient numbers to assure that the specifications are being met. Submit copies of the test results, within 24 hours of the completion of the test. Submit certified copies of the aggregate test results, not less than 30 days before the material is required in the work and certified copies of the bituminous materials test reports indicating compliance with applicable specified requirements, not less than 30 days before the material is required in the work. A copy of the calibration test results, before the bituminous distributor and aggregate spreader are used on the job. Testing is the responsibility of the Contractor and shall be performed by an approved commercial laboratory. The following number of tests, if performed at the appropriate time, will be the minimum acceptable for each type of operation.

3.3.1.1 Gradation

Perform gradation tests in accordance with ASTM C136. Perform a minimum of one gradation for every day of aggregate to be placed, with a minimum of three gradations for each day's run. When the source of materials is changed or deficiencies are found, the gradation shall be repeated and the material already placed shall be retested to determine the extent of the unacceptable material. Replace all in-place unacceptable material at no additional expense to the Government.

3.3.1.2 Abrasion Resistance

Perform abrasion resistance tests in accordance with ASTM C131/C131M. Perform one test for every day of aggregate placed.

3.3.1.3 Stripping

Perform stripping test on aggregate from each source, in accordance with ASTM D3625/D3625M, prior to incorporation into the work and when the source is changed.

3.3.2 Bituminous Material Sample

Obtain a sample of the bituminous material used under the supervision of the Contracting Officer. The sample will be retained by the Government.

3.4 TRIAL APPLICATION - SEAL COAT

Prior to applying the seal coat, place a test section at least 100 feet

long by 20 feet wide using the approved job materials and roll them in accordance with the specified requirements. Perform tests to determine the application rates of the bitumen and aggregate. If the tests indicate that the seal coat test section does not conform to the specification requirements, make necessary adjustments to the application equipment and to the spreading and rolling procedures, and construct additional test sections for conformance to the specifications. Where test sections do not conform to specification requirements, remove seal coat at no expense to the Government; no separate payment will be made for seal coat materials and labor, either in placement or removal of any test section. Perform quality control sampling and testing during construction as required in paragraph FIELD QUALITY CONTROL above.

3.5 FOG SEAL APPLICATION

3.5.1 Sample Application

Determine the required application rate from a sample installation. Select an area of the prepared pavement at least 300 feet long and as wide as the distributor spray bar. Dilute emulsified asphalt with an equal part of water or as recommended by the manufacturer. Apply the water diluted asphalt emulsion in at least three test sections; each a minimum of 100 feet long. The trial applications shall be made at the rates of 0.08 , 0.14 , and 0.20 gallons/square yard. The trial application rates may be modified if approved by the Contracting Officer. Additional trial applications may be made if warranted by pavement surface conditions. Use the rate which has been satisfactorily applied without leaving an excess of asphalt residue on the surface and has been approved, for the fog seal.

3.5.2 Application Inspection

Inspect application of fog seal for uniformity.

3.5.3 Inspection Reports

Furnish a written report citing climatic temperature during application of fog seal, emulsion temperature during application, and rate of emulsion application.

3.5.4 Application

Following preparation of the surface, apply the water diluted asphalt emulsion at the rate determined from the trial application. Maintain application temperature of emulsified asphalt between 75 and 160 degrees F. To obtain uniform application of the fog seal at the junction of previous and subsequent applications, spread building paper on the surface of the applied material for a sufficient distance back from the ends of each application so that flow from the spray bar may be started and stopped on the paper, and so that all sprayers will operate at full force. Immediately after application, remove and properly dispose of the building paper. Treat spots unavoidably missed with the hand spray equipment. Base bids on application of diluted emulsion at 0.14 gsy. If the actual amount required is more or less than 0.14 gsy, an adjustment in the contract price will be made as provided by the contract.

3.6 SITE PROTECTION

During applications, protect adjacent buildings, structures, vehicles, manhole covers, inlet grates, and trees to prevent being spattered or

marred.

3.7 TRAFFIC CONTROL

Protect freshly placed coatings from damage by traffic. Provide sufficient warning signs and barricades to prevent traffic over freshly treated surfaces. Protect treated areas from traffic for at least 2 hours after final application of coatings, or for such time as necessary to prevent picking up. Immediately prior to opening to traffic, roll the entire treated area with a self-propelled pneumatic-tired roller. Provide warning signs and barricades for proper traffic control, in accordance with MUTCD.

-- End of Section --

SECTION 32 01 13.00 20

EMULSIFIED ASPHALT SEAL COATS WITH AGGREGATE
02/12

PART 1 GENERAL

1.1 REFERENCES

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

ASTM INTERNATIONAL (ASTM)

ASTM C136	(2006) Standard Test Method for Sieve Analysis of Fine and Coarse Aggregates
ASTM C142/C142M	(2010) Standard Test Method for Clay Lumps and Friable Particles in Aggregates
ASTM C29/C29M	(2009) Standard Test Method for Bulk Density ("Unit Weight") and Voids in Aggregate
ASTM D140/D140M	(2014) Standard Practice for Sampling Bituminous Materials
ASTM D1474	(2008) Standard Test Method for Indentation Hardness of Organic Coatings
ASTM D2027/D2027M	(2013) Cutback Asphalt (Medium-Curing Type)
ASTM D2419	(2014) Sand Equivalent Value of Soils and Fine Aggregate
ASTM D2995	(1999; R 2009) Determining Application Rate of Bituminous Distributors
ASTM D3625/D3625M	(2012) Standard Practice for Effect of Water on Bituminous-Coated Aggregate Using Boiling Water
ASTM D4402/D4402M	(2013) Viscosity Determination of Asphalt at Elevated Temperatures Using a Rotational Viscometer
ASTM D5	(2006; E 2006) Penetration of Bituminous Materials
ASTM D75/D75M	(2014) Standard Practice for Sampling Aggregates
ASTM D977	(2013; E 2014) Emulsified Asphalt

U.S. FEDERAL AVIATION ADMINISTRATION (FAA)

FAA AC 150/5320-12

(1997, Rev C; Change 1-3, 5 and 6)
Measurement, Construction and Maintenance
of Skid-Resistant Airport Pavement Surfaces

U.S. FEDERAL HIGHWAY ADMINISTRATION (FHWA)

MUTCD

(2009) Manual on Uniform Traffic Control
Devices

1.2 SYSTEM DESCRIPTION

1.2.1 Equipment, Plant and Tools

Equipment, plant and tools used in the work are subject to Government approval and shall be maintained in a satisfactory working condition at all times. Provide equipment which is adequate and has the capability of producing the results specified. Provide calibrated equipment, such as asphalt distributors, scales, batching equipment, spreaders and similar equipment, that has been recalibrated by an approved calibration laboratory within 1 month prior to commencing work and every 6 months thereafter, by such laboratory from the date of recalibration, during the term of the contract. Submit an equipment list with calibration reports.

1.2.2 Asphalt Distributors

Provide distributors that have pneumatic tires of sufficient size and number to prevent rutting, shoving, or otherwise damaging any part of the pavement structure. Design and equip the distributor to distribute the bituminous material in a uniform double or triple lap at the specified temperature, at readily determined and controlled rates from 0.05 to 0.2 gallons/square yard, with a pressure range of 25 to 75 psi with an allowable variation from the specified rate of not more than plus or minus 5 percent, and at variable widths. These rates shall be computer, rather than mechanical controlled. Include in the distributor equipment a separate power unit for the bitumen pump, full-circulation spray bars, 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-held hose attachment suitable for applying bituminous material manually to areas inaccessible to the distributor. Equip the distributor to circulate and agitate the bituminous material during the heating process. Provide distributor with an adjustable, both horizontally and vertically, spray nozzle bar. Make normal width of bar application at least 12 feet, with provisions for lesser or larger width when necessary. Equip distributor with a meter having a dial registering feet of travel/min. Make both dials visible to the distributor driver. Provide an easily accessible thermometer that constantly monitors the temperature of the seal coat.

1.2.3 Aggregate Spreader

The aggregate-spreading equipment shall be adjustable and capable of uniformly spreading aggregate at the specified rate in a single-pass operation of sealer and aggregate over the surface to be sealed. For high volume roads and pavements trafficked by aircraft, aggregate application shall be from a spreading device attached to the asphalt distributor.

1.2.4 Power Brooms and Power Blowers

Provide power brooms and power blowers suitable for cleaning surfaces to which the seal coat is to be applied.

1.2.5 Vacuum Sweepers

Provide self-propelled, vacuum pickup sweepers capable of removing loose sand, water, and debris from pavement surface.

1.3 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are for Contractor Quality Control approval. Submit the following in accordance with Section 01 33 00 SUBMITTAL PROCEDURES:

SD-03 Product Data

Contractor Qualifications; G

Provide copies of Qualifications.

Equipment List; G

List of equipment used in the project along with calibration reports.

Friction Test that includes date, time, weather, speed, wet or dry and operator name for each run of each test; G

Inspection Reports; G

Provide reports and all Quality Assurance records daily when application is made.

SD-04 Samples

Emulsified Asphalt
Aggregates

Provide in accordance with Field Quality Control.

SD-06 Test Reports

Tests; G

Recommendation by contractor/manufacture from results of test section application.

Provide to the Contracting Officer copies of the test results, within 24 hours of the completion of the test. Certified copies of the aggregate test results including gradation, film retention, friable particles, sand equivalent, specific gravity and mohs hardness, not less than 30 days before the material is required in the work.

Bituminous Materials; G

Certified copies of the bituminous materials test reports indicating compliance with specified requirements, not less than 30 days before the material is required in the work. A copy of the calibration test results, before the asphalt distributor and aggregate spreader are used on the job.

1.4 QUALITY ASSURANCE

Provide copies of Contractor Qualifications for applicators, personal and equipment, Certified by Manufacturer to apply product and to have made three (3) applications similar to this project in past two (2) years. Include letters from contracting authorities attesting to performance of work, schedule adherence, quality of workmanship, materials and name and work phone of points of contact.

Obtain samples at time of delivery to the field as necessary to satisfy the requirements herein. Perform sampling and testing using an approved commercial testing laboratory or facilities furnished by the Contractor. No work requiring testing will be permitted until the facilities have been approved. If deemed necessary by the Contracting Officer, laboratory inspection shall be accomplished at the contractor's expense by the Contracting Officer. Perform tests in sufficient numbers, and at the location and times directed, to ensure that the materials meet specified requirements.

1.4.1 Samples

Take aggregate samples for laboratory tests in accordance with ASTM D75/D75M. Take samples of emulsified asphalt in accordance with ASTM D140/D140M.

1.4.2 Aggregates Source

Select sources from which aggregates are to be obtained and notify the Contracting Officer within 15 days after the award of the Contract. Perform tests for the evaluation of aggregates by using an approved commercial laboratory at no expense to the Government. Tests for determining the suitability of aggregate shall include, but not limited to: gradation in accordance with ASTM C136, sand equivalent of 60 or less in accordance with ASTM D2419, clay lumps and friable particles in accordance with ASTM C142/C142M and unit weight and voids in accordance with ASTM C29/C29M. The proposed use of an antistripping agent is subject to approval by the Contracting Officer and determined by the contractor.

1.4.3 Emulsified Asphalt Source

Select sources from which bituminous materials are to be obtained and notify the Contracting Officer within 15 days after the award of the contract.

1.4.4 Equipment Calibration

Equipment calibration may be achieved by either one of the two following procedures:

- a. First Procedure: Contractor to furnish a State Calibration Certification for the emulsified asphalt distributor, from any state providing that service, or other acceptable agency certification at the approval of the Contracting Officer, and the calibration date shall have been within 6 months of the contract award, or up to 12 months if

supporting documents substantiate continuous work using the same distributor.

- b. Second Procedure: Furnish all equipment, materials and labor necessary to calibrate the emulsified asphalt distributor and the aggregate spreader. Perform all calibrations with the approved job materials and prior to applying the specified coatings to the prepared surface. Perform calibration of the emulsified asphalt distributor in accordance with ASTM D2995. Perform work to calibrate the tank and measuring devices of the distributor. Perform inspection and calibration at the beginning of the work and at least once a day during construction.

1.5 DELIVERY, STORAGE, AND HANDLING

Deliver emulsified asphalt to the site in a homogenous and undamaged condition. Inspect the materials for contamination and damage. Unload and store the materials with a minimum of handling. Protect stored aggregate from contamination and segregation. Replace defective or damaged materials.

1.6 ENVIRONMENTAL REQUIREMENTS

Apply the coating when the existing surface is dry, and when the weather is not foggy, rainy, or when the wind velocity will prevent the uniform application of the material. For emulsified asphalt seal coat with aggregate apply only when both the atmospheric temperature and the pavement surface temperature is above 60 degrees F, unless otherwise directed. For emulsified asphalt seal coat without aggregate, apply only when atmospheric temperature is above 50 degrees F and rising or when pavement temperature is above 60 degrees F, unless otherwise directed.

PART 2 PRODUCTS

2.1 EMULSIFIED ASPHALT FOR CONVENTIONAL SEAL COAT

Emulsified Asphalt shall conform to ASTM D977 Grade SS-1 or SS-1H .

2.2 (GSB-88) CATIONIC EMULSION OF GILSONITE ORE

The product shall be a chemically engineered asphalt pavement sealer of a cationic emulsion of Gilsonite ore similar to GSB-88 Emulsified Sealer Binder as manufactured by Asphalt Systems, Inc. Salt Lake City, Utah, www.asphalt systems.biz. Specific application specifications shall be as determined by the results of the test section by the manufacturer and approved by the Contracting Officer. Tests on Residue from Distillation, or Evaporation shall be performed at time of manufacturer to verify conformance to following properties:

Viscosity at 275 degrees F ASTM D4402/D4402M, 1750 cts maximum; Penetration ASTM D5, 50 dmm maximum; Asphaltenes ASTM D2027/D2027M, 15 percent minimum; Saturates ASTM D2027/D2027M, 15 percent maximum; Polar Compounds ASTM D2027/D2027M, 25 percent minimum; Aromatics ASTM D2027/D2027M, 15 percent minimum.

- a. pH may be used in lieu of the particle charge test which is sometimes inconclusive in slow setting bituminous emulsions.
- b. Pumping stability is tested by pumping 1 pint, of sealer material diluted 1 part concentrate to 1 part water, at 77 degrees F, through a 1/4-inch gear pump operating 1750 rpm for 10 minutes with no

significant separation or coagulation.

The Contractor shall submit to the Contracting Officer, manufacturer's certification to the above test results that the material is the type, grade, and quality specified for each load of bituminous material delivered. The certification shall show the shipment number, refinery, consignee, destination, contract number, and date of shipment.

2.3 AGGREGATE FOR SEAL COAT

Provide aggregate consisting of crushed stone, crushed gravel, sand, mineral filler or screenings. The moisture content of the aggregate shall be between 1% and 3%. The aggregate shall conform to the gradation shown in TABLE I.

TABLE I. AGGREGATE GRADATIONS		
(Percent by Weight Passing Square-Mesh Sieves)		
Sieve Size	Conventional Gradation	GSB-88 Gradation
No. 4	100	--
No. 8	10-40	--
No. 16	0-10	100
No. 30	--	40-75
No. 50	0-5	4-12
No. 100	0-1	0-5

2.3.1 Film Retention

The aggregate shall exhibit not less than 95 percent retention of bituminous film in accordance with ASTM D3625/D3625M.

2.3.2 Friable Particles

The amount of friable particles shall not exceed 0.1 percent of the total weight of aggregate sample when tested in accordance with ASTM C142/C142M.

2.3.3 MOHS Hardness

MOHS hardness shall be within 6-8 in accordance with ASTM D1474.

2.3.4 Sand Equivalent

Sand equivalent shall be equal to or greater than 60 in accordance with ASTM D2419.

2.4 ANTISTRIPPING AGENT

The use of antistripping agent is subject to prior approval by the Contracting Officer.

2.5 WATER

Provide fresh, clean, and potable water.

PART 3 EXECUTION

3.1 PREPARATION OF SURFACE

Provide Inspection Reports of; climatic temperature during application of seal coat, emulsion temperature and rate of application, adequacy of surface cleaning and preparation, protection of site facilities and aggregate rate of application as applicable, each day of application.

Treat cracks in the surface, not due to structural deficiencies, as outlined below: Cracks less than or equal to 1/4 inch but less than 3/4 inch width shall be cleaned with compressed air and filled with a crack sealer compatible with the seal coat material and recommended by the seal coat manufacturer. Cracks larger than 3/4 in wide shall be cleaned with compressed air and filled by squeegeeing in a mixture of aggregate and sealer. The final surface of the filled cracks shall be flush or up to 1/8 inch below the pavement surface. Remove any excess materials from the pavement surface.

3.1.1 Cleaning Operations

Provide a clean surface for the seal coat. Flushing with water will be permitted. Water will be made available for the contractor's use from a hydrant location within 2 mile(s) of the project site at prevailing Government rates. The contractor shall provide tools, hoses and hauling equipment for providing and dispensing of the water.

Immediately before applying the sealcoat, loose material, dirt, clay or other objectionable material shall be removed from the surface to be treated by power brooms and sweepers followed by vacuum sweepers. After the cleaning operation and prior to application of the sealcoat, the Contracting Officer will inspect the area to be treated to determine fitness of the area to receive the the sealcoat.

3.1.2 Protection of Site Facilities

During application, account for wind drift and provide measures to protect adjacent buildings, structures, vehicles, manhole covers, signs, inlet grates, lights, Portland cement concrete and other surface features to prevent them from being spattered or marred.

3.2 EMULSIFIED ASPHALT SEAL COAT APPLICATION

3.2.1 Rate

Base bids on applying material within the ranges shown in Table II. The actual application rates vary within the range specified to suit field conditions and will be recommended by the sealcoat manufacturer's representative and approved by the Contracting Officer prior to use in production by the construction of a test section.

TABLE II. APPLICATION OF MATERIAL		
(Quantities Per Square Yard)		
<u>Seal Type Coat</u>	<u>Emulsified Asphalt, gallons</u>	<u>Aggregate pounds</u>
Conventional Seal Coat		
with aggregate		
undiluted	0.10-0.15	10-15
GSB-88	0.12-0.18	0.27-0.7

3.2.2 Temperature

Asphalt application temperature shall provide an application viscosity between 10 and 60 seconds, Saybolt Furol, or between 20 and 120 centistokes, kinematic. Furnish the temperature viscosity relation to the Contracting Officer.

3.2.3 Application of Emulsified Asphalt

Following the preparation and inspection of the pavement surface, apply the emulsified asphalt material at the rates determined by the test section. Uniformly apply the bituminous material in a single pass of the distributor and with either a double or triple lap spray over the surface to be sealed. Spread building paper on the surface for a sufficient distance back from the ends of each application so that flow through the spray bar may be started and stopped on the paper and so that all sprays will be operating at the proper pressure on the surface to be sealed. Immediately after the application, remove the building paper. Properly treat with bituminous material spots missed by the distributor. No smoking, fires, or flames, other than the heaters that are a part of the equipment and hand propane torches used to keep nozzles operational, will be permitted within 25 feet of heating, distributing, and transferring operations of bituminous material other than bituminous emulsions.

3.2.4 Excess Sealcoat Material

Approved mineral aggregate shall be provided by the Contractor and shall be spread in sufficient quantity to effectively blot up any excess sealcoat material remaining on the treated pavement surface after 24 hours.

3.2.5 Ponding and Puddling of Sealcoat Material

If low spots and depressions greater than 1/2 inch in depth in the pavement surface cause ponding or puddling of the applied materials, the pavement surface shall be broomed with a broom drag. Brooming shall continue until the pavement surface is free of any pools of excess material.

3.2.6 Excess Runoff of Sealcoat

Pavement surfaces which have excessive runoff of sealcoat due to excessive amount of material being applied or excessive surface grade shall be treated in two or more applications at no additional cost to the Government. Each additional application shall be performed after the prior application of material has penetrated into the pavement.

3.2.7 Insufficient Sealcoat Material

When it is determined by the Contracting Officer that the actual application rate of the sealcoat is more than 20 percent below the approved application rate, subsequent applications of sealcoat shall be made to bring the actual application rate up to the approved rate; additional sealcoat material shall penetrate into the pavement surface within 24 hours after application.

3.2.8 Aggregate Application Rate

Apply aggregate at the rates determined by the test section. The aggregate weights shown in Table II are those of aggregate having a specific gravity of 2.65. If the specific gravity of the aggregate to be used is less than 2.55 or greater than 2.75, make adjustments in the number of pounds of aggregate required per square yard to insure a constant volume of aggregate per square yard of treatment.

3.2.9 Application of Aggregate

Spread the specified quantity of cover aggregate uniformly over the bituminous material. Before the bituminous material is applied, sufficient aggregate to cover the distributor load of bituminous material shall be on trucks at the site of the work. No bituminous material shall be down more than 3 minutes before it is covered with aggregate. Spreading shall be done uniformly with aggregate-spreading equipment mounted on the distributor. Trucks spreading aggregate shall be operated backwards, covering the bituminous material ahead of the truck wheels. Areas having insufficient cover shall be lightly recovered with additional aggregate by hand during the operations whenever necessary.

3.3 TEST SECTION APPLICATION - SEAL COAT

Prior to production seal coating applying the seal coat, place a test section at a location determined by the Contracting Officer at least 300 feet long by 20 feet wide a minimum of two adjacent passes of equipment using the approved job materials in accordance with the specification requirements. Perform tests to determine the application rates of the emulsified asphalt, in accordance with ASTM D2995, Test Method A, and aggregate. Test sections shall be performed on pavement areas that are not considered critical to operations. Vary the application rates along the longitudinally along the test section in order to effectively evaluate the pavement absorption rates. If the tests indicate that the seal coat test section does not conform to the specification requirements, make necessary adjustments to the application equipment and to the spreading procedures, and construct additional test sections for conformance to the specifications. Where test sections do not conform to specification requirements, repair or remove seal coat at no expense to the Government; no separate payment will be made for seal coat materials and labor, either in placement or removal of any test section. Perform quality control sampling and testing during construction as specified in paragraph FIELD

QUALITY CONTROL. Test sections shall be performed in the presence of the Contracting Officer and the Seal Coat Manufacturer's Representative (SCMR). Notify the Contracting Officer seven days prior to the planned test section date. The SCMR shall recommend to the Contracting Officer application rates of materials used in production seal coating. The Contracting Officer shall approve the application rates prior to production seal coating.

3.4 FIELD QUALITY CONTROL - SEAL COAT

3.4.1 Tests

Perform field tests in sufficient numbers to assure that the specifications are being met. Testing is the responsibility of the Contractor and shall be performed by an approved commercial laboratory. The following number of tests, if performed at the appropriate time, will be the minimum acceptable for each type of operation.

3.4.2 Aggregate Gradation

Perform gradation tests in accordance with ASTM C136. Perform a minimum of one test per day. When the source of materials is changed or deficiencies are found, the gradation shall be repeated and the material already placed shall be retested to determine the extent of the unacceptable material. Replace all in-place unacceptable material or re-apply seal coat material conforming to the specification as directed by Contracting Officer at no additional expense to the Government.

3.4.3 Stripping

Perform stripping test on aggregate from each source, in accordance with ASTM D3625/D3625M, prior to incorporation into the work and when the source is changed.

3.4.4 Emulsified Asphalt Sample

Obtain a sample of the emulsified asphalt used under the supervision of the Contracting Officer. The sample will be retained by the Government.

3.4.5 Water Compatibility Test

In some localities an incompatibility may exist between the asphaltic emulsion and the water to be used for dilution due to their characteristics. Clear, potable water should be used. No less than thirty days prior to commencing work, one half pint of the proposed asphalt emulsion and one half pint of the proposed water shall be combined, agitated, and allowed to sit for a period of 24 hours to test their compatibility. If they prove to be incompatible, indicated by separation of the emulsion, clotting, particles settling or other adverse properties from mixing with water, an approved chemical treatment shall be provided for all water used for dilution or a different and compatible source of water shall be selected. Report results to the Contracting Officer.

3.4.6 Application Inspection

Inspect application of seal coat for uniformity. Furnish a written report within 24 hours of testing citing climatic temperature during application, emulsion temperature during application, and rate of emulsion application determined from testing compared to the approved production rates.

3.4.7 Friction Tests

Accomplish Friction Test in accordance with FAA Advisory Circular FAA AC 150/5320-12 Measurement, Construction, and Maintenance of Skid-Resistant Airport Pavement Surfaces.

- a. Runway: Contractor is responsible to coordinating testing with Air Operations and the Contracting Officer. Each test includes performing friction tests at 40 mph and 60 mph both wet and dry, 15 ft to each side of runway centerline. The Contracting Officer shall be present for testing. Provide written report of results.
- b. Test Schedule:
 1. Within 30 days of prior to application of seal coat to runway.
 2. Within 48 hours after application of seal coat.
 3. Between 45 and 60 days after application of seal coat

3.5 TRAFFIC CONTROL

Protect freshly placed coatings from damage by traffic. Provide sufficient warning signs and barricades to prevent traffic over freshly treated surfaces. Protect treated areas from traffic for at least 2 hours after final application of seal coat material, or for such time as necessary to prevent picking up. Immediately prior to opening for subsequent construction operations (markings) or traffic, broom and vacuum to remove loose material and roll the entire treated area with a self-propelled pneumatic-tired roller. Provide warning signs and barricades for proper traffic control in accordance with MUTCD.

-- End of Section --

SECTION 32 01 16.17

COLD MILLING OF BITUMINOUS PAVEMENTS
08/08

PART 1 GENERAL

1.1 QUALITY ASSURANCE

1.1.1 Grade

Conform the finished milled surfaces to the lines, grades, and cross sections indicated. The finished milled-pavement surfaces shall vary not more than 1/4 inch from the established plan grade line and elevation. Finished surfaces at a juncture with other pavements shall coincide with the finished surfaces of the abutting pavements. The deviations from the plan grade line and elevation will not be permitted in areas of pavements where closer conformance with planned grade and elevation is required for the proper functioning of appurtenant structures involved.

1.1.2 Surface Smoothness

Finished surfaces shall not deviate from the testing edge of a straightedge more than 1/4 inch in the transverse or longitudinal direction.

1.1.3 Traffic Control

Provide all necessary traffic controls during milling operations.

PART 2 PRODUCTS

Not Used

PART 3 EXECUTION

3.1 EXECUTING EQUIPMENT

3.1.1 Cold-Milling Machine

Provide a cold-milling machine which is self-propelled, capable of milling the pavement to a specified depth and smoothness and of establishing grade control; with means of controlling transverse slope and dust produced during the pavement milling operation. The machine shall have the ability to windrow the millings or cuttings or removing the millings or cuttings from the pavement and load them into a truck. The milling machine shall not cause damage to any part of the pavement structure that is not to be removed.

3.1.2 Cleaning Equipment

Provide cleaning equipment suitable for removing and cleaning loose material from the pavement surface.

3.1.3 Straightedge

Furnish and maintain at the site, in good condition, one 12 foot straightedge or other suitable device for each milling machine, for testing

the finished surface. Make straightedge available for Government use. Straightedges shall be 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. Straightedges shall have handles to facilitate movement on the pavement.

3.2 PREPARATION OF SURFACE

Clean the pavement surface of excessive dirt, clay, or other foreign material immediately prior to milling the pavement.

3.3 MILLING OPERATION

A minimum of seven days notice is required, prior to start work, for the Contracting Officer to coordinate the milling operation with other activities at the site. Make sufficient passes so that the designated area is milled to the grades and cross sections indicated. The milling shall proceed with care and in depth increments that will not damage the pavement below the designated finished grade. Repair or replace, as directed, items damaged during milling such as manholes, valve boxes, utility lines, pavement that is torn, cracked, gouged, broken, or undercut. The milled material shall be windrowed or removed from the pavement and loaded into trucks.

3.4 GRADE AND SURFACE-SMOOTHNESS TESTING

3.4.1 Grade-Conformance Tests

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 intervals of 25 feet longitudinally and 25 feet transversely to determine the elevation of the completed pavement. 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. Remove and replace the deficient low area. Remove sufficient material to allow at least 1 inch of asphalt concrete to be placed.

3.4.2 Surface-Smoothness Tests

After completion of the final milling, the finished milled surface will be tested by the Government with a straightedge. Other approved devices may be used, provided that when satisfactorily and properly operated, such devices reveal all surface irregularities exceeding the tolerances specified. Correct surface irregularities that depart from the testing edge by more than 1/4 inch. Skin patching for correcting low areas will not be permitted. Remove and replace the deficient low area. Remove sufficient material to allow at least 1 inch of asphalt concrete to be placed.

3.5 REMOVAL OF MILLED MATERIAL

Material that is removed shall be placed in the disposal area as specified be stockpiled as specified and in such a manner to prevent segregation or contamination become the property of the Contractor and removed from the site. Surplus soil shall be disposed of at an approved landfill. Contractor is not allowed to resell or take ownership of surplus soil materials.

-- End of Section --

SECTION 32 01 17.16

SEALING OF CRACKS IN BITUMINOUS PAVEMENTS
08/08

PART 1 GENERAL

1.1 REFERENCES

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

ASTM INTERNATIONAL (ASTM)

ASTM C509	(2006; R 2011) Elastomeric Cellular Preformed Gasket and Sealing Material
ASTM D6690	(2012) Standard Specification for Joint and Crack Sealants, Hot Applied, for Concrete and Asphalt Pavements
ASTM D789	(2007; E 2010) Determination of Relative Viscosity and Moisture Content of Polyamide (PA)

1.2 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are for Contractor Quality Control approval. Submit the following in accordance with Section 01 33 00 SUBMITTAL PROCEDURES:

SD-03 Product Data

Installation of Sealant

SD-06 Test Reports

Test Requirements

1.3 QUALITY ASSURANCE

Test the crack sealant and backup material, when required, for conformance with the referenced applicable material specification. Furnish samples of materials, in sufficient quantity to be tested upon request. Conformance with the test requirements of the laboratory tests specified will not constitute final acceptance of the materials. Submit reports of all tests. Final acceptance will be based on the performance of the in-place materials.

1.4 DELIVERY, STORAGE, AND HANDLING

Inspect materials delivered to the job site for defects; unload, and store them with a minimum of handling to avoid damage. Provide storage facilities at the job site to protect materials from weather and to

maintain them at the temperatures recommended by the manufacturer.

1.5 ENVIRONMENTAL REQUIREMENTS

The ambient air temperature and the pavement temperature within the joint wall shall be a minimum of 50 degrees F and rising at the time of application of the materials. Do not apply sealant if moisture is observed in the crack.

PART 2 PRODUCTS

2.1 SEALANTS

Provide sealants conforming to ASTM D6690, Type II or ASTM D6690, Type I.

2.2 BACKUP MATERIALS

Provide backup material that is a compressible, nonshrinking, nonstaining, nonabsorptive material and nonreactive with the crack sealant. The melting point of the backing material shall be at least 5 degrees F greater than the maximum pouring temperature of the sealant being used, when tested in accordance with ASTM D789. The material shall have a water absorption of not more than 5 percent by weight when tested in accordance with ASTM C509. The backup material shall be 25 percent (plus or minus 5 percent) larger in diameter than the nominal width of the crack.

PART 3 EXECUTION

3.1 EXECUTING EQUIPMENT

Machines, tools, and equipment used in the performance of the work required by this section shall be approved before the work is started and shall be maintained in satisfactory condition at all times.

3.1.1 Routing Equipment

Provide routing equipment which is a self-powered machine operating a power driven tool or bit specifically designed for routing bituminous pavements. The bit shall rotate about a vertical axis at sufficient speed to cut a smooth vertical-walled reservoir in the pavement surface and shall maintain accurate cutting without damaging the sides or top edges of the reservoir. Provide a router capable of following the trace of the crack without deviation. The use of rotary impact routing devices may be permitted if vertical-sided carbide tipped bits are used.

3.1.2 Concrete Saw

Provide a self-propelled power saw with small diameter (6 inches or less) water-cooled diamond or abrasive saw blades for cutting cracks to the depths and widths specified and for removing filler that is embedded in the cracks or adhered to the crack faces. The diameter of the saw blade shall be small enough to allow the saw to closely follow the trace of the crack.

3.1.3 Sandblasting Equipment

Include in the sandblasting equipment an air compressor, hose, and long-wearing venturi-type nozzle of proper size, shape and opening. The maximum nozzle opening shall not exceed 1/4 inch. The air compressor shall be portable; and shall be capable of furnishing not less than 150 cfm and

maintaining a line pressure of not less than 90 psi at the nozzle while in use. Demonstrate compressor capability under job conditions before approval. The compressor shall be equipped with traps that will maintain the compressed air free of oil and water. The nozzle shall have an adjustable guide that will hold the nozzle aligned with the crack about 1 inch above the pavement surface. Adjust the height, angle of inclination and the size of the nozzle as necessary to secure satisfactory results.

3.1.4 Waterblasting Equipment

Include with the waterblasting equipment a trailer-mounted water tank, pumps, high-pressure hose, wand with safety release cutoff control, nozzle, and auxiliary water resupply equipment. The water tank and auxiliary resupply equipment shall be of sufficient capacity to permit continuous operations. The hose, wand, and nozzle shall be capable of cleaning the crack faces and the pavement surface on both sides of the crack for a width of at least 1/2 inch. A pressure gauge mounted at the pump shall show at all times the pressure inpsi at which the equipment is operating.

3.1.5 Hand Tools

Hand tools may be used, when approved, for removing defective sealant from cracks and repairing or cleaning the crack faces.

3.1.6 Crack Sealing Equipment

Provide unit applicators, used for heating and installing the hot-poured crack sealant materials, that are mobile and equipped with a double-boiler, agitator-type kettle with an oil medium in the outer space for heat transfer; a direct-connected pressure-type extruding device with a nozzle shaped for inserting in the crack to be filled; positive temperature devices for controlling the temperature of the transfer oil and sealant; and a recording type thermometer for indicating the temperature of the sealant. Allow the sealant to circulate through the delivery hose and return to the inner kettle when not in use, due to the applicator unit design .

3.2 PREPARATION OF CRACKS

Immediately before the installation of the crack sealant, thoroughly clean the cracks to remove oxidized pavement, loose aggregate and foreign debris. The preparation shall be as follows:

3.2.1 Cracks

3.2.1.1 Hairline Cracks

Cracks that are less than 1/4 inch wide do not need to be sealed if pavement will receive a hot asphalt overlay.

3.2.1.2 Small Cracks

Cracks that are 1/4 to 3/4 inch wide shall be routed to a nominal width 1/8 inch greater than the existing nominal width and to a depth not less than 3/4 inch, waterblasted or wire brushed and cleaned using compressed air.

3.2.1.3 Medium Cracks

Cracks that are 3/4 to 2 inches wide shall be waterblasted or wire brushed

and cleaned using compressed air.

3.2.1.4 Large Cracks

Cracks that are greater than 2 inches wide shall be repaired using pothole repair techniques instead of sealing.

3.2.2 Existing Sealant Removal

Cut loose the in-place sealant from both crack faces and to a depth shown on the drawings, using a concrete saw or hand tools as specified in paragraph EQUIPMENT. Depth shall be sufficient to accommodate any backup material that is required to maintain the depth of new sealant to be installed. Prior to further cleaning operations, remove all old loose sealant remaining in the crack opening by blowing with compressed air.

3.2.3 Routing

Perform routing of the cracks using a rotary router with a bit that is at least 1/8 inch wider than the nominal width of the crack to remove all residual old sealant (resealing), oxidized pavement and any loose aggregate in the crack wall.

3.2.4 Sawing

Perform sawing of the cracks using a power-driving concrete saw as specified in paragraph EQUIPMENT. Stiffen the blade as necessary with suitable dummy (or used) blades or washers. Immediately following the sawing operation, clean the crack opening using a water jet to remove all saw cuttings and debris.

3.2.5 Sandblasting

Sandblast clean the crack faces and the pavement surfaces extending a minimum of 1/2 inch from the crack edges. Use a multiple-pass technique until the surfaces are free of dust, dirt, old sealant residue, or foreign debris that might prevent the sealant material from bonding to the asphalt pavement. After final cleaning and immediately prior to sealing, blow out the cracks with compressed air and leave them completely free of debris and water. Ensure that sandblasting does not damage the pavement.

3.2.6 Backup Material

Use backup material on all cracks that have a depth greater than 3/4 inch. Insert the backup material into the lower portion of the crack as shown on the drawings. Ensure that the backup material is placed at the specified depth and is not stretched or twisted during installation.

3.2.7 Rate of Progress of Crack Preparation

Limit the stages of crack preparation, which include routing, sandblasting of the crack faces, air pressure cleaning and placing of the backup material, to only that linear footage that can be sealed during the same day.

3.3 PREPARATION OF SEALANT

Do not heat hot-poured sealants in excess of the safe heating temperature recommended by the manufacturer, as shown on the sealant containers.

Withdraw and waste sealant that has been overheated or subjected to application temperatures for over 4 hours or that has remained in the applicator at the end of the day's operation.

3.4 INSTALLATION OF SEALANT

Submit manufacturer's instructions 7 days prior to the use of the material on the project. Installation of the material will not be allowed until the instructions are received.

3.4.1 Time of Application

Seal cracks immediately following final cleaning of the crack walls and following the placement of the backup material (when required). Cracks that cannot be sealed under the conditions specified, or when rain interrupts sealing operations, shall be recleaned and allowed to dry prior to installing the sealant.

3.4.2 Sealing the Crack

Immediately preceding, but not more than 50 feet ahead of the crack sealing operations, perform a final cleaning with compressed air. Fill the cracks from the bottom up to 1/8 to 1/4 inch below the pavement surface. Remove excess or spilled sealant from the pavement by approved methods and discard it. Install the sealant in a manner which prevents the formation of voids and entrapped air. Several passes with the applicator wand may be necessary to obtain the specified sealant depth from the pavement surface. Do not use gravity methods or pouring pots to install the sealant material. Traffic shall not be permitted over newly sealed pavement until authorized by the Contracting Officer. Cracks shall be checked frequently to ensure that the newly installed sealant is cured to a tack-free condition within 3 hours.

3.5 CRACK SEALANT INSTALLATION TEST SECTION

Prior to the cleaning and sealing of the cracks for the entire project, construct a test section at least 200 feet long using the specified materials and approved equipment, to demonstrate the proposed sealing of all cracks of the project. Following the completion of the test section and before any other crack is sealed, inspect the test section to determine that the materials and installation meet the requirements specified. If materials or installation do not meet requirements, remove the materials and reclean and reseal the cracks at no cost to the Government. When the test section meets the requirements, it may be incorporated into the permanent work and paid for at the contract unit price per linear foot for sealing items scheduled. Seal all other cracks in the manner approved for sealing the test section.

3.6 CLEANUP

Upon completion of the project, remove unused materials from the site and leave the pavement in a clean condition.

3.7 QUALITY CONTROL PROVISIONS

3.7.1 Crack Cleaning

Provide quality control provisions during the crack cleaning process to correct improper equipment and cleaning techniques that damage the

bituminous pavement in any manner. Cleaned cracks shall be approved prior to installation of the crack sealant.

3.7.2 Crack Seal Application Equipment

Inspect the application equipment to ensure conformance to temperature requirements and proper installation. Evidences of bubbling, improper installing, and failing to cure or set will cause to suspend operations until causes of the deficiencies are determined and corrected.

3.7.3 Crack Sealant

Inspect the crack sealant for proper cure and set rating, bonding to the bituminous pavement, cohesive separation within the sealant, reversion to liquid, and entrapped air and voids. Sealants exhibiting any of these deficiencies, at any time prior to the final acceptance of the project, shall be removed from the crack, wasted, and replaced as specified herein at no additional cost to the Government.

-- End of Section --

SECTION 32 10 00

BITUMINOUS CONCRETE PAVEMENT

08/08

PART 1 GENERAL

1.1 REFERENCES

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

AMERICAN ASSOCIATION OF STATE HIGHWAY AND TRANSPORTATION OFFICIALS
(AASHTO)

AASHTO T 230 (1968; R 2000) Determining Degree of Pavement Compaction of Bituminous Aggregate Mixtures

AASHTO T 30 (2014) Standard Method of Test for Mechanical Analysis of Extracted Aggregate

ASTM INTERNATIONAL (ASTM)

ASTM D2172/D2172M (2011) Quantitative Extraction of Bitumen from Bituminous Paving Mixtures

ASTM D2950/D2950M (2014) Density of Bituminous Concrete in Place by Nuclear Methods

ASTM D6927 (2006) Standard Test Method for Marshall Stability and Flow of Bituminous Mixtures

STATE OF HAWAII, DEPARTMENT OF TRANSPORTATION (HI DOT)

HI SHS 05 (2005) Standard Specifications for Road, Bridge, and Public Works Construction, State of Hawaii, Department of Transportation

U.S. GREEN BUILDING COUNCIL (USGBC)

LEED NC (2009) Leadership in Energy and Environmental Design(tm) New Construction Rating System

1.2 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are for Contractor Quality Control approval. Submit the following in accordance with Section 01 33 00 SUBMITTAL PROCEDURES:

SD-03 Product Data

Precast car stops; (LEED NC)
Aggregate; (LEED NC)

Asphalt cement; (LEED NC)

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.

SD-04 Samples

Uncompacted mix

Pavement cores

SD-06 Test Reports

Trial batch reports

Mix design

Asphalt concrete

Density

Thickness

Straightedge test

Submit reports for testing specified under paragraph entitled "Field Quality Control."

SD-07 Certificates

Asphalt mix delivery record

Asphalt concrete and material sources

Obtain approval of the Contracting Officer for materials and material sources 2 days prior to the use of such material in the work.

Asphalt concrete

Traffic signs

Submit certificates, signed by the producer, that paving materials and incidental construction items conform to specification requirements.

1.3 QUALITY ASSURANCE

1.3.1 Regulatory Requirements

Provide work and materials in accordance with applicable requirements of HI SHS 05. Divisions, Sections and Paragraphs mentioned herein refer to those specifications. Paragraphs in HI SHS 05 entitled "Quantity and Payment" "Method of Measurement" and "Basis of Payment" shall not apply.

1.3.2 Modification of References

Where term "Engineer" is used in HI SHS 05 it shall be construed to mean Contracting Officer. Where term "state" is used, it shall mean "Federal Government".

1.3.3 Mix Delivery Record Data

Record and submit the following information to each load of mix delivered to the job site. Submit within one day after delivery on Government-furnished forms:

- a. Truck No:
- b. Time In:
- c. Time Out:
- d. Tonnage and Discharge Temperature:
- e. Mix Type:
- f. Location:
- g. Stations Placed:

1.3.4 Trial Batch

Submit current bituminous design reports for all mix types proposed for use on the project.

1.3.5 Mix Design

Submit results of laboratory tests performed on each mix design. Testing shall have been accomplished not more than one year prior to date of material placement.

1.4 ENVIRONMENTAL REQUIREMENTS

Do not produce or place bituminous concrete when the weather is rainy or foggy, when the base course is frozen or has excess moisture, or when the ambient temperature is less than 40 degrees F in the shade away from artificial heat.

1.5 SUSTAINABLE DESIGN REQUIREMENTS

PART 2 PRODUCTS

2.1 ASPHALT CONCRETE

Provide asphalt concrete in accordance with the applicable requirements of the HI SHS 05, except where specified otherwise. Recycled asphalt pavement material may be used as permitted by HI SHS 05.

2.2 SUBBASE

HI SHS 05, materials for construction of the subbase shall be in accordance with Division 300, Section 305, paragraph 305.2.

2.3 BASE COURSE

HI SHS 05, materials for construction of the base course shall be in accordance with Division 300, Section 304, paragraph 304.02.

2.4 GLASSPHALT BASE COURSE

HI SHS 05, materials for construction of the glassphalt base course shall be in accordance with Division 300, Section 302, paragraph 304.2, .

2.5 SURFACE COURSE

HI SHS 05, materials for construction of the surface course shall be in accordance with Division 400, Section 402, paragraph 401.02.

2.6 BITUMINOUS TACK COAT

HI SHS 05, materials for tack coat shall be in accordance with Division 400, Section 407, paragraph 407.02.

2.7 BITUMINOUS PRIME COAT

HI SHS 05, materials for tack coat shall be in accordance with Division 400, Section 420, paragraph 420.02.

2.8 SLURRY SEAL COAT

HI SHS 05, materials for slurry seal coat shall be in accordance with Division 400, Section 404, paragraph 404.02.

2.9 STRIPING

HI SHS 05, materials for paint striping shall be in accordance with Division 600, Section 629, paragraph 629.02, .

2.10 TRAFFIC SIGNS

HI SHS 05, provide traffic signs in accordance with Division 600, Sections 630 and 631, paragraph 630.02 AND 631.02 respectively.

2.11 PRECAST CAR STOPS

Provide car stops to the profile and size indicated. Manufacture with air entrained concrete having a minimum compressive strength of 3,000 psi at 28 days, with two No. 4 reinforcing rods located at mid-point of its cross section and with two galvanized sleeves for anchoring. PART 3 EXECUTION

3.1 PREPARATION

3.1.1 Excavation and Filling

Excavation and filling to establish elevation of subgrade is specified in Section 31 23 00.00 20 EXCAVATION AND FILL.

3.1.2 Pavement Removal

The asphaltic concrete surfaces in the areas indicated for repair or removal shall be completely removed to expose the existing base. Unless otherwise indicated, pavement shall extend a minimum of 12 inches beyond

each side of cut areas. Edges of the asphaltic concrete shall be sawcut in straight lines to full thickness of the course as required. Sides shall be cut perpendicular and parallel to the direction of traffic and edges shall be vertical.

3.1.3 Cold Planing of Existing Concrete

HI SHS 05, methods of cold planing existing pavement shall be in accordance with Division 400, Section 415, paragraph 415.03. See Section 32 01 16.17 COLD MILLING OF BITUMINOUS PAVEMENTS for items specific to cold planing of asphalt.

3.2 CONSTRUCTION

Provide construction in accordance with the applicable requirements of the HI SHS 05, except where indicated or specified otherwise.

3.2.1 Subgrade

Preparation of subgrade shall be in accordance with ,Section 31 23 00.00 20 EXCAVATION AND FILL. Verify compacted subgrade, granular base, or stabilized soil is acceptable and ready to support paving and imposed loads.

3.2.2 Subbase

HI SHS 05, methods of construction of the subbase shall be in accordance with Division 300, Section 305, paragraph 305.03.

3.2.3 Base Course

HI SHS 05, methods of construction of the base course shall be in accordance with Division 300, Section 301, 304 and 312.

3.2.4 Bituminous Tack Coat

HI SHS 05, methods of construction of the tack coat shall be in accordance with Division 400, Section 407, paragraph 407.03.

3.2.5 Bituminous Prime Coat

HI SHS 05, methods of construction of the prime coat shall be in accordance with Division 400, Section 420, paragraph 420.03.

3.2.6 Surface Course

HI SHS 05, methods of construction of the surface course shall be in accordance with Division 400, Section 402, paragraph 401.03.

3.2.7 Slurry Seal Coat

HI SHS 05, methods of construction of the surface course shall be in accordance with Division 400, Section 404, paragraph 404.03.

3.2.8 Striping

HI SHS 05, provide paint striping in accordance with Division 600, Section 629, paragraph 629.03. Allow bituminous pavement to cure for at least 21 days before paint is applied. Pavement shall be thoroughly clean and entirely free of loose sand, stones, dust, oil, grease, water, and other

substances that will be deleterious to the paint or will adversely affect the adhesion of the paint. Do not apply paint during high wind (over 15 miles per hour) or high humidity (over 70 percent). Apply paint only when ambient temperature is 40 degrees F or above and rising but not more than 95 degrees F. Dimensions and arrangement of striping shall be as indicated. Apply paint to a wet film thickness of 0.015 inch by means of conventional traffic line striping equipment. Traffic shall not be permitted to use the painted areas for a minimum of 30 minutes after painting of lines has been completed.

3.2.9 Traffic Signs

HI SHS 05, install traffic signs in accordance with Division 600, Section 630 and 631, paragraph 630.03 and 632.03.

3.2.10 Precast Car Stops

Provide car stops where indicated. Install with an anchor rod driven through each sleeve.

3.2.11 Root Control Barrier

Install geotextile fabric in the soil in a vertical application. Use appropriate holding device to assure fabric position. For vertical application, a minimum 2 inch soil cover is required over the top. A minimum 18 inch extension of fabric beyond the structure area to be protected is required to prevent root growth from growing around fabric edges.

3.3 FIELD QUALITY CONTROL

Sample shall be taken by Contractor as specified herein. Contractor shall replace pavement where sample cores have been removed. Submit 2 pavement cores when using the in-place nuclear density method.

3.3.1 Sample and Core Identification

Place each sample and core in a container and securely seal to prevent loss of material. Tag each sample for identification. Tag shall contain the following information:

- a. Contract No.
- b. Sample No.
- c. Quantity
- d. Date of Sample
- e. Sample Description
- f. Source/Location/Stations Placed/depth below the finish grade
- g. Intended Use
- h. Thicknesses of various lifts placed

3.3.2 Testing

3.3.2.1 Bituminous Mix Testing

Take two samples per day per mix type at plant or from truck. Test uncompacted mix for extraction in accordance with ASTM D2172/D2172M and sieve analysis in accordance with AASHTO T 30. Test samples for stability and flow in accordance with ASTM D6927. When two consecutive tests fail to meet requirements of specifications, cease placement operations and test a new trial batch prior to resumption of placement operations. Submit 2 per day of each mix type. When two tests on uncompacted mix fail submit new trial batch for approval.

3.3.2.2 Testing of Pavement Course

- a. Density: Determine density of pavement by testing cores obtained from the binder and wearing course in accordance with AASHTO T 230. Take three cores at location designated by Contracting Officer for each 200 tons, or fraction thereof, of asphalt placed. Deliver cores undisturbed and undamaged to laboratory and provide test results within 48 hours of each day placement of paving materials.
- b. Thickness: Determine thickness of the binder and wearing course from cores taken for density test.
- c. Straightedge Test: Test compacted surface of binder course and wearing course with a straightedge as work progresses. Apply straightedge parallel with and at right angles to center line after final rolling. Variations in the binder course surface shall not be more than 1/4 inches from the lower edge of the 10 foot straightedge; variations in wearing course surface shall not be more than 1/4 from the lower edge of the 10 foot straightedge. Pavement showing irregularities greater than that specified shall be corrected as directed by Contracting Officer.

3.3.2.3 Alternate Testing Method for Pavement Courses

At Contractor's option the following in-place testing method may be used to determine density and thickness in lieu of testing specified above. Frequency of testing shall be the same. When in-place nuclear method to determine density is used, take two pavement cores at locations designated by Contracting Officer and turn over to Government to verify pavement thickness.

- a. Density: Determine density of pavement by in-place testing using Nuclear Method in accordance with ASTM D2950/D2950M.
- b. Thickness: Determine thickness of finished pavement by use of following equation:

$$t = \frac{W}{0.75d}$$

Where t= pavement thickness, in inches.

W= average weight per square yard of mixture actually used in work.

d= compacted density as measured by nuclear density device.

3.4 WASTE MANAGEMENT

Protect excess material from contamination and return to manufacturer, or reuse on-site for walkways, patching, ditch beds, speed bumps, or curbs.

-- End of Section --

SECTION 32 16 13

CONCRETE SIDEWALKS AND CURBS AND GUTTERS
04/08

PART 1 GENERAL

1.1 REFERENCES

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

AMERICAN ASSOCIATION OF STATE HIGHWAY AND TRANSPORTATION OFFICIALS
(AASHTO)

AASHTO M 182 (2005; R 2009) Standard Specification for Burlap Cloth Made from Jute or Kenaf and Cotton Mats

ASTM INTERNATIONAL (ASTM)

ASTM A1064/A1064M (2014) Standard Specification for Carbon-Steel Wire and Welded Wire Reinforcement, Plain and Deformed, for Concrete

ASTM A615/A615M (2014) Standard Specification for Deformed and Plain Carbon-Steel Bars for Concrete Reinforcement

ASTM C143/C143M (2012) Standard Test Method for Slump of Hydraulic-Cement Concrete

ASTM C171 (2007) Standard Specification for Sheet Materials for Curing Concrete

ASTM C172/C172M (2014a) Standard Practice for Sampling Freshly Mixed Concrete

ASTM C173/C173M (2014) Standard Test Method for Air Content of Freshly Mixed Concrete by the Volumetric Method

ASTM C231/C231M (2014) Standard Test Method for Air Content of Freshly Mixed Concrete by the Pressure Method

ASTM C309 (2011) Standard Specification for Liquid Membrane-Forming Compounds for Curing Concrete

ASTM C31/C31M (2012) Standard Practice for Making and Curing Concrete Test Specimens in the Field

ASTM C920 (2014a) Standard Specification for Elastomeric Joint Sealants

ASTM D1751	(2004; E 2013; R 2013) Standard Specification for Preformed Expansion Joint Filler for Concrete Paving and Structural Construction (Nonextruding and Resilient Bituminous Types)
ASTM D1752	(2004a; R 2013) Standard Specification for Preformed Sponge Rubber Cork and Recycled PVC Expansion
ASTM D5893/D5893M	(2010) Cold Applied, Single Component, Chemically Curing Silicone Joint Sealant for Portland Cement Concrete Pavements

INTERNATIONAL CODE COUNCIL (ICC)

ICC A117.1	(2009) Accessible and Usable Buildings and Facilities
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1.2 SYSTEM DESCRIPTION

1.2.1 General Requirements

Provide plant, equipment, machines, and tools used in the work subject to approval and maintained in a satisfactory working condition at all times. The equipment shall have the capability of producing the required product, meeting grade controls, thickness control and smoothness requirements as specified. Use of the equipment shall be discontinued if it produces unsatisfactory results. The Contracting Officer shall have access at all times to the plant and equipment to ensure proper operation and compliance with specifications.

1.2.2 Slip Form Equipment

Slip form paver or curb forming machine, will be approved based on trial use on the job and shall be self-propelled, automatically controlled, crawler mounted, and capable of spreading, consolidating, and shaping the plastic concrete to the desired cross section in 1 pass.

1.3 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are for Contractor Quality Control approval. Submit the following in accordance with Section 01 33 00 SUBMITTAL PROCEDURES:

SD-03 Product Data

Concrete
Copies of certified delivery tickets for all concrete used in the construction.

SD-06 Test Reports

Field Quality Control
Copies of all test reports within 24 hours of completion of the test.

1.4 ENVIRONMENTAL REQUIREMENTS

1.4.1 Placing During Warm Weather

The temperature of the concrete as placed shall not exceed 85 degrees F except where an approved retarder is used. The mixing water and/or aggregates shall be cooled, if necessary, to maintain a satisfactory placing temperature. The placing temperature shall not exceed 95 degrees F at any time.

PART 2 PRODUCTS

2.1 CONCRETE

Provide concrete conforming to the applicable requirements of HI SHS 05 except as otherwise specified. Concrete shall have a minimum compressive strength of 3500 psi at 28 days. Maximum size of aggregate shall be 1-1/2 inches. Submit copies of certified delivery tickets for all concrete used in the construction.

2.1.1 Air Content

Mixtures shall have 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

The concrete slump shall be 2 inches plus or minus 1 inch where determined in accordance with ASTM C143/C143M.

2.1.3 Reinforcement Steel

Reinforcement bars shall conform to ASTM A615/A615M. Wire mesh reinforcement shall conform to ASTM A1064/A1064M.

2.2 CONCRETE CURING MATERIALS

2.2.1 Impervious Sheet Materials

Impervious sheet materials shall conform to ASTM C171, type optional, except that polyethylene film, if used, shall be white opaque.

2.2.2 Burlap

Burlap shall conform to AASHTO M 182.

2.2.3 White Pigmented Membrane-Forming Curing Compound

White pigmented membrane-forming curing compound shall conform to ASTM C309, Type 2.

2.3 CONCRETE PROTECTION MATERIALS

Concrete protection materials shall be 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

Contraction joint filler for curb and gutter shall consist of hard-pressed fiberboard.

2.4.2 Expansion Joint Filler, Premolded

Expansion joint filler, premolded, shall conform to ASTM D1751 or ASTM D1752, 1/2 inch thick, unless otherwise indicated.

2.5 JOINT SEALANTS

Joint sealant, cold-applied shall conform 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. Forms shall be of wood or steel, straight, of sufficient strength to resist springing during depositing and consolidating concrete. Wood forms shall be surfaced plank, 2 inches nominal thickness, straight and free from warp, twist, loose knots, splits or other defects. Wood forms shall have a nominal length of 10 feet. Radius bends may be formed with 3/4 inch boards, laminated to the required thickness. Steel forms shall be channel-formed sections with a flat top surface and with welded braces at each end and at not less than two intermediate points. Ends of steel forms shall be interlocking and self-aligning. Steel forms shall include flexible forms for radius forming, corner forms, form spreaders, and fillers. Steel forms shall have a nominal length of 10 feet with a minimum of 3 welded stake pockets per form. Stake pins shall be solid steel rods with chamfered heads and pointed tips designed for use with steel forms.

2.6.1 Sidewalk Forms

Sidewalk forms shall be of a height equal to the full depth of the finished sidewalk.

2.6.2 Curb and Gutter Forms

Curb and gutter outside forms shall have a height equal to the full depth of the curb or gutter. The inside form of curb shall have batter as indicated and shall be securely fastened to and supported by the outside form. Rigid forms shall be provided 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.

2.7 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

The subgrade shall be constructed to the specified grade and cross section prior to concrete placement. Subgrade shall be placed and compacted as directed in conformance with Section 31 23 00.00 20 EXCAVATION AND FILL.

3.1.1 Sidewalk Subgrade

The subgrade shall be tested 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

The subgrade shall be tested for grade and cross section by means of a template extending the full width of the curb and gutter. The subgrade shall be of materials equal in bearing quality to the subgrade under the adjacent pavement.

3.1.3 Maintenance of Subgrade

The subgrade shall be maintained in a smooth, compacted condition in conformity with the required section and established grade until the concrete is placed. The subgrade shall be in a moist condition when concrete is placed. The subgrade shall be prepared and protected to produce a subgrade 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. Corners, deep sections, and radius bends shall have additional stakes and braces, as required. Clamps, spreaders, and braces shall be used where required to ensure rigidity in the forms. Forms shall be removed without injuring the concrete. Bars or heavy tools shall not be used against the concrete in removing the forms. Any concrete found defective after form removal shall be promptly and satisfactorily repaired. Forms shall be cleaned and coated with form oil 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 shall be checked with a 10 foot straightedge. Forms shall have a transverse slope of 1/4 inch per foot with the low side adjacent to the roadway. Side forms shall not be removed for 12 hours after finishing has been completed.

3.2.2 Curbs and Gutters

The forms of the front of the curb shall be removed not less than 2 hours nor more than 6 hours after the concrete has been placed. Forms back of curb shall remain in place until the face and top of the curb have been finished, as specified for concrete finishing. Gutter forms shall not be

removed 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 shall be of the thickness indicated. After concrete has been placed in the forms, a strike-off guided by side forms shall be used to bring the surface to proper section to be compacted. The concrete shall be consolidated by tamping and spading or with an approved vibrator, and the surface shall be finished 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. A scored surface shall be produced 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

All slab edges, including those at formed joints, shall be finished with an edger having a radius of 1/8 inch. Transverse joint shall be edged before brooming, and the brooming shall eliminate the flat surface left by the surface face of the edger. Corners and edges which have crumbled and areas which lack sufficient mortar for proper finishing shall be cleaned and filled solidly with a properly proportioned mortar mixture and then finished.

3.3.4 Surface and Thickness Tolerances

Finished surfaces shall 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

Concrete shall be placed to the section required in a single lift. Consolidation shall be achieved by using approved mechanical vibrators. Curve shaped gutters shall 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

Exposed surfaces shall be floated and finished with a smooth wood float until true to grade and section and uniform in texture. Floated surfaces shall then be brushed with a fine-hair brush with longitudinal strokes. The edges of the gutter and top of the curb shall be rounded with an edging tool to a radius of 1/2 inch. Immediately after removing the front curb

form, the face of the curb shall be rubbed with a wood or concrete rubbing block and water until blemishes, form marks, and tool marks have been removed. The front curb surface, while still wet, shall be brushed in the same manner as the gutter and curb top. The top surface of gutter and entrance shall be finished to grade with a wood float.

3.4.4 Joint Finishing

Curb edges at formed joints shall be finished as indicated.

3.4.5 Surface and Thickness Tolerances

Finished surfaces shall 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

Sidewalk joints shall be constructed to divide the surface into rectangular areas. Transverse contraction joints shall be spaced at a distance equal to the sidewalk width or 5 feet on centers, whichever is less, and shall be continuous across the slab. Longitudinal contraction joints shall be constructed along the centerline of all sidewalks 10 feet or more in width. Transverse expansion joints shall be installed at sidewalk returns and opposite expansion joints in adjoining curbs. Where the sidewalk is not in contact with the curb, transverse expansion joints shall be installed as indicated. Expansion joints shall be formed about 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

The contraction joints shall be formed 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, using a jointer to cut the groove, or by sawing a groove in the hardened concrete with a power-driven saw, unless otherwise approved. Sawed joints shall be constructed by sawing a groove in the concrete with a 1/8 inch blade to the depth indicated. An ample supply of saw blades shall be available on the job before concrete placement is started, and at least one standby sawing unit in good working order shall be available at the jobsite at all times during the sawing operations.

3.5.2 Sidewalk Expansion Joints

Expansion joints shall be formed with 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. Joint filler shall be held in place with steel pins or other devices to prevent warping of the filler during floating and finishing. Immediately after finishing operations are completed, joint edges shall be rounded with an edging tool having a radius of 1/8 inch, and concrete over the joint filler shall be removed. At the end of the curing period, expansion joints shall be cleaned and filled with cold-applied joint sealant. Joint sealant shall be gray or stone in color. The joint opening shall be thoroughly cleaned before the sealing material is placed. Sealing material shall not be spilled on exposed surfaces of the concrete.

Concrete at the joint shall be surface dry and atmospheric and concrete temperatures shall be above 50 degrees F at the time of application of joint sealing material. Excess material on exposed surfaces of the concrete shall be removed immediately and concrete surfaces cleaned.

3.5.3 Reinforcement Steel Placement

Reinforcement steel shall be accurately and securely fastened in place with suitable supports and ties before the concrete is placed.

3.6 CURB AND GUTTER JOINTS

Curb and gutter joints shall be constructed at right angles to the line of curb and gutter.

3.6.1 Contraction Joints

Contraction joints shall be constructed 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. Contraction joints (except for slip forming) shall be constructed by means of 1/8 inch thick separators and of a section conforming to the cross section of the curb and gutter. Separators shall be removed 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, the contraction joints shall be cut in the top portion of the gutter/curb hardened concrete in a continuous cut across the curb and gutter, using a power-driven saw. The depth of cut shall be at least one-fourth of the gutter/curb depth and 1/8 inch in width.

3.6.2 Expansion Joints

Expansion joints shall be formed by means of preformed expansion joint filler material cut and shaped to the cross section of curb and gutter. Expansion joints shall be provided in curb and gutter directly opposite expansion joints of abutting portland cement concrete pavement, and shall be of the same type and thickness as joints in the pavement. Where curb and gutter do not abut portland cement concrete pavement, expansion joints at least 1/2 inch in width shall be provided at intervals not less than 30 feet nor greater than 120 feet. Expansion joints shall be provided in nonreinforced concrete gutter at locations indicated. Expansion joints shall be sealed immediately following curing of the concrete or as soon thereafter as weather conditions permit. Expansion joints and the top 1 inch depth of curb and gutter contraction-joints shall be sealed with joint sealant. The joint opening shall be thoroughly cleaned before the sealing material is placed. Sealing material shall not be spilled on exposed surfaces of the concrete. Concrete at the joint shall be surface dry and atmospheric and concrete temperatures shall be above 50 degrees F at the time of application of joint sealing material. Excess material on exposed surfaces of the concrete shall be removed immediately and concrete surfaces cleaned.

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 shall be on hand and ready for use before actual concrete placement begins. Protection shall be provided as necessary to prevent cracking of the pavement due to temperature changes during the curing period.

3.7.1.1 Mat Method

The entire exposed surface shall be covered with 2 or more layers of burlap. Mats shall overlap each other at least 6 inches. The mat shall be thoroughly wetted with water prior to placing on concrete surface and shall be kept continuously in a saturated condition and in intimate contact with concrete for not less than 7 days.

3.7.1.2 Impervious Sheeting Method

The entire exposed surface shall be wetted with a fine spray of water and then covered with impervious sheeting material. Sheets shall be laid directly on the concrete surface with the light-colored side up and overlapped 12 inches when a continuous sheet is not used. The curing medium shall not be less than 18-inches wider than the concrete surface to be cured, and shall be securely weighted down by heavy wood planks, or a bank of moist earth placed along edges and laps in the sheets. Sheets shall be satisfactorily repaired or replaced if torn or otherwise damaged during curing. The curing medium shall remain on the concrete surface to be cured for not less than 7 days.

3.7.1.3 Membrane Curing Method

A uniform coating of white-pigmented membrane-curing compound shall be applied to the entire exposed surface of the concrete as soon after finishing as the free water has disappeared from the finished surface. Formed surfaces shall be coated immediately after the forms are removed and in no case longer than 1 hour after the removal of forms. Concrete shall not be allowed to dry before the application of the membrane. If any drying has occurred, the surface of the concrete shall be moistened with a fine spray of water and the curing compound applied as soon as the free water disappears. Curing compound shall be applied in two coats by hand-operated pressure sprayers at a coverage of approximately 200 square feet/gallon for the total of both coats. The second coat shall be applied in a direction approximately at right angles to the direction of application of the first coat. The compound shall form a uniform, continuous, coherent film that will not check, crack, or peel and shall be free from pinholes or other imperfections. If pinholes, abrasion, or other discontinuities exist, an additional coat shall be applied to the affected areas within 30 minutes. Concrete surfaces that are subjected to heavy rainfall within 3 hours after the curing compound has been applied shall be resprayed by the method and at the coverage specified above. Areas where the curing compound is damaged by subsequent construction operations within the curing period shall be resprayed. Necessary precautions shall be taken to insure that the concrete is properly cured at sawed joints, and that no curing compound enters the joints. The top of the joint opening and the joint groove at exposed edges shall be tightly sealed before the concrete

in the region of the joint is resprayed with curing compound. The method used for sealing the joint groove shall prevent loss of moisture from the joint during the entire specified curing period. Approved standby facilities for curing concrete pavement shall be provided 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. Concrete surfaces to which membrane-curing compounds have been applied shall be adequately protected during the entire curing period from pedestrian and vehicular traffic, except as required for joint-sawing operations and surface tests, and from any other possible damage to the continuity of the membrane.

3.7.2 Backfilling

After curing, debris shall be removed and the area adjoining the concrete shall be backfilled, graded, and compacted to conform to the surrounding area in accordance with lines and grades indicated.

3.7.3 Protection

Completed concrete shall be protected from damage until accepted. Repair damaged concrete and clean concrete discolored during construction. Concrete that is damaged shall be removed and reconstructed for the entire length between regularly scheduled joints. Refinishing the damaged portion will not be acceptable. Removed damaged portions shall be disposed of as directed.

3.7.4 Protective Coating

Protective coating, of linseed oil mixture, shall be applied 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. Concrete to receive a protective coating shall be moist cured.

3.7.4.1 Application

Curing and backfilling operation shall be completed prior to applying two coats of protective coating. Concrete shall be surface dry and clean before each application. Coverage shall be by spray application at 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 shall be in accordance with the manufacturer's instructions. Coated surfaces shall be protected from vehicular and pedestrian traffic until dry.

3.7.4.2 Precautions

Protective coating shall not be heated by direct application of flame or electrical heaters and shall be protected from exposure to open flame, sparks, and fire adjacent to open containers or applicators. Material shall not be applied 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 any additional tests to insure that the requirements of these specifications are met.

3.8.2 Concrete Testing

3.8.2.1 Strength Testing

Provide molded concrete specimens for strength tests. Samples of concrete placed each day shall be taken not less than once a day nor less than once for every 250 cubic yards of concrete. The samples for strength tests shall be taken in accordance with ASTM C172/C172M. Cylinders for acceptance shall be molded in conformance with ASTM C31/C31M by an approved testing laboratory. Each strength test result shall 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. ASTM C231/C231M shall be used with concretes and mortars made with relatively dense natural aggregates. Two tests for air content shall be made on randomly selected batches of each class of concrete placed during each shift. Additional tests shall be made when excessive variation in concrete workability is reported by the placing foreman or the Government inspector. If results are out of tolerance, the placing foreman shall be notified and he shall 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

Two slump tests shall be made on randomly selected batches of each class of concrete for every 250 cubic yards, or fraction thereof, of concrete placed during each shift. Additional tests shall be performed 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

The anticipated thickness of the concrete shall be determined 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, the subgrade shall be true to grade prior to concrete placement and the thickness will be determined by measuring each edge of the completed slab.

3.8.4 Surface Evaluation

The finished surface of each category of the completed work shall be

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, high areas shall be reduced 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 shall not exceed 5 percent of the area of any integral slab, and the depth of grinding shall not exceed 1/4 inch. Pavement areas requiring grade or surface smoothness corrections in excess of the limits specified above shall be removed and replaced.

3.9.3 Appearance

Exposed surfaces of the finished work will be inspected by the Government and any deficiencies in appearance will be identified. Areas which exhibit excessive cracking, discoloration, form marks, or tool marks or which are otherwise inconsistent with the overall appearances of the work shall be removed and replaced.

3.10 Detectable Warning System

Install Detectable Warning Systems required by contract plans per ICC A117.1, Section 705, and by manufacturers' installation instructions.

-- End of Section --

SECTION 32 17 23.00 20

PAVEMENT MARKINGS

04/06

PART 1 GENERAL

1.1 REFERENCES

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

ASTM INTERNATIONAL (ASTM)

ASTM D2240	(2005; R 2010) Standard Test Method for Rubber Property - Durometer Hardness
ASTM D2621	(1987; R 2011) Infrared Identification of Vehicle Solids from Solvent-Reducible Paints
ASTM D2697	(2003; R 2014) Volume Nonvolatile Matter in Clear or Pigmented Coatings
ASTM D3335	(1985a; R 2014) Low Concentrations of Lead, Cadmium, and Cobalt in Paint by Atomic Absorption Spectroscopy
ASTM D3718	(1985a; R 2010) Low Concentrations of Chromium in Paint by Atomic Absorption Spectroscopy
ASTM D3924	(1980; R 2011) Standard Environment for Conditioning and Testing Paint, Varnish, Lacquer, and Related Materials
ASTM D3960	(2005; R 2013) Determining Volatile Organic Compound (VOC) Content of Paints and Related Coatings
ASTM D4280	(2012) Extended Life Type, Nonplowable, Raised, Retroreflective Pavement Markers
ASTM D4505	(2012) Preformed Retroreflective Pavement Marking Tape for Extended Service Life
ASTM D4541	(2009; E 2010) Pull-Off Strength of Coatings Using Portable Adhesion Testers
ASTM D471	(2012a) Standard Test Method for Rubber Property - Effect of Liquids
ASTM D522/D522M	(2014) Mandrel Bend Test of Attached Organic Coatings
ASTM D711	(2010) No-Pick-Up Time of Traffic Paint

ASTM D792	(2013) Density and Specific Gravity (Relative Density) of Plastics by Displacement
ASTM D823	(1995; E 2012; R 2012) Producing Films of Uniform Thickness of Paint, Varnish, and Related Products on Test Panels.
ASTM E28	(2014) Softening Point of Resins Derived from Naval Stores by Ring and Ball Apparatus
ASTM G154	(2012a) Standard Practice for Operating Fluorescent Light Apparatus for UV Exposure of Nonmetallic Materials

INTERNATIONAL CONCRETE REPAIR INSTITUTE (ICRI)

ICRI 03732	(1997) Selecting and Specifying Concrete Surface Preparation for Sealers, Coatings, and Polymer Overlays
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U.S. GENERAL SERVICES ADMINISTRATION (GSA)

FED-STD-595	(Rev C; Notice 1) Colors Used in Government Procurement
FS TT-B-1325	(Rev D; Notice 1) Beads (Glass Spheres) Retro-Reflective (Metric)
FS TT-P-1952	(Rev E) Paint, Traffic and Airfield Markings, Waterborne

1.2 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are for information only or as otherwise designated. When used, a designation following the "G" designation identifies the office that will review the submittal for the Government. Submit the following in accordance with Section 01 33 00 SUBMITTAL PROCEDURES:

SD-03 Product Data

Reflective media for roads and streets

Paints for roads and streets

High Build Acrylic Coating (HBAC); G

Thermoplastic compound

Raised Pavement Markers and Adhesive

Equipment; G

Lists of proposed equipment, including descriptive data, and notifications of proposed Contractor actions as specified in this section. List of removal equipment shall include descriptive data indicating area of coverage per pass, pressure adjustment range, tank and flow capacities, and safety precautions required for the equipment operation.

SD-06 Test Reports

Reflective media for roads and streets

Paints for roads and streets

High Build Acrylic Coating (HBAC); G

Thermoplastic compound

Raised Pavement Markers and Adhesive

Certified reports from sampling and testing made in accordance with paragraph entitled "Sampling and Testing" prior to the use of the materials at the jobsite. Testing shall be performed in an approved independent laboratory.

SD-07 Certificates

Qualifications

Reflective media for roads and streets

Paints for roads and streets

Volatile Organic Compound, (VOC)

Certificate stating that the proposed pavement marking paint meets the VOC regulations of the local Air Pollution Control District having jurisdiction over the geographical area in which the project is located.

Thermoplastic compound

Construction equipment list

SD-08 Manufacturer's Instructions

Paints for roads and streets

Thermoplastic compound

Submit manufacturer's Material Safety Data Sheets.

1.3 DELIVERY AND STORAGE

Deliver paints, paint materials and thermoplastic compound materials in original sealed containers that plainly show the designated name, specification number, batch number, color, date of manufacture, manufacturer's directions, and name of manufacturer. Provide storage facilities at the job site for maintaining materials at temperatures recommended by the manufacturer.

1.4 WEATHER LIMITATIONS

Apply paint to clean, dry surfaces, and unless otherwise approved, only when the air and pavement surface temperature is at least 5 degrees above the dew point and the air and pavement temperatures are above 40 degrees F and less than 95 degrees F for oil-based materials; above 50 degrees F and less than 110 degrees F for water-based materials. Maintain paint temperature within these same limits.

1.5 EQUIPMENT

Machines, tools, and equipment used in the performance of the work shall be approved by the Contracting Officer and maintained in satisfactory operating condition. Submit construction equipment list for approval by the Contracting Officer.

1.5.1 Mobile and Maneuverable

Application equipment shall be mobile and maneuverable to the extent that straight lines can be followed and normal curves can be made in a true arc.

1.5.2 Paint Application Equipment

1.5.2.1 Self-Propelled or Mobile-Drawn Pneumatic Spraying Machines

Provide self-propelled or mobile-drawn pneumatic spraying machine with suitable arrangements of atomizing nozzles and controls to obtain the specified results. Provide machine having a speed during application capable of applying the stripe widths indicated at the paint coverage rate specified herein and of even uniform thickness with clear-cut edges. Provide equipment used for marking streets and highways capable of placing the prescribed number of lines at a single pass as solid lines, intermittent lines, or a combination of solid and intermittent lines using a maximum of three different colors of paint as specified. Provide paint applicator with paint reservoirs or tanks of sufficient capacity and suitable gages to apply paint in accordance with requirements specified. Equip tanks with suitable air-driven mechanical agitators. Equip spray mechanism with quick-action valves conveniently located, and include necessary pressure regulators and gages in full view and reach of the operator. Install paint strainers in paint supply lines to ensure freedom from residue and foreign matter that may cause malfunction of the spray guns. The paint applicator shall be readily adaptable for attachment of an air-actuated dispenser for the reflective media approved for use. Provide pneumatic spray guns for hand application of paint in areas where the mobile paint applicator cannot be used. Applicator for water-based markings shall be equipped with non-stick coated hoses; metal parts in contact with

the paint material shall be constructed of grade 302, 304, 316, or equal stainless steel.

1.5.3 Thermoplastic Application Equipment

1.5.3.1 Thermoplastic Material

Thermoplastic material shall be applied to the primed pavement surface by spray techniques or by the extrusion method, wherein one side of the shaping die is the pavement and the other three sides are contained by, or are part of, suitable equipment for heating and controlling the flow of material. By either method, the markings shall be applied with equipment that is capable of providing continuous uniformity in the dimensions of the stripe.

1.5.3.2 Application Equipment

- a. Application equipment shall provide continuous mixing and agitation of the material. Conveying parts of the equipment between the main material reservoir and the extrusion shoe or spray gun shall prevent accumulation and clogging. All parts of the equipment which come into contact with the material shall be easily accessible and exposable for cleaning and maintenance. All mixing and conveying parts up to and including the extrusion shoes and spray guns shall maintain the material at the required temperature with heat-transfer oil or electrical-element-controlled heat.
- b. The application equipment shall be constructed to ensure continuous uniformity in the dimensions of the stripe. The applicator shall provide a means for cleanly cutting off stripe ends squarely and shall provide a method of applying "skiplines". The equipment shall be capable of applying varying widths of traffic markings.
- c. The applicator shall be equipped with a drop-on type bead dispenser capable of uniformly dispensing reflective glass spheres at controlled rates of flow. The bead dispenser shall be automatically operated and shall begin flow prior to the flow of composition to assure that the strip is fully reflectorized.

1.5.3.3 Mobile and Maneuverable

Application equipment shall be mobile and maneuverable to the extent that straight lines can be followed and normal curves can be made in a true arc. The equipment used for the placement of thermoplastic pavement markings shall be of two general types: mobile applicator and portable applicator.

1.5.3.4 Mobile Application Equipment

The mobile applicator shall be defined as a truck-mounted, self-contained pavement marking machine that is capable of hot applying thermoplastic by either the extrusion or spray method. The unit shall be equipped to apply the thermoplastic marking material at temperatures exceeding 375 degrees F, at widths varying from 3 to 12 inches and in thicknesses varying from 0.040 to 0.200 inch and shall have an automatic drop-on bead system. The mobile unit shall be capable of operating continuously and of installing a minimum of 20,000 lineal feet of longitudinal markings in an 8-hour day.

The mobile unit shall be equipped with a melting kettle which holds a

minimum of 6000 pounds of molten thermoplastic material. The kettle shall be capable of heating the thermoplastic composition to temperatures of 375 to 425 degrees F. A thermostatically controlled heat transfer liquid shall be used. Heating of the composition by direct flame shall not be allowed. Oil and material temperature gauges shall be visible at both ends of the kettle. The mobile unit shall be equipped with a minimum of two extrusion shoes located one on each side of the truck, and shall be capable of marking simultaneous edgeline and centerline stripes. Each extrusion shoe shall be a closed, oil-jacketed unit; shall hold the molten thermoplastic at a temperature of 375 to 425 degrees F; and shall be capable of extruding a line of 3 to 8 inches in width; and at a thickness of not less than 0.120 inch nor more than 0.190 inch, and of generally uniform cross section. Alternatively, the mobile unit shall be equipped with a spray gun system. The spray system shall consist of a minimum of four spray guns, located two on each side of the truck, and shall be capable of marking simultaneous edgeline and centerline stripes. The spray system shall be surrounded (jacketed) with heating oil to maintain the molten thermoplastic at a temperature of 375 to 425 degrees F; and shall be capable of spraying a stripe of 3 to 12 inches in width, and in thicknesses varying from 0.060 inch to 0.098 inch, and of generally uniform cross section.

The mobile unit shall be equipped with an electronic programmable line pattern control system. The control system shall be capable of applying skip or solid lines in any sequence, through any and all of the extrusion shoes, or the spray guns, and in programmable cycle lengths. In addition, the mobile unit shall be equipped with an automatic counting mechanism capable of recording the number of lineal feet of thermoplastic markings applied to the pavement surface with an accuracy of 0.5 percent.

1.5.3.5 Portable Application Equipment

The portable applicator shall be defined as hand-operated equipment, specifically designed for placing special markings such as crosswalks, stopbars, legends, arrows, and short lengths of lane, edge and centerlines. The portable applicator shall be capable of applying thermoplastic pavement markings by the extrusion method. The portable applicator shall be loaded with hot thermoplastic composition from the melting kettles on the mobile applicator. The portable applicator shall be equipped with all the necessary components, including a materials storage reservoir, bead dispenser, extrusion shoe, and heating accessories, so as to be capable of holding the molten thermoplastic at a temperature of 375 to 425 degrees F, of extruding a line of 3 to 12 inches in width, and in thickness of not less than 0.120 inch nor more than 0.190 inch and of generally uniform cross section.

1.5.4 Reflective Media Dispenser

The dispenser for applying the reflective media shall be attached to the paint dispenser and shall operate automatically and simultaneously with the applicator through the same control mechanism. The dispenser shall be capable of adjustment and designed to provide uniform flow of reflective media over the full length and width of the stripe at the rate of coverage specified in paragraph APPLICATION, at all operating speeds of the applicator to which it is attached.

1.5.5 Preformed Tape Application Equipment

Mechanical application equipment shall be used for the placement of preformed marking tape. Mechanical application equipment shall be defined

as a mobile pavement marking machine specifically designed for use in applying precoated, pressure-sensitive pavement marking tape of varying widths, up to 12 inches. The applicator shall be equipped with rollers, or other suitable compactive device, to provide initial adhesion of the preformed, pressure-sensitive marking tape with the pavement surface. Additional hand-operated rollers shall be used as required to properly seat the thermoplastic tape.

1.5.6 Surface Preparation Equipment

1.5.6.1 Waterblast Equipment

The water pressure shall be specified at 2600 psi at 140 degrees F in order to adequately clean the surfaces to be marked.

1.5.7 Marking Removal Equipment

Equipment shall be mounted on rubber tires and shall be capable of removing markings from the pavement without damaging the pavement surface or joint sealant. Waterblasting equipment shall be capable of producing an adjustable, pressurized stream of water. Sandblasting equipment shall include an air compressor, hoses, and nozzles. The compressor shall be equipped with traps to maintain the air free of oil and water.

1.5.7.1 Chemical Equipment

Chemical equipment shall be capable of application and removal of chemicals from the pavement surface, and shall leave only non-toxic biodegradable residue.

1.5.8 Traffic Controls

Suitable warning signs shall be placed near the beginning of the worksite and well ahead of the worksite for alerting approaching traffic from both directions. Small markers shall be placed along newly painted lines or freshly placed raised markers to control traffic and prevent damage to newly painted surfaces or displacement of raised pavement markers. Painting equipment shall be marked with large warning signs indicating slow-moving painting equipment in operation.

1.6 MAINTENANCE OF TRAFFIC

1.6.1 Lighting

When night operations are necessary, all necessary lighting and equipment shall be provided. Lighting shall be directed or shaded to prevent interference with aircraft, the air traffic control tower, and other base operations. All lighting and related equipment shall be capable of being removed from the runway within 15 minutes of notification of an emergency. Night work must be coordinated with the Airfield Manager and approved in advance by the Contracting Officer or authorized representative. The Government reserves the right to accept or reject night work on the day following night activities by the Contractor.

1.6.2 Roads, Streets, and Parking Areas

When traffic must be rerouted or controlled to accomplish the work, the necessary warning signs, flagpersons, and related equipment for the safe passage of vehicles shall be provided.

1.7 WEATHER LIMITATIONS FOR REMOVAL

Pavement surface shall be free of snow, ice, or slush. Surface temperature shall be at least 40 degrees F and rising at the beginning of operations, except those involving shot or sand blasting. Operation shall cease during thunderstorms. Operation shall cease during rainfall, except for waterblasting and removal of previously applied chemicals. Waterblasting shall cease where surface water accumulation alters the effectiveness of material removal.

PART 2 PRODUCTS

2.1 MATERIALS

Provide materials conforming to the requirements specified herein.

2.1.1 Paints for Roads and Streets

FS TT-P-1952, color as indicated .

2.1.2 Reflective Media for Roads and Streets

FS TT-B-1325, Type I, Gradation A.

2.1.3 Thermoplastic Compound

The thermoplastic reflectorized pavement marking compound shall be extruded or sprayed in a molten state onto a primed pavement surface. Following a surface application of glass beads and upon cooling to normal pavement temperatures, the marking shall be an adherent reflectorized strip of the specified thickness and width that is capable of resisting deformation by traffic.

2.1.3.1 Composition Requirements

The binder component shall be formulated as a hydrocarbon resin. The pigment, beads and filler shall be uniformly dispersed in the binder resin. The thermoplastic composition shall be free from all skins, dirt, and foreign objects and shall comply with the following requirements:

<u>Component</u>	<u>Percent by Weight</u>	
	<u>White</u>	<u>Yellow</u>
Binder	17 min	17 min
Titanium dioxide	10 min	-
Glass beads	20 min	20 min
Calcium carbonate and inert fillers	49 min	*
Yellow pigments	-	*

<u>Component</u>	<u>Percent by Weight</u>	
	<u>White</u>	<u>Yellow</u>
*Amount and type of yellow pigment, calcium carbonate and inert fillers shall be at the option of the manufacturer, providing the other composition requirements of this specification are met.		

2.1.3.2 Physical Properties

- a. Drying time: When installed at 70 degrees F and in thicknesses between 0.120 and 0.190 inch, the composition shall be completely solid and shall show no damaging effect from traffic after curing 15 minutes.
- b. Softening point: The composition shall have a softening point of not less than 194 degrees F when tested in accordance with ASTM E28.
- c. Specific gravity: The specific gravity of the composition shall be between 1.9 and 2.2 as determined in accordance with ASTM D792.

2.1.3.3 Primer

- a. Asphalt concrete primer: The primer for asphalt concrete pavements shall be a thermosetting adhesive with a solids content of pigment reinforced synthetic rubber and synthetic plastic resin dissolved or dispersed in a volatile organic solvent. The solids content shall not be less than 10 percent by weight at 70 degrees F and 60 percent relative humidity. A wet film thickness of 0.005 inch, plus or minus 0.001 inch, shall dry to a tack-free condition in less than 5 minutes.
- b. Portland cement concrete primer: The primer for portland cement concrete pavements shall be an epoxy resin primer. The primer shall be of the type recommended by the manufacturer of the thermoplastic composition.

2.1.4 PREFORMED TAPE

The preformed tape shall be an adherent reflectorized strip in accordance with ASTM D4505 Type I or IV, Class optional.

2.1.5 Raised Pavement Markers

Either metallic or nonmetallic markers of the button or prismatic reflector type may be used. Markers shall be of permanent colors as specified for pavement marking, and shall retain the color and brightness under the action of traffic. Button markers shall have a diameter of not less than 4 inches, and shall be spaced not more than 40 feet apart on solid longitudinal lines. Broken centerline marker spacings shall be in segments indicated with gaps indicated between segments. Button markers shall have rounded surfaces presenting a smooth contour to traffic and shall not project more than 3/4 inch above level of pavement. Pavement markers and adhesive epoxy shall conform to ASTM D4280

2.1.6 High Build Acrylic Coating (HBAC)

Formulate High Build Acrylic Coating (HBAC) to meet the requirements of Table I.

2.1.6.1 Preapproved HBAC Vendors and Materials

Table II presents a partial list of HBAC vendors and materials. Up to specifications's date of issue, preapproved materials met specification requirements. It is the user's responsibility to confirm preapproved material formulations have not changed and specification requirements will be met. Other products may meet HBAC requirements.

PART 3 EXECUTION

3.1 SURFACE PREPARATION

Allow new pavement surfaces to cure for a period of not less than seven days before application of marking materials. Thoroughly clean surfaces to be marked before application of the paint. Remove dust, dirt, and other granular surface deposits by sweeping, blowing with compressed air, rinsing with water, or a combination of these methods as required. Remove rubber deposits, existing paint markings, residual curing compounds, and other coatings adhering to the pavement by stiff brooms, scrapers, wire brushes, mechanical abrasion or water blasting when permitted. For Portland Cement Concrete pavement, grinding, light shot blasting, and light scarification, to a resulting profile equal to ICRI 03732 CSP 2, CSP 3, and CSP 4, respectively, can be used in addition to water blasting, to either remove existing coatings or for surface preparation on most pavements: shot blasting shall not be used on airfield pavements due to the potential of Foreign Object Damage (FOD) to aircraft. Scrub affected areas, where oil or grease is present on old pavements to be marked, with several applications of trisodium phosphate solution or other approved detergent or degreaser and rinse thoroughly after each application. After cleaning oil-soaked areas, seal with shellac or primer recommended by the manufacturer to prevent bleeding through the new paint. Do not commence painting in any area until pavement surfaces are dry and clean.

3.1.1 Early Painting of Rigid Pavements

Pretreat rigid pavements that require early painting with an aqueous solution containing 3 percent phosphoric acid and 2 percent zinc chloride. Apply the solution to the areas to be marked.

3.2 APPLICATION

3.2.1 Testing for Moisture

Apply pavement markings to dry pavement only. The Contractor shall test the pavement surface for moisture before beginning work after each period of rainfall, fog, high humidity, or cleaning, or when the ambient temperature has fallen below the dew point. Do not commence marking until the pavement is sufficiently dry and the pavement condition has been approved by the CO or authorized representative. Employ the "plastic wrap method" to test the pavement for moisture as follows: Cover the pavement with a 300 mm by 300 mm (12 inch by 12 inch) section of clear plastic wrap and seal the edges with tape. After 15 minutes, examine the plastic wrap for any visible moisture accumulation inside the plastic. Do not begin marking operations until the test can be performed with no visible moisture

accumulation inside the plastic wrap.

3.2.2 Rate of Application

3.2.2.1 Reflective Markings

Apply paint evenly to the pavement area to be coated at a rate of 105 plus or minus 5 square feet per gallon. Apply High Build Acrylic Coating (HBAC) at a rate of 50 square feet per gallon. Apply glass spheres uniformly to the wet paint on road and street pavement at a rate of (6) plus or minus (0.5) pounds of glass spheres per gallon. Collect and record readings for white and yellow retroreflective markings at the rate of one reading per 1000 linear feet. The minimum acceptable average for white markings is 200 millicandelas per square meter per lux (mcd/m²/lx) (measured with MiroLux 12 Retroreflectometer or similar instrument as agreed). The minimum acceptable average for yellow markings is 175 millicandelas per square meter per lux (mcd/m²/lx). Readings shall be computed by averaging a minimum of 10 readings taken within the area at random locations. Areas not meeting the retroreflective requirements stated above shall be re-marked.

3.2.2.2 Nonreflective Markings

Apply paint evenly to the pavement surface to be coated at a rate of 105 plus or minus 5 square feet per gallon. Apply High Build Acrylic Coating (HBAC) at a rate of 50 square feet per gallon.

3.2.2.3 Thermoplastic Compound

After surface preparation has been completed, prime the asphalt or concrete pavement surface with spray equipment. Allow primer materials to "set-up" prior to applying the thermoplastic composition. Allow the asphalt concrete primer to dry to a tack-free condition, usually occurring in less than 10 minutes. Allow the Portland Cement concrete primer to dry in accordance with the thermoplastic manufacturer recommendations. To shorten the curing time of the epoxy resins, an infrared heating device may be used on the concrete primer. Apply asphalt concrete primer to all asphalt concrete pavements at a wet film thickness of 0.005 inch, plus or minus 0.001 inch 265 to 400 square feet per gallon. Apply portland cement concrete primer to all concrete pavements (including concrete bridge decks) at a wet film thickness of between 0.04 to 0.05 inch 320 to 400 square feet per gallon. After the primer has "set-up", apply the thermoplastic at temperatures no lower than 375 degrees F nor higher than 425 degrees F at the point of deposition. Immediately after installation of the marking, apply drop-on reflective glass spheres mechanically at the rate of one pound per 20 square feet such that the spheres are held by and imbedded in the surface of the molten material. Apply all extruded thermoplastic markings at the specified width and at a thickness of not less than 0.125 inch nor more than 0.190 inch. Apply all sprayed thermoplastic markings at the specified width and the thickness designated in the contract plans. If the plans do not specify a thickness, apply centerline markings at a wet thickness of 0.090 inch, plus or minus 0.005 inch, and edgeline markings at a wet thickness of 0.060 inch, plus or minus 0.005 inch.

3.2.3 Painting

Apply paint pneumatically with approved equipment at rate of coverage specified herein. Provide guidelines and templates as necessary to control paint application. Take special precautions in marking numbers, letters,

and symbols. Manually paint numbers, letters, and symbols. Sharply outline all edges of markings. The maximum drying time requirements of the paint specifications will be strictly enforced, to prevent undue softening of bitumen, and pickup, displacement, or discoloration by tires of traffic. Discontinue painting operations if there is a deficiency in drying of the markings until cause of the slow drying is determined and corrected.

3.2.4 Reflective Media

Application of reflective media shall immediately follow the application of paint. Accomplish drop-on application of the glass spheres to ensure even distribution at the specified rate of coverage. Should there be malfunction of either paint applicator or reflective media dispenser, discontinue operations until deficiency is corrected.

3.2.5 Thermoplastic Compound

Place thermoplastic pavement markings upon dry pavement. At the time of installation the pavement surface temperature shall be a minimum of 40 degrees F and rising. Thermoplastics, as placed, shall be free from dirt or tint. Apply all centerline, skipline, edgeline, and other longitudinal type markings with a mobile applicator. Place all special markings, crosswalks, stop bars, legends, arrows, and similar patterns with a portable applicator, using the extrusion method.

3.2.6 Raised Pavement Markers

Prefabricated markers shall be aligned carefully at the required spacing or as directed and permanently fixed in place by means of epoxy adhesives. To ensure good bond, areas where markers will be set shall be thoroughly cleaned by water blasting and use of compressed air prior to applying adhesive.

3.3 FIELD TESTING, INSPECTION, AND DEMONSTRATIONS

3.3.1 Sampling and Testing

As soon as the paint and reflective and thermoplastic materials are available for sampling, obtain by random selection from the sealed containers, two quart samples of each batch in the presence of the Contracting Officer. Accomplish adequate mixing prior to sampling to ensure a uniform, representative sample. A batch is defined as that quantity of material processed by the manufacturer at one time and identified by number on the label. Clearly identify samples by designated name, specification number, batch number, project contract number, intended use, and quantity involved. Test samples by an approved laboratory. If a sample fails to meet specification, replace the material in the area represented by the samples and retest the replacement material as specified above. Submit copy of the test results to the Contracting Officer. Include in the report of test results a listing of any specification requirements not verified by the test laboratory. At the discretion of the Contracting Officer, samples provided may be tested by the Government for verification.

3.3.2 Inspection

Examine material at the job site to determine that it is the material referenced in the report of test results or certificate of compliance. A certificate of compliance shall be accompanied by test results

substantiating conformance to the specified requirements.

3.3.3 Surface Preparations and Application Procedures

Surface preparations and application procedures will be examined by the Contracting Officer to determine conformance with the requirements specified. Approve each separate operation prior to initiation of subsequent operations.

3.4 TRAFFIC CONTROL AND PROTECTION

Place warning signs near the beginning of the work site and well ahead of the work site for alerting approaching traffic from both directions. Place small markers along newly painted lines to control traffic and prevent damage to newly painted surfaces. Mark painting equipment with large warning signs indicating slow-moving painting equipment in operation. Do not use foil-backed material for temporary pavement marking because of its potential to conduct electricity during accidents involving downed power lines.

3.5 QUALITY ASSURANCE

Demonstrate success of bond of reflective media, new paint marking and the pavement surface, vacuum cured surface of new marking after a seven (7) day dry time. Inspect newly applied markings for signs of bond failure based on visual inspection and comparison to results from Test Stripe Demonstration paragraph.

3.5.1 Reflective Media and Coating Bond Verification

Within seven (7) days after pavement marking application, use industrial vacuum to sweep new markings. Visually inspect the pavement markings and the material captured by the vacuum. Verify that no significant loss of reflective media has occurred to the pavement marking due to the vacuum cleaning.

3.5.2 Reflective Media and Coating Application Verification

Use a wet film thickness gauge to measure the application of wet paint.

Use a microscope or magnifying glass to evaluate the embedment of glass beads in the paint. Verify the glass bead embedment with approximately 50 percent of the beads embedded and 50 percent of the beads exposed.

TABLE I - REQUIREMENTS FOR HIGH BUILD ACRYLIC COATINGS (HBAC)	
TEST	MINIMUM REQUIREMENT (AND MAXIMUM WHERE INDICATED)
Resin System (ASTM D2621)	Waterborne 100 percent Acrylic
Percent Volume Solids (ASTM D2697)	58 percent
Volatile Organic Compound, max. (ASTM D3960)	1.25 lbs/gal
White (FED-STD-595)	37925
Yellow (FED-STD-595)	33538
Shore D Hardness (ASTM D2240)	45
1/8 inch Mandrel Bend at 5 mils Dry Film Thickness (DFT, one-week cure (ASTM D522/D522M, Method B)	No visual defects at bend (Conditions at ASTM D3924)
Adhesion to Concrete and Asphaltic Pavements (ASTM D4541)	140 psi or 100 percent cohesive failure in pavement
Accelerated Weathering, Yellow, 2500 Hours UV Exposure (ASTM G154: see note 1)	Max. color loss to 33655 (FED-STD-595)
Water Absorption at 168 Hours Immersion Tap Water (ASTM D471)	9.0 percent max. weight increase (conditions at ASTM D3924)
Application at 65 mils Wet, One Coat, One-week Cure, (see note 2)	No visual cracking or curling (conditions at ASTM D3924)
No Pick-Up at 25 mils (ASTM D711)	Wet 10 minutes max.
Lead (ASTM D3335)	0.06 percent max.
Cadmium (ASTM D3335)	0.06 percent max.
Chromium (ASTM D3718)	0.00 percent

TABLE I - REQUIREMENTS FOR HIGH BUILD ACRYLIC COATINGS (HBAC)	
TEST	MINIMUM REQUIREMENT (AND MAXIMUM WHERE INDICATED)
Notes:	
<p>(1) Properly mix and apply yellow paint at 10 mils plus or minus 2 mils DFT over a suitably sized, clean aluminum substrate (ASTM D823), and cure for a minimum of 48 hours: four individual yellow samples shall be prepared. Expose three samples to continuous Ultraviolet (UV) light for 2500 hours, without cycles condensation, in accordance to ASTM G154: UVA-340 lamps shall be used in the testing apparatus. Following exposure, compare the three exposed samples to the "one" non-exposed sample using FED-STD-595 colors 33538 and 33655 as visual references: evaluate exposed samples for degree of visual color loss. Yellow paint shall receive a passing rating if each exposed sample appears equivalent to the non-exposed sample, and in addition, displays color loss no greater than FED-STD-595 color 33655.</p>	
<p>(2) Using double-stick, foam mounting tape (or equal) with a nominal thickness of 65 mils, apply a rectangular mold with inner dimensions of 3 in by 10 in to a clean aluminum sample approximately sized at 6 in by 12 in by 1/8 in. Do not remove the tape's plastic backing. Mix and apply excess paint into mold. Remove excess paint, by squeegee or other appropriate draw down technique, to a uniform thickness equal to the tape's height. Paint application and draw down shall be performed within a period of no more than 60 seconds. Approximately one to two minutes following the draw down, remove tape from sample and allow coating to cure for a minimum period of one week ASTM D3924. Using a micrometer or other appropriate device, measure cured coating thickness (less sample thickness) to confirm resulting coating application was at or above 38 mils DFT. Inspect coating for visual signs of cracking and curling. Following a one week cure, coating shall receive a passing rating if applied greater than 38 mils DFT and visually free of both cracking and curling.</p>	

TABLE II - PREAPPROVED HBACs	
MANUFACTURER	PRODUCTS
TMT-Pathway 1021 North Mission Road Los Angeles, CA 90033 (800) 338-7680	Legend Build, #2712A9, White
	Legend Build, #2713A9, Yellow
Pervo Paints 6624 Stanford Avenue Los Angeles, CA 90001 (323) 758-1147	Pervo 6050, White
	Pervo 6053, Yellow
Vogel Traffic Services 1920 Albany Place South PO Box 140 Orange City, IA 51041 (712) 737-4016	UC-1516, White
	UC-3588, Yellow

-- End of Section --

SECTION 32 84 24

IRRIGATION SPRINKLER SYSTEMS

08/11

PART 1 GENERAL

1.1 REFERENCES

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

AMERICAN PETROLEUM INSTITUTE (API)

API Std 598 (2009) Valve Inspecting and Testing

AMERICAN SOCIETY OF SANITARY ENGINEERING (ASSE)

ASSE 1020 (2004; Errata 2004; Errata 2004)
Performance Requirements for Pressure
Vacuum Breaker Assembly (ANSI Approved
2004)

ASSE Series 5000 (2009) Cross-Connection Control
Professional Qualification Standard

AMERICAN WATER WORKS ASSOCIATION (AWWA)

AWWA C500 (2009) Metal-Seated Gate Valves for Water
Supply Service

AWWA C511 (2007) Standard for Reduced-Pressure
Principle Backflow Prevention Assembly

AWWA C651 (2005; Errata 2005) Standard for
Disinfecting Water Mains

AWWA C901 (2008) Polyethylene (PE) Pressure Pipe and
Tubing, 1/2 In. (13mm) Through 3 In. (76
mm), for Water Service

AWWA M14 (2004; 3rd Ed) Manual: Recommended
Practice for Backflow Prevention and
Cross-Connection Control

ASME INTERNATIONAL (ASME)

ASME B1.2 (1983; Errata 1992; R 2007) Gages and
Gaging for Unified Inch Screw Threads

ASME B16.15 (2013) Cast Copper Alloy Threaded Fittings
Classes 125 and 250

ASME B16.18 (2012) Cast Copper Alloy Solder Joint
Pressure Fittings

ASME B16.22 (2013) Standard for Wrought Copper and

Copper Alloy Solder Joint Pressure Fittings

ASTM INTERNATIONAL (ASTM)

ASTM B32	(2008; R 2014) Standard Specification for Solder Metal
ASTM B43	(2014) Standard Specification for Seamless Red Brass Pipe, Standard Sizes
ASTM B88	(2014) Standard Specification for Seamless Copper Water Tube
ASTM D1785	(2012) Standard Specification for Poly(Vinyl Chloride) (PVC), Plastic Pipe, Schedules 40, 80, and 120
ASTM D2241	(2009) Standard Specification for Poly(Vinyl Chloride) (PVC) Pressure-Rated Pipe (SDR Series)
ASTM D2287	(2012) Nonrigid Vinyl Chloride Polymer and Copolymer Molding and Extrusion Compounds
ASTM D2464	(2013) Standard Specification for Threaded Poly(Vinyl Chloride) (PVC) Plastic Pipe Fittings, Schedule 80
ASTM D2466	(2013) Standard Specification for Poly(Vinyl Chloride) (PVC) Plastic Pipe Fittings, Schedule 40
ASTM D2564	(2012) Standard Specification for Solvent Cements for Poly(Vinyl Chloride) (PVC) Plastic Piping Systems
ASTM D2774	(2012) Underground Installation of Thermoplastic Pressure Piping
ASTM D2855	(1996; R 2010) Standard Practice for Making Solvent-Cemented Joints with Poly(Vinyl Chloride) (PVC) Pipe and Fittings
ASTM D3261	(2012; E 2014) Standard Specification for Butt Heat Fusion Polyethylene (PE) Plastic Fittings for Polyethylene (PE) Plastic Pipe and Tubing
ASTM F441/F441M	(2013; E 2013) Standard Specification for Chlorinated Poly(Vinyl Chloride) (CPVC) Plastic Pipe, Schedules 40 and 80

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

FCCCHR List	(continuously updated) List of Approved Backflow Prevention Assemblies
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MANUFACTURERS STANDARDIZATION SOCIETY OF THE VALVE AND FITTINGS
INDUSTRY (MSS)

MSS SP-80 (2013) Bronze Gate, Globe, Angle and Check Valves

MSS SP-85 (2011) Gray Iron Globe & Angle Valves Flanged and Threaded Ends

NATIONAL ELECTRICAL MANUFACTURERS ASSOCIATION (NEMA)

NEMA ICS 2 (2000; R 2005; Errata 2008) Standard for Controllers, Contactors, and Overload Relays Rated 600 V

NEMA ICS 6 (1993; R 2011) Enclosures

NATIONAL FIRE PROTECTION ASSOCIATION (NFPA)

NFPA 70 (2014; AMD 1 2013; Errata 1 2013; AMD 2 2013; Errata 2 2013; AMD 3 2014; Errata 3-4 2014; AMD 4-6 2014) National Electrical Code

NSF INTERNATIONAL (NSF)

NSF/ANSI 14 (2014) Plastics Piping System Components and Related Materials

U.S. GENERAL SERVICES ADMINISTRATION (GSA)

CID A-A-51145 (Rev D; Notice 1; Notice 2) Flux, Soldering, Non-Electronic, Paste and Liquid

UNDERWRITERS LABORATORIES (UL)

UL 651 (2011; Reprint May 2014) Standard for Schedule 40 and 80 Rigid PVC Conduit and Fittings

1.2 SYSTEM DESCRIPTION

This system is designed with a water pressure minimum of 60 pounds per square inch (psi) at connection to main backflow prevention device. If pressure falls above or below indicated values, Contractor shall notify Contracting Officer. For Irrigation Sprinkler System, indicate the following:

- a. Head, piping, valve, , layout.
- b. Pipe, valve, backflow preventer, and controller.
- c. Invert elevations. Indicate obstructions interfering with operation.
- d. Water source equipment, including existing mains, piping, valves and meters.
- e. System and supply pressures.

- f. Indicate wiring diagram between existing power source and controller/water pump.
- g. Number and extent of control valve circuits.
- h. Provide details of all irrigation components and accessories.

1.3 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are for Contractor Quality Control approval. Submit the following in accordance with Section 01 33 00 SUBMITTAL PROCEDURES:

SD-02 Shop Drawings

Irrigation sprinkler system

Drawings including irrigation legend prepared by a licensed, registered or certified Landscape Architect or Irrigation Specialist.

SD-03 Product Data

Piping materials, tubing, and fittings

Valves and accessories

Sprinkler heads

Backflow preventers

Automatic controller

Solvent cement

Control wiring

Drip irrigation equipment and accessories

Water meter

Tapping tee

Valve boxes and lids

Drip head accessories

SD-05 Design Data

System pressure calculations

Irrigation requirements

SD-06 Test Reports

Valves, and accessories tests

Backflow preventers

Pressure test

Operation test

Including verification of sprinkler head layout

Submit record of pressure tests conducted on recording gage.

SD-07 Certificates

Backflow preventers

ASSE Series 5000, Submit a certificate of Full Approval or a current Certificate of Approval from FCCCHR List for size, and make of backflow preventer being provided for this project. A Certificate of Provisional Approval will not be acceptable.

SD-08 Manufacturer's Instructions

Automatic controller

Sprinkler heads

Piping materials

Tubing and fittings.

Backflow preventers

Valves

Solvent cement

Control wiring

Drip irrigation and accessories

Water meter

Rain shut-off device

SD-11 Closeout Submittals

Controller Charts

1.4 DELIVERY, STORAGE, AND HANDLING

1.4.1 Delivery

Deliver materials in original rolls, packages, cartons, and containers with the name of manufacturer, brand, and model. Inspect materials delivered to the site for damage.

1.4.2 Storage

Store materials on site in enclosures or under protective covering. Store

plastic piping and rubber gaskets under cover out of direct sunlight. Do not store materials directly on ground. Keep inside of pipes and fittings free from dirt and debris.

1.4.3 Handling

Handle and carry pipe, fittings, valves, and accessories in such a manner as to ensure delivery to trench in sound undamaged condition. Do not drag pipe.

1.5 QUALITY ASSURANCE

1.5.1 Required Test

Submit tests signed by an authorized official of a testing laboratory of sprinkler head, valve, automatic controller, emitter heads, vacuum breaker, backflow preventer, and water hammer arrester.

PART 2 PRODUCTS

2.1 PIPING MATERIALS

2.1.1 Copper Tubing and Associated Fittings

2.1.1.1 Tubing

ASTM B88, Type K.

2.1.1.2 Fittings

ASME B16.22 and ASME B16.18, solder joint. Solder, ASTM B32 alloy Grade Sn95 or Sn94. Flux, CID A-A-51145, Type I.

2.1.2 Red Brass Pipe and Associated Fittings

2.1.2.1 Pipe

ASTM B43, regular.

2.1.2.2 Fittings

ASME B16.15, Class 250, cast bronze threaded.

2.1.3 Polyvinyl Chloride (PVC) Pipe, Fittings and Solvent Cement

NSF/ANSI 14, seal of approval for potable water.

2.1.3.1 Pipe

ASTM D1785, PVC 1120 Schedule 40 ; or ASTM D2241, PVC 1120 SDR 21, Class 315 . Provide integral lavender-color pipe for non-potable use.

2.1.3.2 Fittings

- a. Solvent Welded Socket Type: ASTM D2466, Schedule 40.
- b. Threaded Type: ASTM D2464, Schedule 80.

2.1.3.3 Solvent Cement

ASTM D2564.

2.1.4 Polyethylene (PE) Plastic Piping

2.1.4.1 Pipe

AWWA C901, outside diameter (od) base with dimension ratio (DR) of 9.3 to provide 150 psi minimum pressure rating.

2.1.4.2 Fittings

ASTM D3261, DR of 9.3.

2.1.5 Dielectric Fittings

ASTM F441/F441M, Schedule 80, CPVC threaded pipe nipples, 4 inch length.

2.1.6 Drip Irrigation Tubing

ASTM D2287, maximum inside diameter (id) of 1/8 or 1/2 inch, vinyl plastic extruded from non-rigid chloride, integrally algae-resistant, homogeneous throughout, smooth inside and outside, free from foreign materials, cracks, serrations, blisters and other effects. Provide slip, barbed or compression fittings.

2.1.7 Pipe Sleeving

- a. Provide PVC piping two times the diameter of main or lateral piping.
- b. Provide grey PVC electrical conduit sized according to number of control wires. Minimum 2 inch size.

2.2 IRRIGATION AND DRIP SPRINKLER HEADS

Provide lavender-colored body, nozzle, and/or cap indicator for non-potable use.

2.2.1 Fixed Riser Irrigation Heads

2.2.1.1 Stream Rotors, Full or Part Circle

Sprinkler body, nozzle, and screen constructed of heavy-duty, ultra-violet resistant plastic. Heavy duty, stainless steel internal construction with plastic body. Provide check valve below each sprinkler body on riser.

2.2.1.2 Gear Rotor Irrigation Head, Full or Part Circle

Single-stream, water lubricated, gear drive type capable of covering required irrigation area. Part circle sprinkler with an adjustable arc coverage of 30 to 360 degrees. Stainless steel internal construction with plastic body, with matched precipitation rate nozzles in standard /low/ flat angle trajectories, filter screen, reducible watering radius.

2.2.1.3 Spray Irrigation Heads, Full or Part Circle

Capable of covering the required irrigation area. Sprinkler body, nozzle, and screen constructed of heavy-duty, ultra-violet resistant plastic.

Matched precipitation rate nozzle with an adjustable screw capable of regulating the radius and the flow. Capable of housing under the nozzle; protective, non-clogging filter screen and/or pressure compensating devices. Screen used in conjunction with the adjusting screw from regulating. Provide check valve below each sprinkler body on riser.

2.2.1.4 Adjustable Flood Bubbler Head

Capable of operating over a pressure range of 10 to 60 psi. Constructed of durable ultra-violet resistant plastic with a plastic inlet filter screen to protect the nozzle against clogging, and a stainless steel adjustable screw, capable of shutting off the bubbler and regulating the flow.

2.2.1.5 Pressure Compensating Flood Bubbler Head

Capable of providing a consistent discharge rate. Plastic inlet filter screen bubbler assembly to protect the nozzle against clogging. Permanently assembled design constructed of durable, ultra-violet resistant plastic with a integral rubber flow washer for regulating the discharge rate at an operating pressure range of 20 to 90 psi.

2.2.2 Pop-Up Irrigation Head

2.2.2.1 Stream Rotor Irrigation Head, Full or Part Circle

Sprinkler body, nozzle, and screen constructed of heavy-duty, ultra-violet resistant plastic. Heavy duty, stainless steel internal construction with plastic body. Pop-up height of 4, 6 or 12 inches as measured from top of cap at normal installation to middle of nozzle orifice.

2.2.2.2 Gear Rotor Irrigation Head, Full or Part Circle

Sprinkler body, nozzle, and screen constructed of heavy-duty, ultra-violet resistant plastic. Heavy duty, stainless steel internal construction with plastic body and match precipitation rates for standard low or flat angle trajectories. Single-stream, water lubricated, gear drive type capable of covering the required irrigation area. Part circle sprinkler with an adjustable arc coverage of 30 to 360 degrees. Pop-up height of 4, 6 or 12 inches as measured from top of cap at normal installation to middle of nozzle orifice. Provide wiper seal that positively seals against nozzle flange to keep debris out of rotor and cleans debris from pop-up stem as it retracts. Provide check valve in head.

2.2.2.3 Spray Irrigation Head, Full or Part Circle

Capable of covering the required irrigation area. Sprinkler body, nozzle, and screen constructed of heavy-duty, ultra-violet resistant plastic with wiper seal. Plastic nozzle with matched precipitation rate and an adjustable screw capable of regulating the radius and flow. Capable of housing under the nozzle; protective, non-clogging filter screen and/or pressure compensating devices. Screen used in conjunction with the adjusting screw from regulating. Pop-up height of 4, 6 or 12 inches as measured from the top of cap at normal installation to middle of nozzle orifice.

2.2.3 Bubblers Irrigation Head

2.2.3.1 Adjustable Flood Bubbler

Capable of providing a discharge rate for the required irrigation area. Operating over a pressure range of 10 to 60 psi. Construct of durable ultra-violet resistant plastic with a plastic inlet filter screen to protect the nozzle against clogging, and a stainless steel adjusting screw, capable of shutting off the bubbler and regulating the flow. Pop-up height of 4, 6 or 12 inches as measured from top of cap at normal installation to middle of nozzle orifice.

2.2.3.2 Pressure Compensating Flood Bubbler

Capable of providing a consistent discharge rate required for the irrigation area. Plastic inlet filter screen bubbler assembly to protect the nozzle against clogging. Permanently assembled design constructed of durable, ultra-violet resistant plastic with an integral rubber flow washer for regulating the discharge rate at an operating pressure range of 20 to 90 psi. Pop-up height of 4, 6 or 12 inches as measured from top of cap at normal installation to middle of nozzle orifice.

2.3 VALVES

Provide lavender-colored assembly for non-potable use.

2.3.1 Isolation Valve

2.3.1.1 Ball Valves, Less than 3 Inches

API Std 598, brass or plastic body, threaded ends.

2.3.1.2 Gate Valves, 3 Inches and Larger

AWWA C500, bottom wedging double discs, parallel seats, non-rising stems, open by counterclockwise turning. Provide flanged end connections. Provide bronze interior construction of valves including stem containing a maximum 2 percent aluminum and maximum 16 percent zinc.

2.3.2 Control Valves

2.3.2.1 Remote Control Valve, Electrical

Solenoid actuated globe or angle valves of 3/4 to 3 inch size, alternating current (ac), 60/50 cycle. Provide plastic valve housing suitable for service at 150 psi operating pressure.

2.3.2.2 Manual Angle Control Valve, Manual Globe Control Valve

Less than 2 1/2 inch MSS SP-80, type 3, Class 150 threaded ends. Angle or globe valve 2 1/2 inch and larger MSS SP-85, Type II, Class 250 threaded ends.

2.3.3 Quick Coupling Valves

Two piece unit consisting of a coupler water seal valve assembly and a removable upper body to allow spring and key track to be serviced without shutout of main. Provide brass parts. Provide yellow lockable lids with springs for positive closure on key removal.

2.3.4 Hose Bib

One piece consisting of all brass construction with full flow 3/4 inch hose connection outlet and with attached handle with gaskets and washers.

2.3.5 Backflow Preventers

2.3.5.1 Reduced Pressure Type Backflow Preventers

AWWA C511. Provide backflow preventers complete with mounted valve and strainer, stainless steel or bronze, internal parts. Total pressure drop through complete assembly shall be a maximum of 10 psi at rated flow. Listing of particular make, model/design, and size in FCCCHR List will be acceptable as required proof for testing and certification.

- a. Piping Assembly: Red brass pipe and fittings .
- b. Strainers: Bronze or brass construction with gasket caps. Equip units with No. 200 mesh stainless steel screen elements.

2.3.5.2 Pressure Type Vacuum Breaker

ASSE 1020 bronze or brass construction, with one or two check valves, vacuum relief, inlet and discharge shut-offs valves, and field test cocks, and with vacuum relief opening of greater diameter than unit.

2.3.5.3 Atmospheric Vacuum Breaker

AWWA M14, vacuum relief, inlet and discharge openings, and with vacuum relief opening of greater diameter than unit.

2.4 ACCESSORIES AND APPURTENANCES

2.4.1 Tapping Tee

Bronze flat, double strap, with neoprene gasket or "O"-ring seal.

2.4.2 Water Meter

Meter to include roll sealed register, magnetic drive, straight reading (odometer shall indicate in gallons, large numerals, glass lens for legibility,) low flow indicator to detect leaks, tamper proof seal pin to detect theft; sturdy durable, corrosion resistant main case, electrical grounding continuity; nutating disc measuring chamber with minimum head loss.

2.4.3 Drip Head Accessories

2.4.3.1 Strainer

Provide strainer at inlet to each drip control valve assembly. Provide polyester fabric screen attached to a PVC frame having the equivalent of 150 mesh filtration capacity. Compact "Y" body and cap configuration. Incorporate flush valves within strainer to clean screen without disassembling unit.

2.4.3.2 Riser Adapters

PVC material, threaded or barbed to attached drip heads to tubing, pop-up irrigation body, or rigid piping and tubing to rigid piping.

2.4.3.3 Tubing Stakes

Plastic, plastic coated steel, or other non-corrosive strong material to secure tubing.

2.4.3.4 Bug Cap

Provide check valves at end of each emitter outlet distribution line. Valves shall permit free flow of water with minimum restriction; prevent back siphoning, entry of insects, and contamination into outlet ports.

2.4.3.5 Subterranean Drip Box and Cover

Construct of ultra-violet resistant PVC. Two slots in bottom of box to allow for installation of distribution tubing onto the emission device.

2.4.3.6 Line Flushing Valve

Construct of PVC with maximum flow rate of 15 gpm with minimum flushing water volume of one gallon at a minimum 4 psi to a maximum 25 psi at a point of discharge.

2.4.3.7 Valve Boxes

Plastic valve box for each isolation valve, control valve, and quick coupling valve. Provide box sizes that are suitable and adjustable for valve used.

- a. Cast the word "IRRIGATION" on cover.
- b. Stencil, engrave, or brand controller and valve sequence on remote control valve cover. Letters minimum 4 inches height.

2.4.4 Flow Meter

Flow meter sized for the gpm, female national pipe threaded ends and replaceable metering insert. 9 volt direct current output with a pulse rate which is proportional to the gpm, a 0.067 amperes fuse link to protect metering insert and 14 gage output feeder wire to be powered by the controller. Provide brass or plastic meter housing suitable for service at 150 psi operating pressure.

2.5 Automatic Controller Electrical or solar wth battery back-up

Controller, NEMA ICS 2 with 120-volt single phase service or 24 VDC solar with 24 VDC battery, operating with indicated station, and grounded chassis. Provide enclosure NEMA ICS 6 Type 3R, with locking hinge cover, wall mounted or pedestal mounted.

2.5.1 Controller Features

- a. Matching -station controller with independent programs that can run concurrently.

- b. Allows an infinite number of cycles per day by placing the program in a looping mode.
- c. Ability to be programmed in one second increments, from one second to 24 minutes.
- d. A water budgeting capability in all stations within a program in one percent increments from one percent to 255 percent.
- e. A programmable watering calendar ranging from one to 16 to days.
- f. A single-station timed manual feature that allows a station to be turned on manually for its programmed watering time.
- g. A semi-automatic manual cycle feature.
- h. A true manual operation with safety shut-off at midnight and indicate which station is on by means of L.E.D.S.
- i. UL listed, having a re-settable circuit breaker, cadmium plated, weatherproof steel case, and keyed lock.

2.6 ELECTRICAL CIRCUITS

2.6.1 Control Wiring for Electrically Operated Valves

NFPA 70, copper conductor 14 gage wire, Type UF.

2.6.2 Conduit

UL 651, rigid polyvinyl chloride conduit, Schedule 40.

2.7 CONCRETE MATERIALS

2500 psi compressive concrete strength at 28 days.

PART 3 EXECUTION

3.1 INSTALLATION

Install sprinkler system after site grading has been completed.

3.1.1 Trenching

Hand trench around roots to pipe grade when roots of 2 inches diameter or greater are encountered. Make width of trench 4 inches minimum or 1 1/2 times diameter of pipe, whichever is wider. Backfill and hand tamp over excavation. When rock is encountered, excavate 4 inches deeper and backfill with silty sand (SM) or well-graded sand (SW) to pipe grade. Keep trenches free of obstructions and debris that would damage pipe. Do not mix subsoil with topsoil. Bore under existing concrete walks, drives and other obstacles at a depth conforming to bottom of adjacent trenches. Install pipe sleeve, two pipe diameters larger than sprinkler pipe, to fill bore. Prior to backfilling of trench, Contracting Officer shall verify and approve location of all irrigation heads.

3.1.2 Piping System

3.1.2.1 Clearances

- a. Minimum horizontal clearances between lines: 4 inches for 2 inch pipe and less; 12 inches for 2 inch pipe and more.
- b. Minimum vertical clearances between lines: One inch.

3.1.2.2 Minimum Backfill Cover

- a. 18 inches for pressure mainline pipe and valve control wire.
- b. 12 inches for non-pressure lateral pipe.
- c. 24 inches for all piping under paved or non-paved pedestrian paths.

3.1.2.3 Restoration

Fill top 3 inches with topsoil and compact with same density as surrounding soil. Restore turf and according to Section 32 92 19 SEEDING, Section 32 92 26 SPRIGGING, . . .

3.1.2.4 Sterilization

Sprinkler system fed from a potable water system sterilized upstream of backflow preventer in accordance with AWWA C651. Sterilize new water lines for a minimum of 24 hours to meet state health test requirements before placing in service. Minimum retention period shall be 3 hours.

3.1.3 Piping Installation

3.1.3.1 Polyvinyl Chloride (PVC) Pipe

- a. Solvent-Cemented Joints: ASTM D2855.
- b. Threaded Joints: full cut with a maximum of three threads remain exposed on pipe and nipples. Make threaded joints tight without recourse to wicks or fillers, other than polytetrafluoroethylene thread tape.
- c. Piping: ASTM D2774 or ASTM D2855, and pipe manufacturer's instructions. Install pipe in a serpentine (snaked) manner to allow for expansion and contraction in trench before backfilling. Install pipes at temperatures over 40 degrees F.

3.1.3.2 Soldered Copper Tubing

Ream pipe and remove burrs. Clean and polish contact surfaces of joint. Flux both male and female ends. Insert end of tube into fittings full depth of socket. After soldering, a solder bead shall show continuously around entire joint circumference. Remove excess acid flux from tubings and fittings.

3.1.3.3 Threaded Brass or Galvanized Steel Pipe

Prior to installation ream pipe. Cut threads as specified in ASME B1.2. Make joints with pipe joint compound applied to male end only.

3.1.3.4 Polyethylene (PE) Pipe and Drip Tubing

Bury 12 inches deep. compression connection or barbed connection in accordance with manufacturers recommendation. Install hose in serpentine manner. When cutting hose, use a shearing tool such as a pipe cutter, knife or shears. Use only manufacturer's recommended tool and procedure when installing drip heads.

3.1.3.5 Dielectric Protection

Where pipes of dissimilar metal are joined, make connection with dielectric fitting.

3.1.4 Irrigation Heads

Install plumb and level with terrain.

3.1.4.1 Fixed Riser Irrigation Heads

Nozzle mounted on fixed riser minimum 6 inches above grade in mulched planter beds, 12 inches above grade in planter beds with groundcover. Provide swing joint assembly attachment between lateral lines and fixed risers.

3.1.4.2 Pop-Up Irrigation Head

Install plumb and level with terrain. Provide swing joint assembly attachment between lateral line and pop-up body. Top of irrigation head shall be flush with surrounding finish grade.

3.1.4.3 Drip Heads

Install drip heads . Connect drip head to a drip head stake . Attach tubing to barbed fitting and daylight distribution tubing at rootball secured with stake. Add bug cap at end of secured distribution tubing. After installing drip heads and before operating system, open end of drop lateral and flush lines clean. The number of drip heads on a line shall not exceed manufacturer's recommendations for that hose or distribution tubing size and length.

3.1.5 Valves

3.1.5.1 Isolation Valves

Install in a valve box extending from grade to below valve body, with a minimum of 4 inches cover measured from finish grade to top of valve stem.

3.1.5.2 Control Valves

Plumb valve in a valve box extending from grade to below valve body, with minimum of 4 inch cover measured from grade to top of valve. Install automatic valves beside sprinkler heads with a valve box.

3.1.5.3 Quick Coupling Valves

Install 2 inches above finish grade in planter bed, level with finish grade in turf areas.

3.1.5.4 Hose Bibb

Install with support.

3.1.5.5 Drain Valves

Entire system shall be manually or automatically drainable. Equip low point of each underground line with drain valve draining into an excavation containing gravel. Cover gravel with building paper. Backfill with excavated material and 6 inches of topsoil.

3.1.6 Backflow Preventers

- a. Install backflow preventer in new connection to existing water distribution system, between connection and control valves. Install with concrete pads. Install with concrete pads in turf only.
- b. Flush pipe lines prior to installing device.
- c. Device shall not be installed in pits or where any part of the device could become submerged in standing water
- d. Install device a minimum of 12 inches from trees, walls, fences, structures and other obstructions.

3.1.6.1 Reduced Pressure Backflow Preventer

- a. Protect device by a strainer located upstream.
- b. Install device a minimum of 12 inches between finish grade and bottom of relief port.

3.1.6.2 Pressure Vacuum Breaker

- a. Install device a minimum of 12 inches between highest irrigation head and bottom of air relief valve.

3.1.6.3 Atmospheric Vacuum Breaker

Install device minimum of 12 inches between highest irrigation head and bottom of relief valve located downstream of irrigation control valve.

3.1.7 Accessories

3.1.7.1 Connection To Existing Water Supply Systems (Tapping Tee)

Use tapping or drilling machine valve and mechanical joint type sleeves for connections to be made under pressure. Bolt sleeves around mains; bolt valve conforming to AWWA C500 to the branch. Open valve, attach drilling machine, make tap, close valve, and remove drilling machine, without interruption of service. Notify Contracting Officer in writing at least 15 days prior to the date the connections are required; receive approval before any service is interrupted. Provide materials required to make connections into the existing water supply systems and perform excavating, backfilling, and other incidental labor as required. Furnish the labor and the tapping or drilling machine for making the actual connections to the existing systems.

3.1.7.2 Water Meter

Install meter upstream of backflow preventer per manufacturer's recommendations and local PWC Utility Department Instructions.

3.1.7.3 Valve Boxes and Lids

- a. Install with one cu ft pea gravel sump below valve.
- b. Support valve box with brick or concrete block.
- d. For turf areas, install flush with finish grade.
- e. For planter beds, install 2 inches above finish grade.
- f. For sloped conditions, install valve box level with terrain.

3.1.7.4 Backflow Preventer Enclosure

- a. Install with concrete pad.
- b. Place hinges so direction of swing will not conflict with other site features.

3.1.7.5 Rain Shut-Off Devices

- a. Install as per manufacturer's recommendations.
- b. For wall mounted controllers, attach devices to side of building or eave, minimum 8 feet above finish grade and a minimum of 12 inches from building wall or eave.
- c. For pedestal mounted controllers, mount on top of minimum 42 inches high pole outside of irrigation coverage in vandal-resistant enclosure.

3.1.8 Electrical Circuits

Bury wires beside mainline pipe in same trench. Provide grey electrical conduit where wires run under paved or non-paved pedestrian paths and vehicular roads. Tag wires at controller and control valve location with plastic tie wrapped tags. Provide one control wire to each control valve location and one common wire looped from controller to each control valve. provide one separate control valve wire of a different color from controller to each control valve cluster.

3.1.8.1 Loops

Provide a 12 inch loop of wire at each valve where controls are connected.

3.1.8.2 Expansion and Contraction

Bundle multiple tubes or wires and tape together at 10 foot intervals with 12 inch loop for expansion and contraction.

3.1.8.3 Splices

Make electrical splices waterproof. Locate all field electrical splices in valve boxes.

3.1.9 Automatic Controller

Determine exact location of controllers in field before installation. Coordinate the electrical service to these locations. Install in accordance with manufacturer's recommendations and NFPA 70.

3.1.10 Flushing

After piping, risers, and valves are in place and connected, but prior to installation of sprinkler heads and valves, flush piping system under a full head of water. Maintain flushing for 3 minutes.

3.1.11 Adjustment

After grading, plant installation, and rolling of planted areas, adjust sprinkler heads flush with finished grade. Make adjustments by providing new nipples of proper length or by use of heads having an approved device, integral with head, which will permit adjustment in height of head without changing piping.

3.1.12 Sterilization

Sprinkler system fed from a potable water system shall be sterilized upstream of backflow preventer in accordance with AWWA C651. Sterilize new waterlines for a minimum of 24-hours, to meet , state, federal, health test requirements before placing in service. Minimum retention period shall be 3 hours.

3.2 FIELD QUALITY CONTROL

The Contractor will conduct and the Contracting Officer and the QC representative will witness field inspections and field tests specified in this section. Perform field tests, and provide labor, equipment, and incidentals required for testing.

3.2.1 Pressure Test

3.2.1.1 Duration

During pressure test, maintain a hydrostatic pressure of 150 psi without pumping for a period of one hour with an allowable pressure drop of 5 psi before backfilling system.

3.2.1.2 Leaks

Correct leaks. Make necessary corrections to stop leakage.

3.2.1.3 Retest

Retest system twice until pressure can be maintained for duration of test.

3.2.2 Operation Test

3.2.2.1 Accessories

At conclusion of pressure test, install irrigation heads or drip heads, quick coupling assemblies, and hose bib, and test entire system for operation under normal operating pressure. Make necessary corrections or adjustments to raise or lower pressure for each system if tests results do

not match pressure requirements.

3.2.2.2 Acceptance

Operation test is acceptable if system operates through at least one complete cycle for areas to be irrigated.

3.2.3 Controller Charts

Provide one chart for each controller supplied. Indicate in chart area controlled by automatic controller. The chart is a reduction of the actual plans that will fit the maximum dimensions inside controller housing. Use black line print for chart and a different pastel or transparent color to indicate each station area of coverage. After chart is completed and approved for final acceptance, seal chart between two 20 mil pieces of clear plastic.

-- End of Section --

SECTION 32 92 19

SEEDING

10/06

PART 1 GENERAL

1.1 REFERENCES

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

ASTM INTERNATIONAL (ASTM)

ASTM C 602	(2007) Agricultural Liming Materials
ASTM D 4427	(2007) Peat Samples by Laboratory Testing
ASTM D 4972	(2001; R 2007) pH of Soils

U.S. DEPARTMENT OF AGRICULTURE (USDA)

AMS Seed Act	(1940; R 1988; R 1998) Federal Seed Act
DOA SSIR 42	(1996) Soil Survey Investigation Report No. 42, Soil Survey Laboratory Methods Manual, Version 3.0

1.2 DEFINITIONS

1.2.1 Stand of Turf

95 percent ground cover of the established species.

1.3 RELATED REQUIREMENTS

Section 32 84 24 IRRIGATION SPRINKLER SYSTEMS, 32 92 19 SEEDING and Section 32 92 26 SPRIGGING, applies to this section for pesticide use and plant establishment requirements, with additions and modifications herein.

1.4 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are for Contractor Quality Control approval. When used, a designation following the "G" designation identifies the office that will review the submittal for the Government. The following shall be submitted in accordance with Section 01 33 00 SUBMITTAL PROCEDURES:

SD-03 Product Data

Wood cellulose fiber mulch

Fertilizer

Include physical characteristics, and recommendations.

SD-06 Test Reports

Topsoil composition tests (reports and recommendations).

SD-07 Certificates

State certification and approval for seed

SD-08 Manufacturer's Instructions

Erosion Control Materials

1.5 DELIVERY, STORAGE, AND HANDLING

1.5.1 Delivery

1.5.1.1 Seed Protection

Protect from drying out and from contamination during delivery, on-site storage, and handling.

1.5.1.2 Fertilizer, Gypsum, Sulfur, Iron, and Lime Delivery

Deliver to the site in original, unopened containers bearing manufacturer's chemical analysis, name, trade name, trademark, and indication of conformance to state and federal laws. Instead of containers, fertilizer, gypsum, sulphur, iron, and lime may be furnished in bulk with certificate indicating the above information.

1.5.2 Storage

1.5.2.1 Seed, Fertilizer, Gypsum, Sulfur, Iron, and Lime Storage

Store in cool, dry locations away from contaminants.

1.5.2.2 Topsoil

Prior to stockpiling topsoil, treat growing vegetation with application of appropriate specified non-selective herbicide. Clear and grub existing vegetation three to four weeks prior to stockpiling topsoil.

1.5.2.3 Handling

Do not drop or dump materials from vehicles.

1.6 TIME RESTRICTIONS AND PLANTING CONDITIONS

1.6.1 Restrictions

Do not plant when the ground is muddy, or when air temperature exceeds 90 degrees Fahrenheit.

1.7 TIME LIMITATIONS

1.7.1 Seed

Apply seed within twenty four hours after seed bed preparation.

PART 2 PRODUCTS

2.1 SEED

2.1.1 Classification

Provide State-certified seed of the latest season's crop delivered in original sealed packages, bearing producer's guaranteed analysis for percentages of mixtures, purity, germination, weedseed content, and inert material. Label in conformance with AMS Seed Act and applicable state seed laws. Wet, moldy, or otherwise damaged seed will be rejected. Field mixes will be acceptable when field mix is performed on site in the presence of the Contracting Officer.

2.2 TOPSOIL

2.2.1 On-Site Topsoil

Surface soil stripped and stockpiled on site and modified as necessary to meet the requirements specified for topsoil in paragraph entitled "Composition." When available topsoil shall be existing surface soil stripped and stockpiled on-site in accordance with Section 31 23 00.00 20 EXCAVATION AND FILL.

2.2.2 Off-Site Topsoil

Conform to requirements specified in paragraph entitled "Composition." Additional topsoil shall be furnished by the Contractor.

2.2.3 Composition

Containing from 5 to 10 percent organic matter as determined by the topsoil composition tests of the Organic Carbon, 6A, Chemical Analysis Method described in DOA SSIR 42. Maximum particle size, 3/4 inch, with maximum 3 percent retained on 1/4 inch screen. The pH shall be tested in accordance with ASTM D 4972. Topsoil shall be free of sticks, stones, roots, and other debris and objectionable materials. Other components shall conform to the following limits:

Silt	25-50 percent
Clay	10-30 percent
Sand	20-35 percent
pH	5.5 to 7.0
Soluble Salts	600 ppm maximum

2.3 SOIL CONDITIONERS

Add conditioners to topsoil as required to bring into compliance with "composition" standard for topsoil as specified herein.

2.3.1 Lime

Commercial grade hydrate or burnt limestone containing a calcium carbonate equivalent (C.C.E.) as specified in ASTM C 602.

2.3.2 Aluminum Sulfate

Commercial grade.

2.3.3 Sulfur

100 percent elemental

2.3.4 Iron

100 percent elemental

2.3.5 Peat

Natural product of peat moss derived from a freshwater site and conforming to ASTM D 4427. Shred and granulate peat to pass a 1/2 inch mesh screen and condition in storage pile for minimum 6 months after excavation.

2.3.6 Sand

Clean and free of materials harmful to plants.

2.3.7 Perlite

Horticultural grade.

2.3.8 Composted Derivatives

Ground bark, nitrolized sawdust, humus or other green wood waste material free of stones, sticks, and soil stabilized with nitrogen and having the following properties:

2.3.8.1 Particle Size

Minimum percent by weight passing:

No. 4 mesh screen	95
No. 8 mesh screen	80

2.3.8.2 Nitrogen Content

Minimum percent based on dry weight:

Fir Sawdust	0.7
Fir or Pine Bark	1.0

2.3.9 Gypsum

Coarsely ground gypsum comprised of calcium sulfate dihydrate 61 percent, calcium 22 percent, sulfur 17 percent; minimum 96 percent passing through 20 mesh screen, 100 percent passing thru 16 mesh screen.

2.3.10 Calcined Clay

Calcined clay shall be granular particles produced from montmorillonite clay calcined to a minimum temperature of 1200 degrees F. Gradation: A minimum 90 percent shall pass a No. 8 sieve; a minimum 99 percent shall be retained on a No. 60 sieve; and a maximum 2 percent shall pass a No. 100 sieve. Bulk density: A maximum 40 pounds per cubic foot.

2.4 FERTILIZER

2.4.1 Granular Fertilizer

Organic, granular controlled release fertilizer containing the following minimum percentages, by weight, of plant food nutrients:

- 8 percent available nitrogen
- 8 percent available phosphorus
- 8 percent available potassium
- 4 percent sulfur
- 2 percent iron

2.4.2 Hydroseeding Fertilizer

Controlled release fertilizer, to use with hydroseeding and composed of pills coated with plastic resin to provide a continuous release of nutrients for at least 6 months and containing the following minimum percentages, by weight, of plant food nutrients.

- 12 percent available nitrogen
- 8 percent available phosphorus
- 8 percent available potassium

2.5 MULCH

Mulch shall be free from noxious weeds, mold, and other deleterious materials.

2.5.1 Straw

Stalks from oats, wheat, rye, barley, or rice. Furnish in air-dry condition and of proper consistency for placing with commercial mulch blowing equipment. Straw shall contain no fertile seed.

2.5.2 Hay

Air-dry condition and of proper consistency for placing with commercial mulch blowing equipment. Hay shall be sterile, containing no fertile seed.

2.5.3 Wood Cellulose Fiber Mulch

Use recovered materials of either paper-based (100 percent) or wood-based (100 percent) hydraulic mulch. Processed to contain no growth or germination-inhibiting factors and dyed an appropriate color to facilitate visual metering of materials application. Composition on air-dry weight basis: 9 to 15 percent moisture, pH range from 5.5 to 8.2. Use with hydraulic application of grass seed and fertilizer.

2.6 WATER

Source of water shall be approved by Contracting Officer and of suitable quality for irrigation, containing no elements toxic to plant life.

2.7 EROSION CONTROL MATERIALS

Erosion control material shall conform to the following:

2.7.1 Erosion Control Blanket

70 percent agricultural straw/30 percent coconut fiber matrix stitched with a degradable nettings, designed to degrade within 12 months.

2.7.2 Erosion Control Net

Net shall be heavy, twisted jute mesh, weighing approximately 1.22 pounds per linear yard and 4 feet wide with mesh openings of approximately 1 inch square.

2.7.3 Erosion Control Material Anchors

Erosion control anchors shall be as recommended by the manufacturer.

PART 3 EXECUTION

3.1 PREPARATION

3.1.1 EXTENT OF WORK

Provide soil preparation (including soil conditioners as required), fertilizing, seeding, and surface topdressing of all newly graded finished earth surfaces, unless indicated otherwise, and at all areas inside or outside the limits of construction that are disturbed by the Contractor's operations.

3.1.1.1 Topsoil

Provide 4 inches of off-site topsoil to meet indicated finish grade. After areas have been brought to indicated finish grade, incorporate fertilizer, pH adjusters, and soil conditioners into soil a minimum depth of 4 inches by disking, harrowing, tilling or other method approved by the Contracting Officer. Remove debris and stones larger than 3/4 inch in any dimension remaining on the surface after finish grading. Correct irregularities in finish surfaces to eliminate depressions. Protect finished topsoil areas from damage by vehicular or pedestrian traffic.

3.1.1.2 Soil Conditioner Application Rates

Apply soil conditioners at rates as determined by laboratory soil analysis of the soils at the job site.

3.1.1.3 Fertilizer Application Rates

Apply fertilizer at rates as determined by laboratory soil analysis of the soils at the job site.

3.2 SEEDING

3.2.1 Seed Application Seasons and Conditions

Immediately before seeding, restore soil to proper grade. Do not seed when ground is muddy or in an unsatisfactory condition for seeding. If special conditions exist that may warrant a variance in the above seeding dates or conditions, submit a written request to the Contracting Officer stating the special conditions and proposed variance. Apply seed within twenty four hours after seedbed preparation. Sow seed by approved sowing equipment. Sow one-half the seed in one direction, and sow remainder at right angles to

the first sowing.

3.2.2 Seed Application Method

Seeding method shall be hydroseeding.

3.2.2.1 Hydroseeding

First, mix water and fiber. Wood cellulose fiber, paper fiber, or recycled paper shall be applied as part of the hydroseeding operation. Fiber shall be added at 1,000 pounds, dry weight, per acre. Then add and mix seed and fertilizer to produce a homogeneous slurry. Seed shall be mixed to ensure broadcasting at the rate of 5 pounds per 1000 square feet. When hydraulically sprayed on the ground, material shall form a blotter like cover impregnated uniformly with grass seed. Spread with one application with no second application of mulch.

3.2.3 Mulching

3.2.3.1 Hay or Straw Mulch

Hay or straw mulch shall be spread uniformly at the rate of 2 tons per acre. Mulch shall be spread by hand, blower-type mulch spreader, or other approved method. Mulching shall be started on the windward side of relatively flat areas or on the upper part of steep slopes, and continued uniformly until the area is covered. The mulch shall not be bunched or clumped. Sunlight shall not be completely excluded from penetrating to the ground surface. All areas installed with seed shall be mulched on the same day as the seeding. Mulch shall be anchored immediately following spreading.

3.2.4 Rolling

If seeding is performed with cultipacker-type seeder or by hydroseeding, rolling may be eliminated.

3.2.5 Erosion Control Material

Install in accordance with manufacturer's instructions, where indicated or as directed by the Contracting Officer.

3.2.6 Watering

Start watering areas seeded as required by temperature and wind conditions. Apply water at a rate sufficient to insure thorough wetting of soil to a depth of 2 inches without run off. During the germination process, seed is to be kept actively growing and not allowed to dry out.

3.3 PROTECTION OF TURF AREAS

Immediately after turfing, protect area against traffic and other use.

3.4 RESTORATION

Restore to original condition existing turf areas which have been damaged during turf installation operations at the Contractor's expense. Keep clean at all times at least one paved pedestrian access route and one paved vehicular access route to each building. Clean other paving when work in adjacent areas is complete.

-- End of Section --

SECTION 32 92 26

SPRIGGING

04/06

PART 1 GENERAL

1.1 REFERENCES

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

ASTM INTERNATIONAL (ASTM)

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ASTM D 4427	(2007) Peat Samples by Laboratory Testing
ASTM D 4972	(2001; R 2007) pH of Soils

TURFGRASS PRODUCERS INTERNATIONAL (TPI)

TPI GSS	(1995) Guideline Specifications to Turfgrass Sodding
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U.S. DEPARTMENT OF AGRICULTURE (USDA)

AMS Seed Act	(1940; R 1988; R 1998) Federal Seed Act
DOA SSIR 42	(1996) Soil Survey Investigation Report No. 42, Soil Survey Laboratory Methods Manual, Version 3.0

1.2 DEFINITIONS

1.2.1 Stand of Turf

95 percent ground cover of the established species.

1.3 RELATED REQUIREMENTS

Section 32 84 24 IRRIGATION AND SPRINKLER SYSTEMS, Section 32 92 19 SEEDING, and Section 32 92 26 SPRIGGING applies to this section for pesticide use and plant establishment requirements, with additions and modifications herein.

1.4 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are for Contractor Quality Control approval. When used, a designation following the "G" designation identifies the office that will review the submittal for the Government. The following shall be submitted in accordance with Section 01 33 00 SUBMITTAL PROCEDURES:

SD-03 Product Data

Fertilizer

Include physical characteristics, and recommendations.

SD-06 Test Reports

Topsoil composition tests (reports and recommendations).

SD-07 Certificates

State certification and approval for seed

Sod farm certification for sprigs. Indicate type of sprig in accordance with TPI GSS.

SD-08 Manufacturer's Instructions

Erosion Control Materials

1.5 DELIVERY, STORAGE, AND HANDLING

1.5.1 Delivery

1.5.1.1 Sprig Protection

Protect from drying out and from contamination during delivery, on-site storage, and handling.

1.5.1.2 Fertilizer, Gypsum, Sulfur, Iron, and Lime Delivery

Deliver to the site in original, unopened containers bearing manufacturer's chemical analysis, name, trade name, trademark, and indication of conformance to state and federal laws. Instead of containers, fertilizer, gypsum, sulphur, iron, and lime may be furnished in bulk with certificate indicating the above information.

1.5.2 Storage

1.5.2.1 Sprig Storage

Lightly sprinkle with water, cover with moist burlap, straw, or other approved covering; and protect from exposure to wind and direct sunlight until planted. Provide covering that will allow air to circulate so that internal heat will not develop. Do not store longer than 24 hours. Do not store directly on concrete or bituminous surfaces.

1.5.2.2 Seed, Fertilizer, Gypsum, Sulfur, Iron, and Lime Storage

Store in cool, dry locations away from contaminants.

1.5.2.3 Handling

Do not drop or dump materials from vehicles.

1.6 TIME RESTRICTIONS AND PLANTING CONDITIONS

1.6.1 Restrictions

Do not plant when the ground is muddy, or when air temperature exceeds 90

degrees Fahrenheit.

1.7 TIME LIMITATIONS

1.7.1 Sprigging

Perform sprigging a maximum of twenty four hours after initial harvesting.

PART 2 PRODUCTS

2.1 SPRIGS

2.1.1 Classification

Healthy living stems, stolons, or rhizomes and attached roots of locally adapted grass without adhering soil, including two to three nodes and from 4 to 6 inches long. Obtain from heavy, dense certified sod as classified in the TPI GSS. Provide sprigs which have been grown under climatic conditions similar to those in the locality of the project. Coordinate harvesting and planting operations to prevent exposure of sprigs to the sun for more than 30 minutes before covering and moistening. Sprigs containing weeds or other detrimental material or that are heat damaged will be rejected.

2.1.2 Composition

Botanical and Common Name

Match Existing adjacent surrounding grass species. Where there is a mixture of grass species, use the dominant grass species.

2.2 SEED

2.2.1 Seed Classification

State-certified seed of the latest season's crop shall be provided in original sealed packages bearing the producer's guaranteed analysis for percentages of mixture, purity, germination, hard seed, weed seed content, and inert material. Labels shall be in conformance with AMS Seed Act and applicable state seed laws.

2.3 TOPSOIL

2.3.1 On-Site Topsoil

Surface soil modified as necessary to meet the requirements specified for topsoil in paragraph entitled "Composition." When available topsoil shall be existing surface soil stripped and stockpiled on-site in accordance with Section 31 23 00.00 20 EXCAVATION AND FILL.

2.3.2 Off-Site Topsoil

Conform to requirements specified in paragraph entitled "Composition." Additional topsoil shall be furnished by the Contractor.

2.3.3 Composition

Containing from 5 to 10 percent organic matter as determined by the topsoil

composition tests of the Organic Carbon, 6A, Chemical Analysis Method described in DOA SSIR 42. Maximum particle size, 3/4 inch, with maximum 3 percent retained on 1/4 inch screen. The pH shall be tested in accordance with ASTM D 4972. Topsoil shall be free of sticks, stones, roots, and other debris and objectionable materials. Other components shall conform to the following limits:

Silt	25-50 percent
Clay	10-30 percent
Sand	20-35 percent
pH	5.5 to 7.0
Soluble Salts	600 ppm maximum

2.4 pH ADJUSTERS AND SOIL CONDITIONERS

Add conditioners to topsoil as required to bring into compliance with "composition" standard for topsoil as specified herein.

2.4.1 Lime

Commercial grade hydrate or burnt limestone containing a calcium carbonate equivalent (C.C.E.) as specified in ASTM C 602.

2.4.2 Aluminum Sulfate

Commercial grade.

2.4.3 Sulfur

100 percent elemental

2.4.4 Iron

100 percent elemental

2.4.5 Peat

Natural product of peat moss derived from a freshwater site and conforming to ASTM D 4427. Shred and granulate peat to pass a 1/2 inch mesh screen and condition in storage pile for minimum 6 months after excavation.

2.4.6 Sand

Clean and free of materials harmful to plants.

2.4.7 Perlite

Horticultural grade.

2.4.8 Composted Derivatives

Ground bark, nitrolized sawdust, humus or other green wood waste material free of stones, sticks, and soil stabilized with nitrogen and having the following properties:

2.4.8.1 Particle Size

Minimum percent by weight passing:

No. 4 mesh screen	95
No. 8 mesh screen	80

2.4.8.2 Nitrogen Content

Minimum percent based on dry weight:

Fir Sawdust	0.7
Fir or Pine Bark	1.0

2.4.9 Gypsum

Coarsely ground gypsum comprised of calcium sulfate dihydrate 91 percent, calcium 22 percent, sulfur 17 percent; minimum 96 percent passing through 20 mesh screen, 100 percent passing thru 16 mesh screen.

2.4.10 Calcined Clay

Calcined clay shall be granular particles produced from montmorillonite clay calcined to a minimum temperature of 1200 degrees F. Gradation: A minimum 90 percent shall pass a No. 8 sieve; a minimum 99 percent shall be retained on a No. 60 sieve; and a maximum 2 percent shall pass a No. 100 sieve. Bulk density: A maximum 40 pounds per cubic foot.

2.5 FERTILIZER

2.5.1 Granular Fertilizer

Organic, granular controlled release fertilizer containing the following minimum percentages, by weight, of plant food nutrients:

- 8 percent available nitrogen
- 8 percent available phosphorus
- 8 percent available potassium
- 4 percent sulfur
- 2 percent iron

2.5.2 Hydrosprigging Fertilizer

Controlled release fertilizer, to use with hydrosprigging and composed of pills coated with plastic resin to provide a continuous release of nutrients for at least 6 months and containing the following minimum percentages, by weight, of plant food nutrients.

- 12 percent available nitrogen
- 8 percent available phosphorus
- 8 percent available potassium

2.6 MULCH

Mulch shall be free from noxious weeds, mold, and other deleterious materials.

2.6.1 Straw

Stalks from oats, wheat, rye, barley, or rice. Furnish in air-dry condition and of proper consistency for placing with commercial mulch blowing equipment. Straw shall contain no fertile seed.

2.6.2 Hay

Air-dry condition and of proper consistency for placing with commercial mulch blowing equipment. Hay shall be sterile, containing no fertile seed.

2.6.3 Wood Cellulose Fiber Mulch

Use recovered materials of either paper-based (100 percent) or wood-based (100 percent) hydraulic mulch. Processed to contain no growth or germination-inhibiting factors and dyed an appropriate color to facilitate visual metering of materials application. Composition on air-dry weight basis: 9 to 15 percent moisture, pH range from 5.5 to 8.2. Use with hydraulic application of grass and fertilizer.

2.7 WATER

Source of water shall be approved by Contracting Officer and of suitable quality for irrigation containing no element toxic to plant life.

2.8 EROSION CONTROL MATERIALS

Erosion control material shall conform to the following:

2.8.1 Erosion Control Blanket

Blanket shall be machine produced mat of wood excelsior formed from a web of interlocking wood fibers; covered on one side with either knitted straw blanket-like mat construction; covered with biodegradable plastic mesh; or interwoven biodegradable thread, plastic netting, or twisted kraft paper cord netting.

2.8.2 Erosion Control Net

Net shall be heavy, twisted jute mesh, weighing approximately 1.22 pounds per linear yard and 4 feet wide with mesh openings of approximately 1 inch square.

2.8.3 Erosion Control Material Anchors

Erosion control anchors shall be as recommended by the manufacturer.

PART 3 EXECUTION

3.1 PREPARATION

3.1.1 EXTENT OF WORK

Provide soil preparation (including soil conditioners), fertilizing, and sprigging, temporary seeding of all newly graded finished earth surfaces, unless indicated otherwise, and at all areas inside or outside the limits of construction that are disturbed by the Contractor's operations.

3.1.2 Soil Preparation

Provide 4 inches of off-site topsoil to meet indicated finish grade. After areas have been brought to indicated finish grade, incorporate fertilizer, pH adjusters, and soil conditioners into soil a minimum depth of 4 inches by disking, harrowing, tilling or other method approved by the Contracting Officer. Remove debris and stones larger than 3/4 inch in any dimension

remaining on the surface after finish grading. Correct irregularities in finish surfaces to eliminate depressions. Protect finished topsoil areas from damage by vehicular or pedestrian traffic.

3.1.2.1 Soil Conditioner Application Rates

Apply soil conditioners at rates as determined by laboratory soil analysis of the soils at the job site.

3.1.2.2 Fertilizer Application Rates

Apply fertilizer at rates as determined by laboratory soil analysis of the soils at the job site.

3.2 SPRIGGING INSTALLATION

Prior to installing sprigs, any previously prepared surface compacted or damaged shall be reworked to meet the requirements of paragraph SOIL PREPARATION. Areas shall be sprigged as indicated.

3.2.1 Installing Sprigs

The sprigging method shall be Hydroplanting. Sprigging procedure shall ensure even coverage.

3.2.1.1 Hydroplanting

Sprigs shall be mixed with water and uniformly applied under pressure over the entire area. Sprigs shall be covered by distributing a topdressing uniformly and evenly to a minimum 1 inch depth. Topdressing shall conform to the paragraph TOPSOIL.

3.2.2 Mulching

3.2.2.1 Hay or Straw Mulch

Hay or straw mulch shall be spread uniformly at the rate of 2 tons per acre. Mulch shall be spread by hand, blower-type mulch spreader, or other approved method. Mulching shall be started on the windward side of relatively flat areas or on the upper part of steep slopes, and continued uniformly until the area is covered. The mulch shall not be bunched or clumped. Sunlight shall not be completely excluded from penetrating to the ground surface. All areas installed with seed shall be mulched on the same day as the seeding. Mulch shall be anchored immediately following spreading.

3.2.2.2 Mechanical Anchor

Mechanical anchor shall be a V-type-wheel land packer; a scalloped-disk land packer designed to force mulch into the soil surface; or other suitable equipment.

3.2.2.3 Wood Cellulose Fiber, Paper Fiber and Recycled Paper

Wood cellulose fiber, paper fiber, or recycled paper shall be applied as part of the hydroseeding operation. The mulch shall be mixed and applied in accordance with the manufacturer's recommendations.

3.2.3 Applying Seed Over Sprigs

Seed shall be applied using either broadcast equipment and methods. Seeding procedure shall ensure even coverage. Gravity feed applicators, which drop seed directly from a hopper onto the prepared soil, shall not be used.

3.2.3.1 Hydroseeding

Seed shall be mixed to ensure broadcast at the rate of 5 pounds per 1000 square feet. Seed and fertilizer shall be added to water and thoroughly mixed at the rates specified. The maximum time period for the seed to be held in the slurry shall be 24 hours. Wood cellulose fiber mulch and tackifier shall be added at the rates recommended by the manufacturer after the seed, fertilizer, and water have been thoroughly mixed to produce a homogeneous slurry. Slurry shall be uniformly applied under pressure over the entire area. The hydroseeded area shall not be rolled.

3.2.4 Erosion Control Material

Install in accordance with manufacturer's instructions, where indicated or as directed by the Contracting Officer.

3.2.5 Watering Sprigs

Watering shall be started immediately after completing each day of sprigging. Water shall be applied at a rate sufficient to ensure moist soil conditions to a minimum 1 inch depth. Run-off, puddling, and wilting shall be prevented. Unless otherwise directed, watering trucks shall not be driven over turf areas. Watering of other adjacent areas or plant material shall be prevented.

3.3 PROTECTION OF TURF AREAS

Immediately after turfing, protect area against traffic and other use.

3.4 RESTORATION

Restore to original condition existing turf areas which have been damaged during turf installation operations. Keep clean at all times at least one paved pedestrian access route and one paved vehicular access route to each building. Clean other paving when work in adjacent areas is complete.

-- End of Section --

SECTION 00 01 15

LIST OF DRAWINGS

01/07

PART 1 GENERAL

1.1 SUMMARY

This section lists the drawings for the project pursuant to contract clause "DFARS 252.236-7001, Contract Drawings, Maps and Specifications."

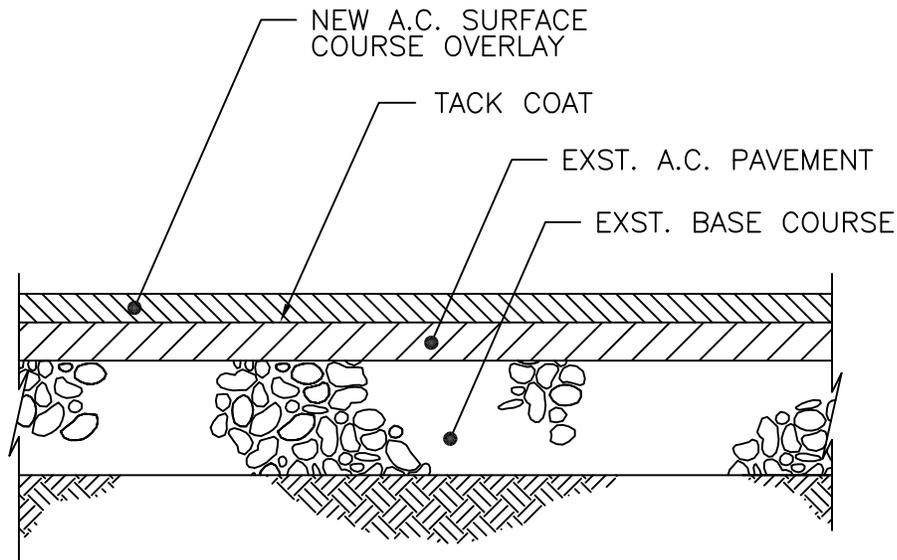
1.2 CONTRACT SKETCHES (CONTRACT SKETCHES ARE LOCATED AT THE END OF SPECIFICATIONS)

Contract sketches are as follows:

SKETCH NO.	TITLE
00 01 15-AA	FLEXIBLE PAVEMENT OVERLAY
00 01 15-AB	FLEXIBLE PAVEMENT TRANSITION DETAIL
00 01 15-AC	A.C. PAVEMENT REPAIR - TYPE I
00 01 15-AD	A.C. PAVEMENT REPAIR - TYPE II
00 01 15-AE	A.C. PAVEMENT REPAIR - TYPE III
00 01 15-AF	A.C. PAVEMENT REPAIR - TYPE IV
00 01 15-AG	A.C. CURB SECTION
00 01 15-AH	STANDARD CURB PAINTING
00 01 15-AI	RAISED PAVEMENT MARKERS
00 01 15-AJ	TYPICAL MARKING LAYOUT (Standard traffic stripes)
00 01 15-AK	TYPICAL MARKING LAYOUT (standard traffic stripes)
00 01 15-AL	TYPICAL MARKING LAYOUT (intersection)
00 01 15-AM	TYPICAL MARKING LAYOUT (intersection)
00 01 15-AN	TYPE "A" CROSSWALK DETAIL
00 01 15-AO	TYPE "B" CROSSWALK DETAIL
00 01 15-AP	TYPE "C" CROSSWALK DETAIL
00 01 15-AQ	PARALLEL PARKING STALLS
00 01 15-AR	90 DEGREE PARKING STALLS
00 01 15-AS	60 DEGREE PARKING STALLS
00 01 15-AT	45 DEGREE PARKING STALLS
00 01 15-AU	ARROW DETAIL
00 01 15-AV	ARROW DETAIL
00 01 15-AW	ARROW DETAIL
00 01 15-AX	PAVEMENT WORD MARKING
00 01 15-AY	PAVEMENT WORD MARKING
00 01 15-AZ	TYPICAL HANDICAP LOGO
00 01 15-BA	HANDICAP LOGO - PROPORTION
00 01 15-BB	CONCRETE THROUGH GUTTER
00 01 15-BC	INSTALLATION OF CONCRETE SIDEWALK
00 01 15-BD	CAST-IN-PLACE CONCRETE CURB
00 01 15-BE	CONCRETE PARKING BUMPER
00 01 15-BF	TYPICAL HANDICAP SIGNS

-- End of Document --

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TYPICAL SECTION

STEPS TO BE FOLLOWED IN PREPARING THE OLD A.C. PAVEMENT SURFACE PRIOR TO OVERLAYING:

- a. SEALING OF CRACKS
 1. CRACKS 1/16"–1/8" WIDE – CLEAN WITH COMPRESSED AIR AND BROOM AND SEAL WITH SS-1 PRIOR TO APPLICATION OF TACK COAT.
 2. CRACKS OVER 1/8" WIDE – ROUT, CLEAN WITH COMPRESSED AIR AND BROOM, AND SEAL WITH SAND ASPHALT, SLURRY SEAL MIXTURE OR ANY SEALANT COMPLYING WITH FEDERAL SPECS S-5-1401.
- b. PATCH POTHOLES, ALLIGATOR CRACKS, SEVERE RAVELING, DEPRESSED AND RUTTED AREAS.
- c. CLEAN SURFACE THOROUGHLY WITH ROTARY BROOMS, COMPRESSED AIR, PUSH BROOMS, OR WHATEVER EQUIPMENT IS APPLICABLE.
- d. APPLY TACK COAT TO DRY CLEAN SURFACE.
- e. WHEN TACK COAT IS COMPLETELY CURED (WHEN EMULSION BREAKS), APPLY REQUIRED OVERLAY AND COMPACT.

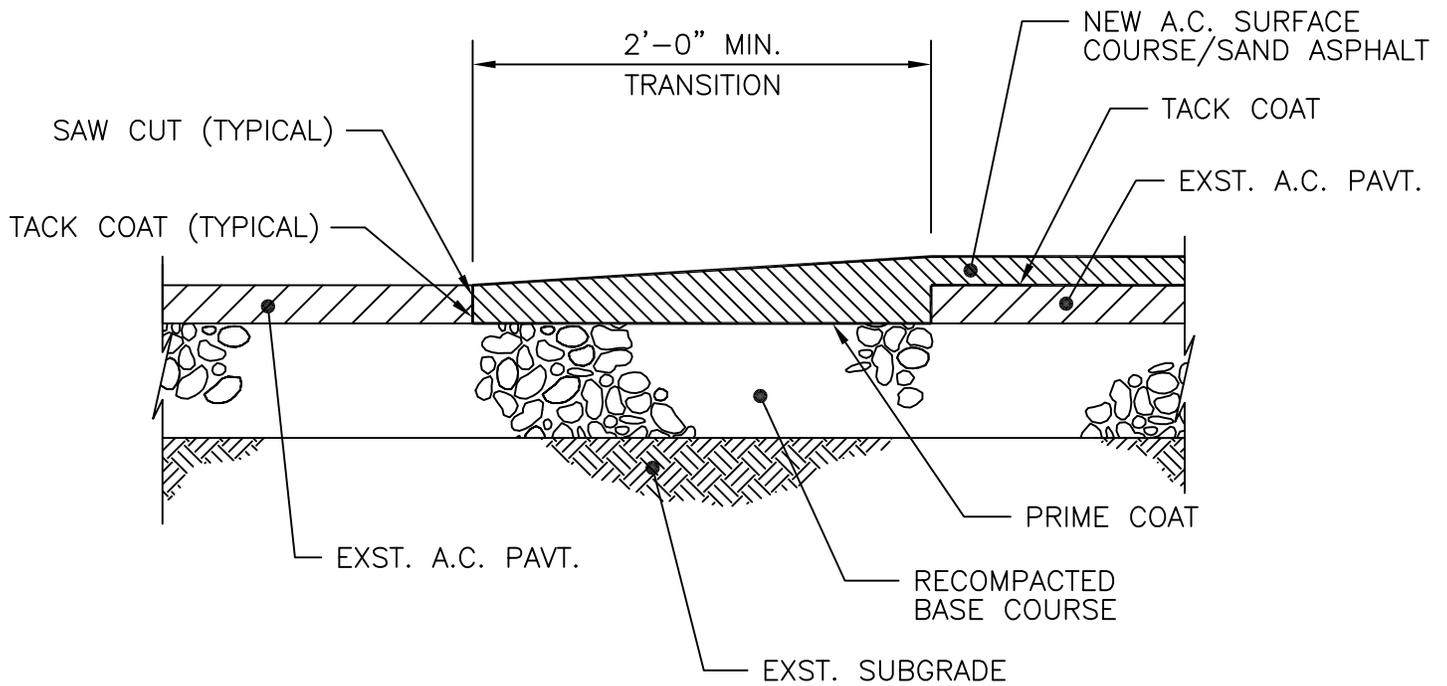
FLEXIBLE PAVEMENT OVERLAY

**NAVFAC HAWAII
CAPITAL IMPROVEMENTS
PEARL HARBOR**

FILENAME:

SHT 1
OF 1

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NO. 00 01 15-AA



OVERLAY ON EXISTING PAVEMENT

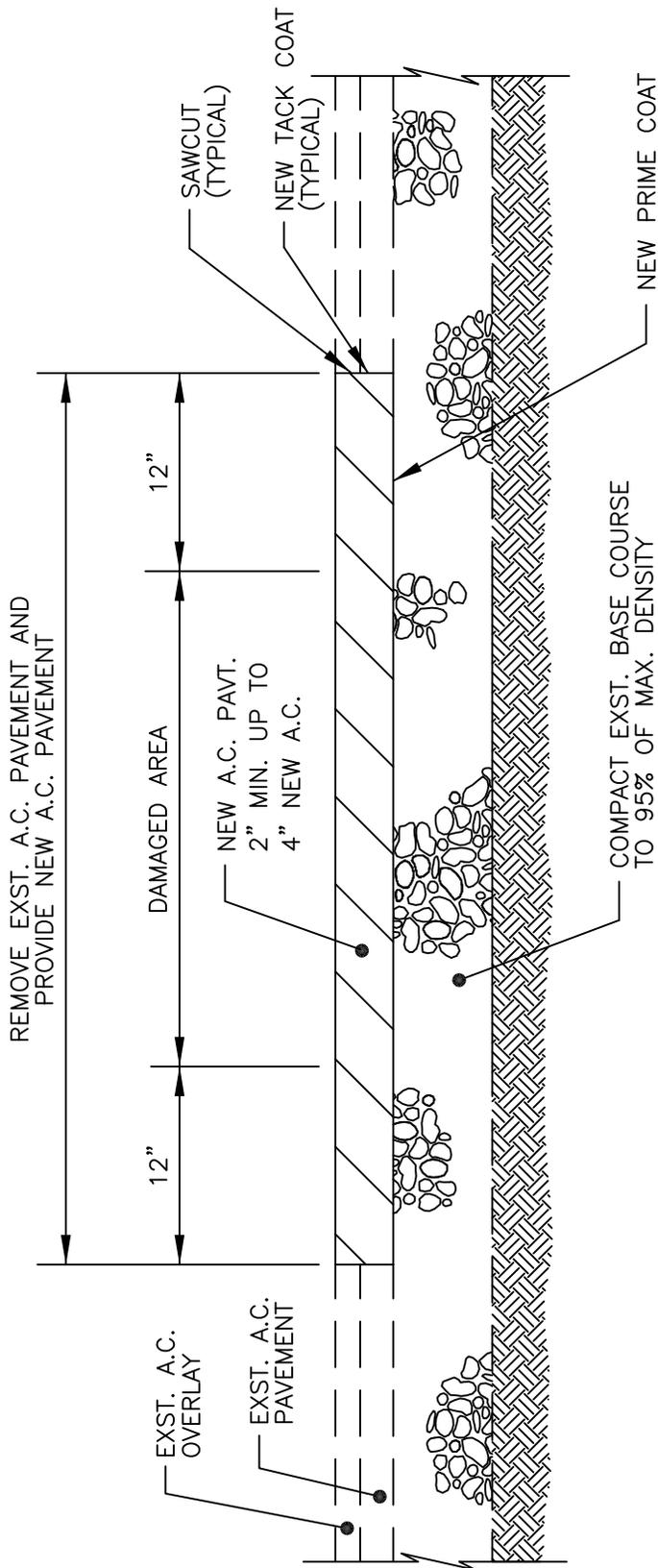
FLEXIBLE PAVEMENT TRANSITION DETAIL

**NAVFAC HAWAII
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PEARL HARBOR**

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SHT 1
OF 1

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NO. 00 01 15-AB



A.C. PAVEMENT REPAIR - TYPE I

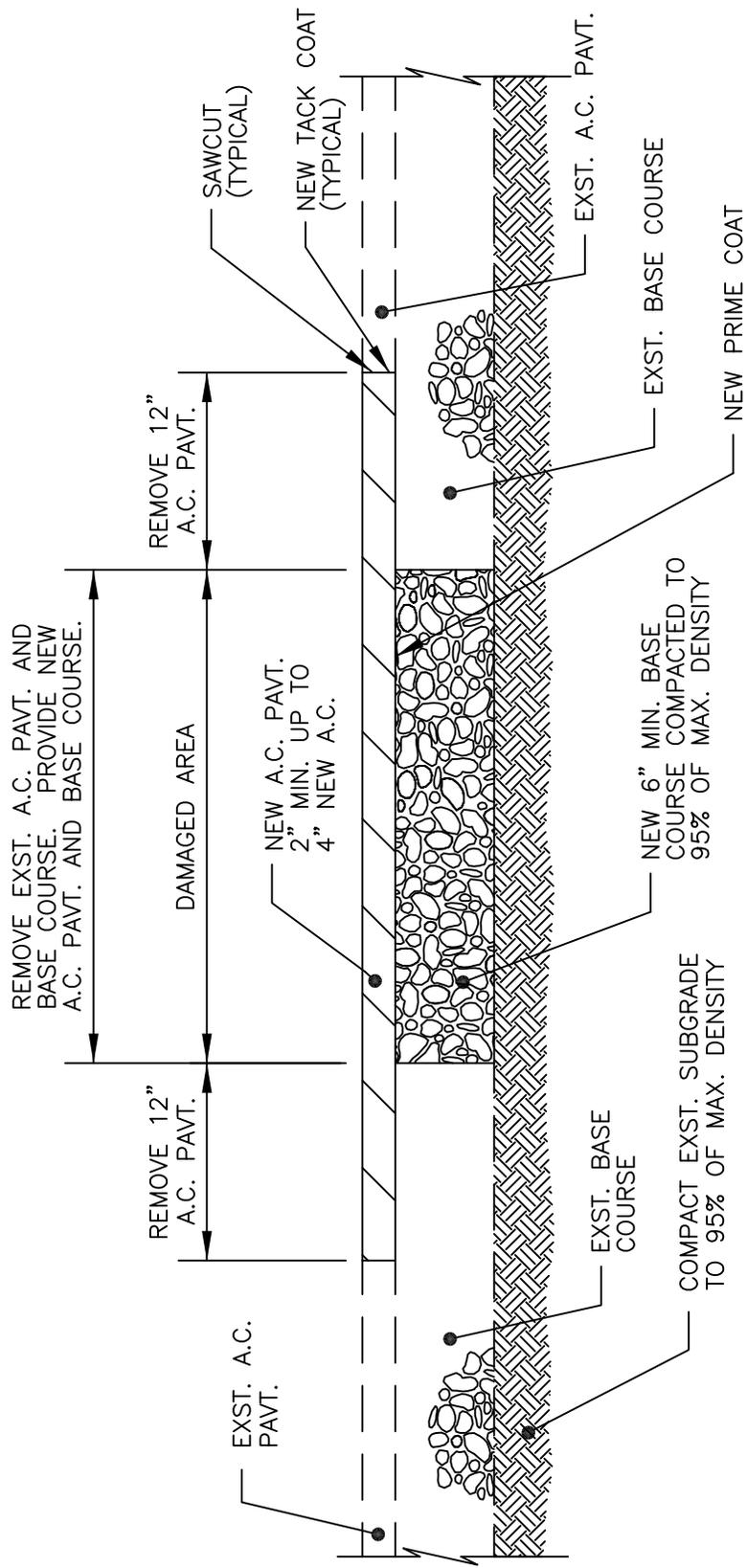
A.C. PAVEMENT REPAIR - TYPE I

**NAVFAC HAWAII
CAPITAL IMPROVEMENTS
PEARL HARBOR**

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SHT 1
OF 1

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NO. 00 01 15-AC



A.C. PAVEMENT REPAIR - TYPE II

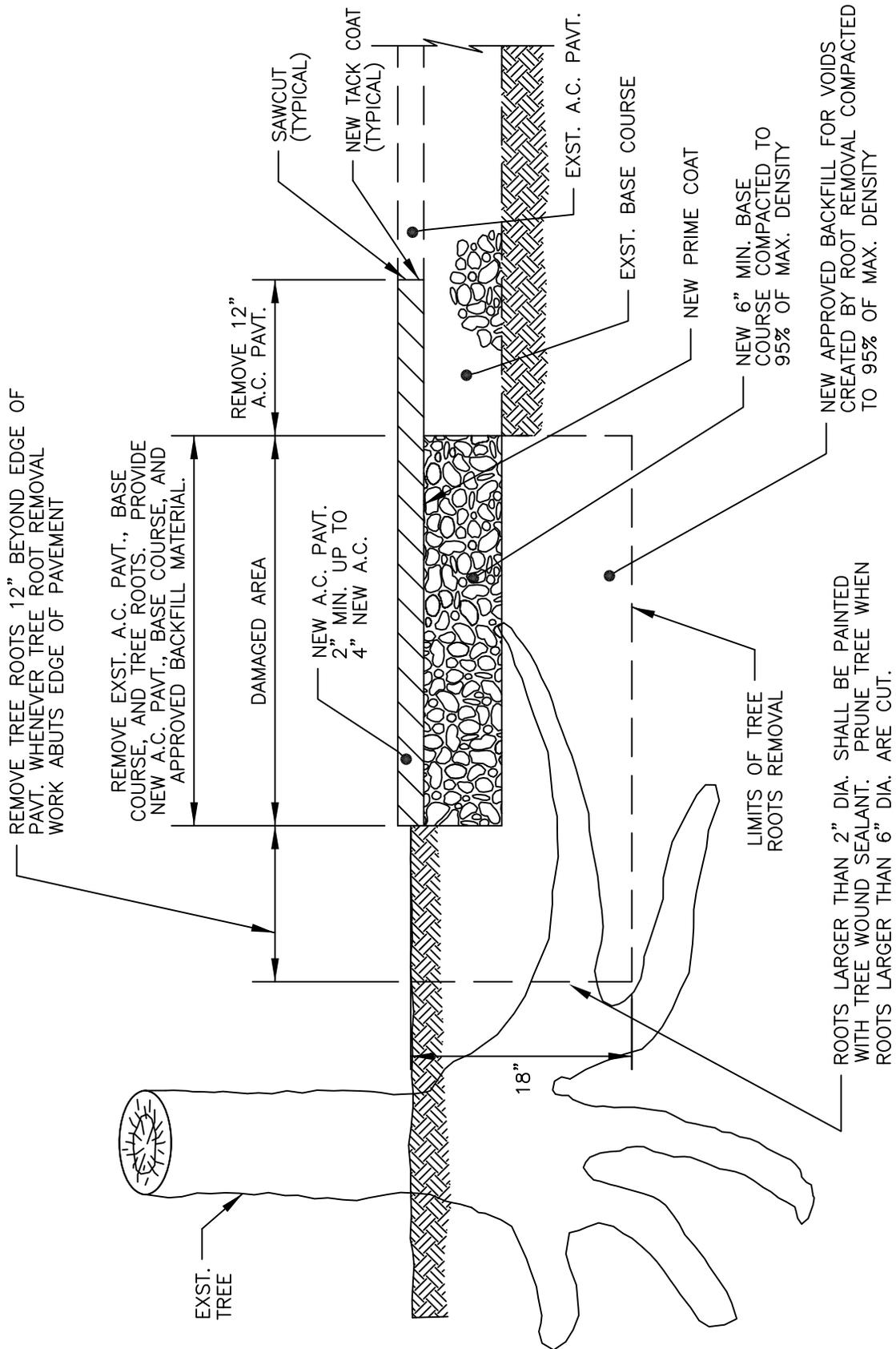
A.C. PAVEMENT REPAIR - TYPE II

**NAVFAC HAWAII
CAPITAL IMPROVEMENTS
PEARL HARBOR**

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SHT 1
OF 1

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NO. 00 01 15-AD



A.C. PAVEMENT REPAIR - TYPE III

A.C. PAVEMENT REPAIR - TYPE III

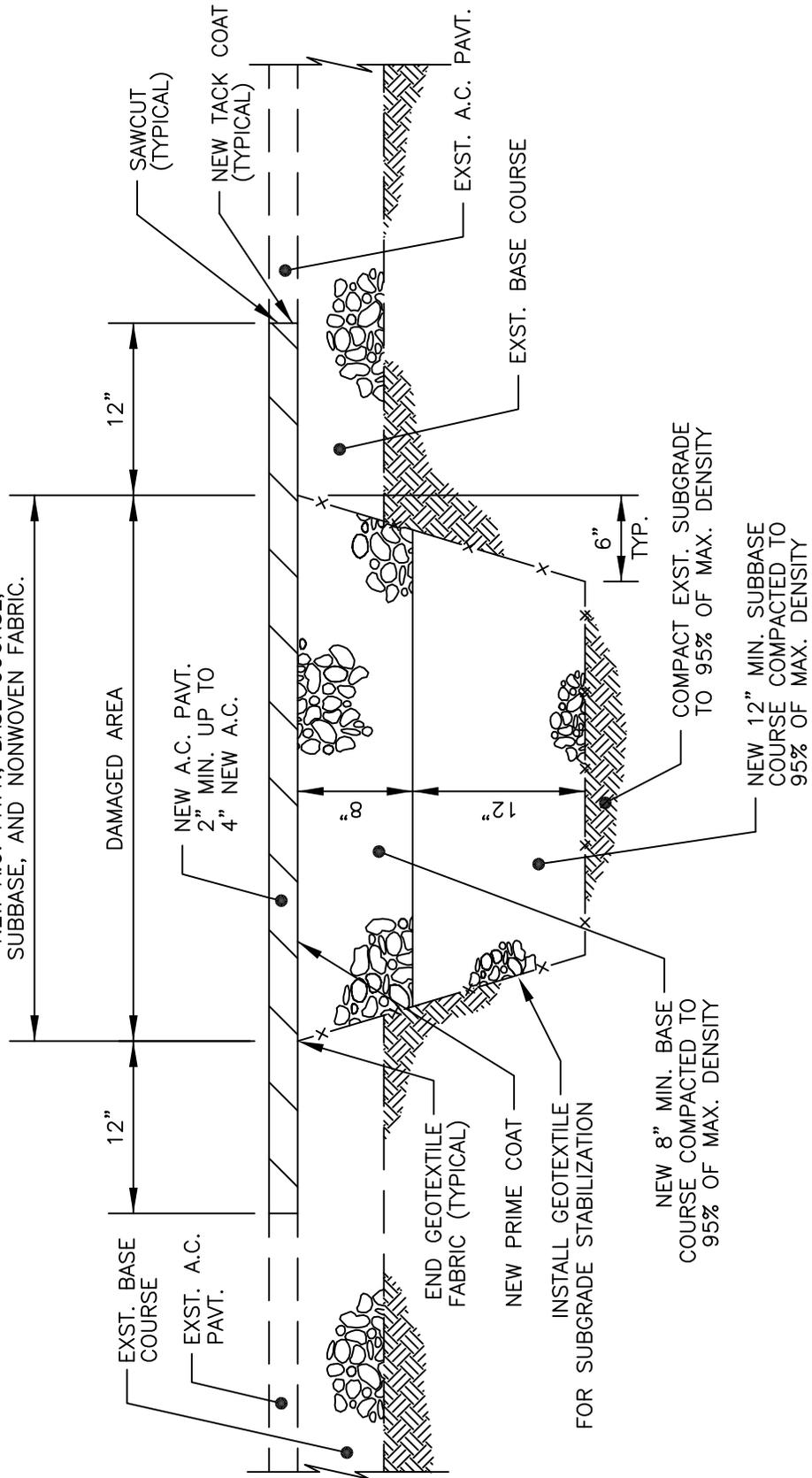
**NAVFAC HAWAII
CAPITAL IMPROVEMENTS
PEARL HARBOR**

FILENAME:

SHT 1
OF 1

SK
NO. 00 01 15-AE

REMOVE EXST. A.C. PAVT., BASE COURSE, AND SUBGRADE. PROVIDE NEW A.C. PAVT., BASE COURSE, SUBBASE, AND NONWOVEN FABRIC.



A.C. PAVEMENT REPAIR - TYPE IV

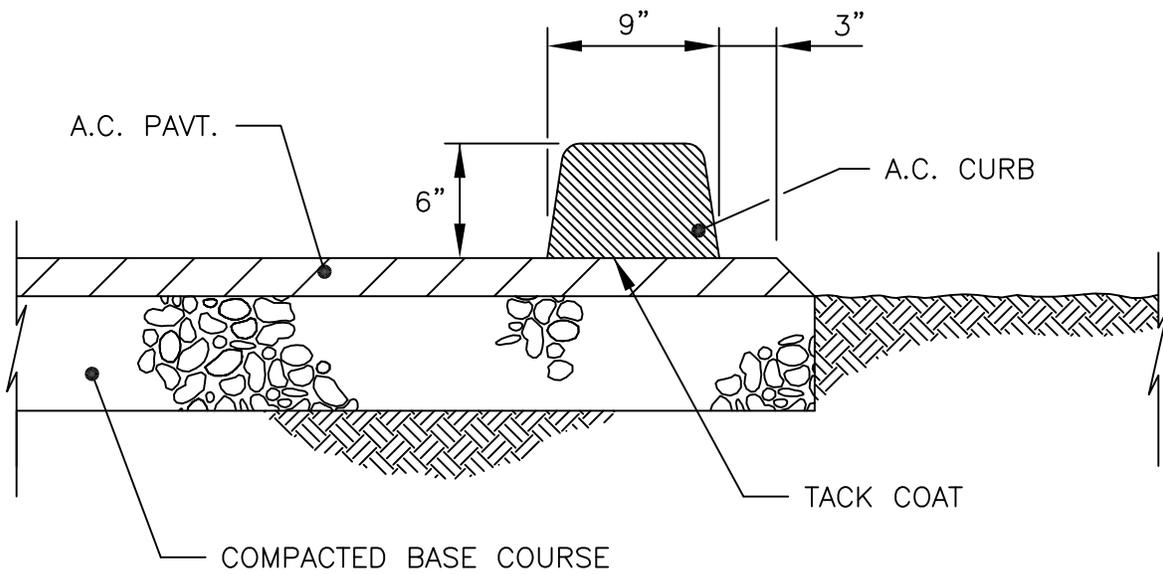
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**NAVFAC HAWAII
CAPITAL IMPROVEMENTS
PEARL HARBOR**

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NO. 00 01 15-AF



SECTION — A.C. CURB

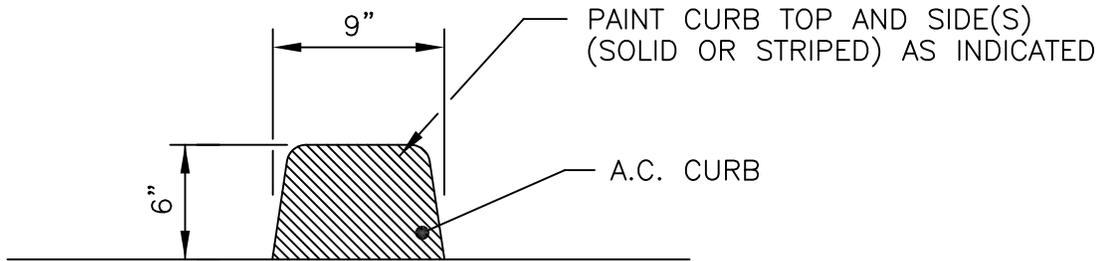
**ASPHALTIC CONCRETE
CURB SECTION**

**NAVFAC HAWAII
CAPITAL IMPROVEMENTS
PEARL HARBOR**

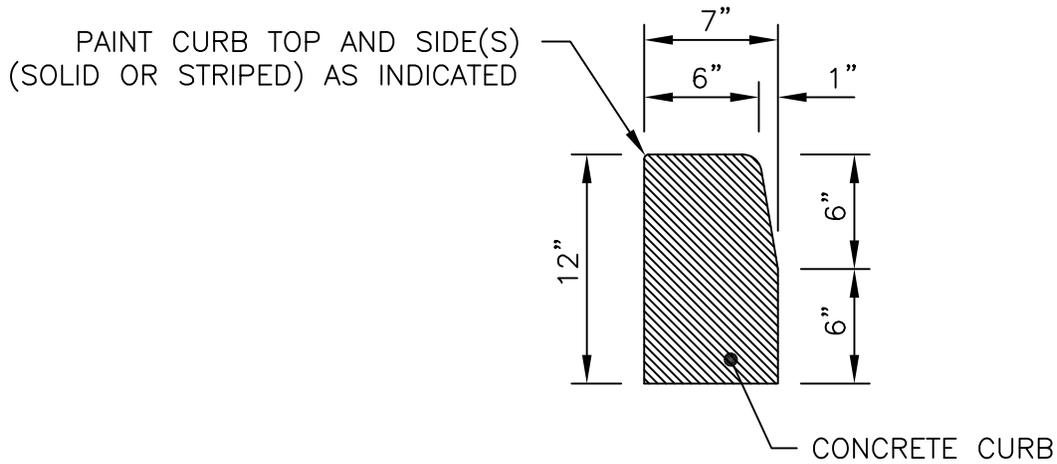
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NO. 00 01 15-AG



SECTION — A.C. CURB



SECTION — CONCRETE CURB

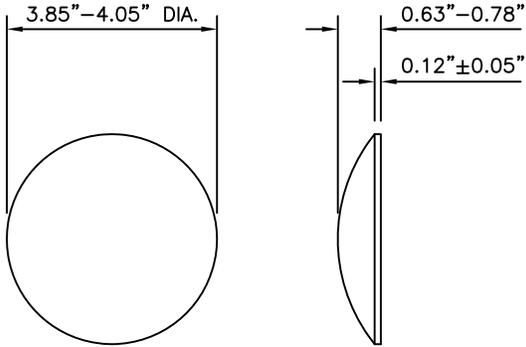
STANDARD CURB PAINTING

**NAVFAC HAWAII
CAPITAL IMPROVEMENTS
PEARL HARBOR**

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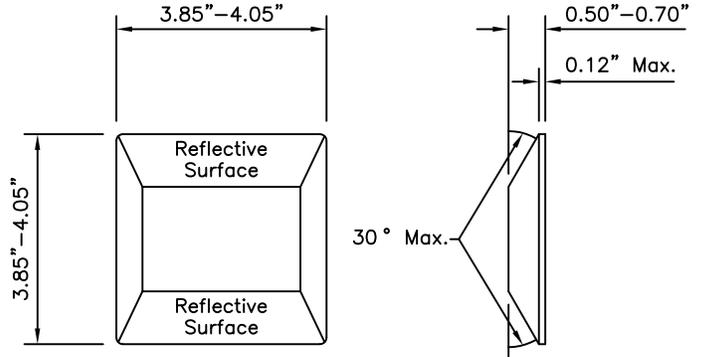
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OF 1

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NO. 00 01 15-AH

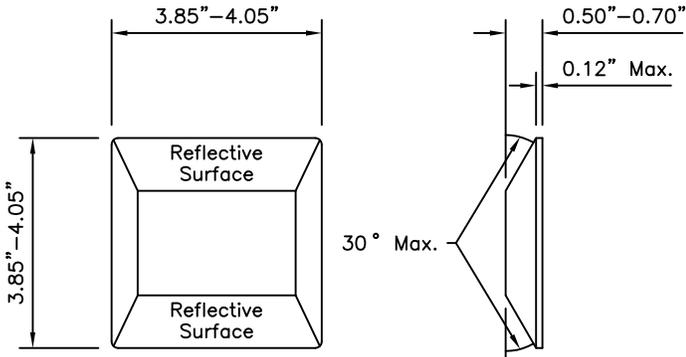


TYPE A
NON-REFLECTIVE WHITE MARKER

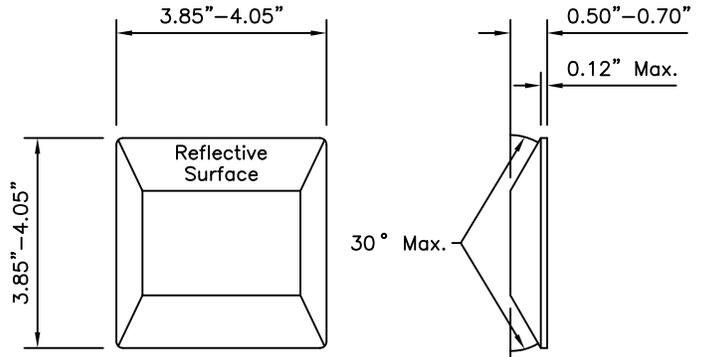
TYPE J
NON-REFLECTIVE YELLOW MARKER



TYPE C
RED-CLEAR REFLECTIVE MARKER



TYPE D
TWO-WAY YELLOW REFLECTIVE MARKER



TYPE H
ONE-WAY YELLOW REFLECTIVE MARKER

RAISED PAVEMENT MARKERS

**NAVFAC HAWAII
CAPITAL IMPROVEMENTS
PEARL HARBOR**

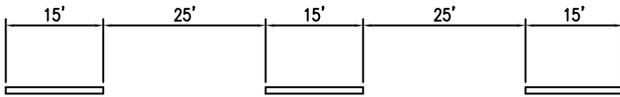
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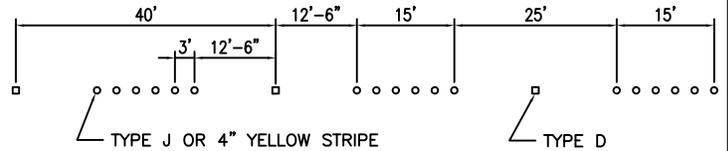
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STANDARD TRAFFIC STRIPES

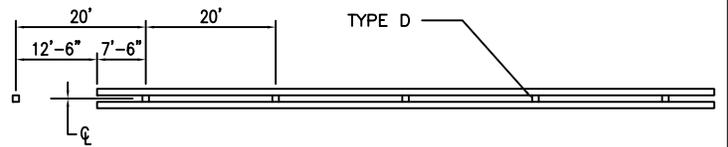
4" YELLOW STRIPING



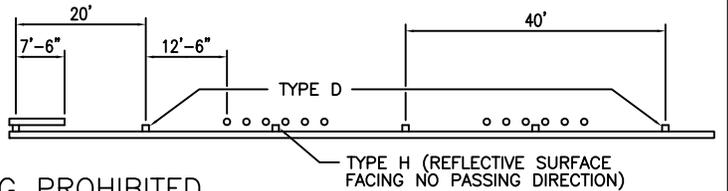
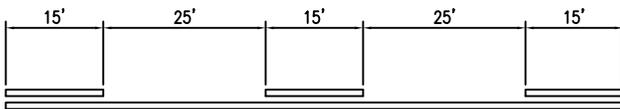
RAISED PAVEMENT MARKING



TWO-LANE PASSING PERMITTED



TWO-LANE PASSING PROHIBITED
FOR NO PASSING IN EITHER DIRECTION



TWO-LANE PASSING PROHIBITED
FOR PASSING WHEN DASHED LINE
IS IN DRIVER'S LANE

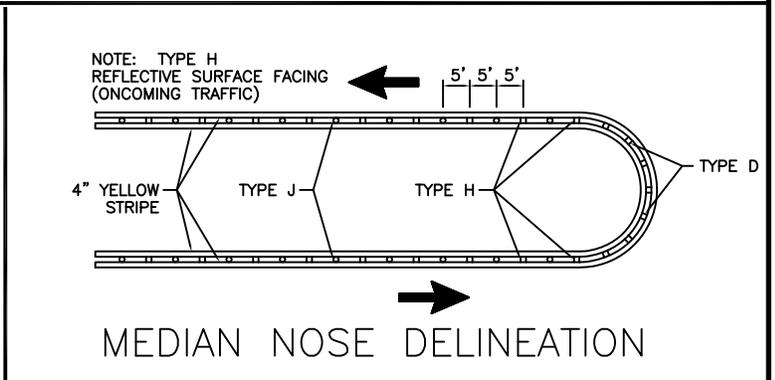
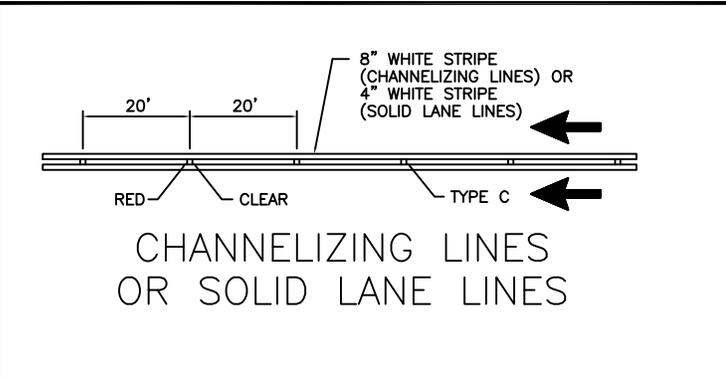
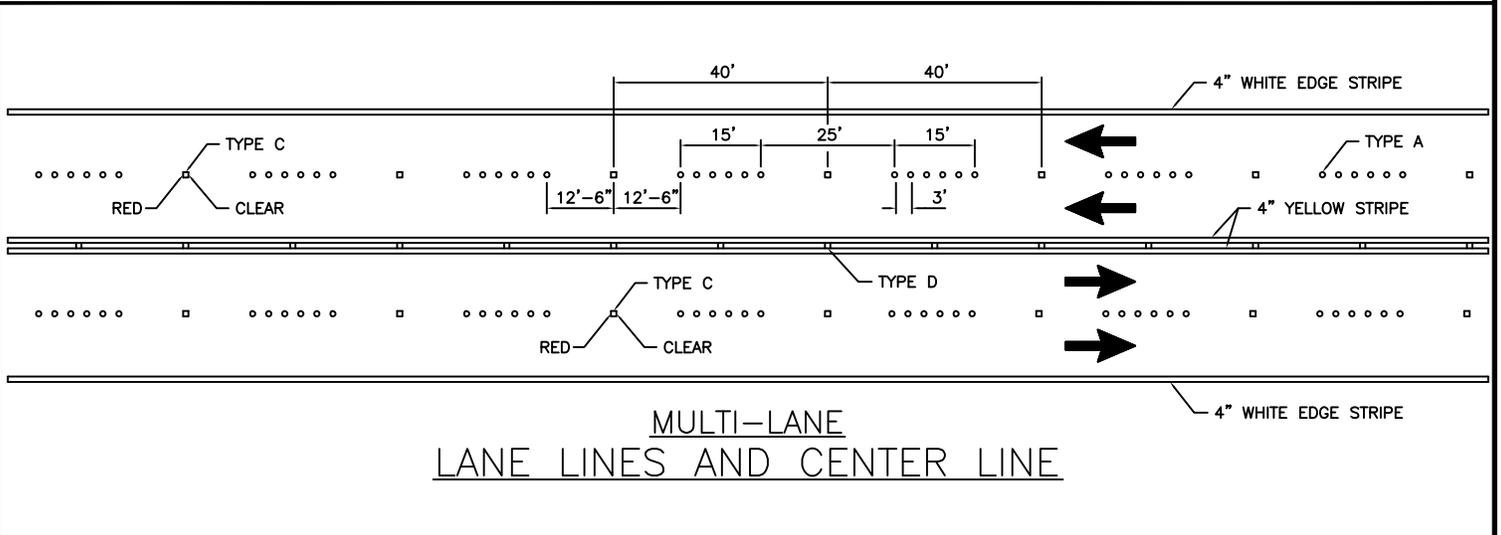
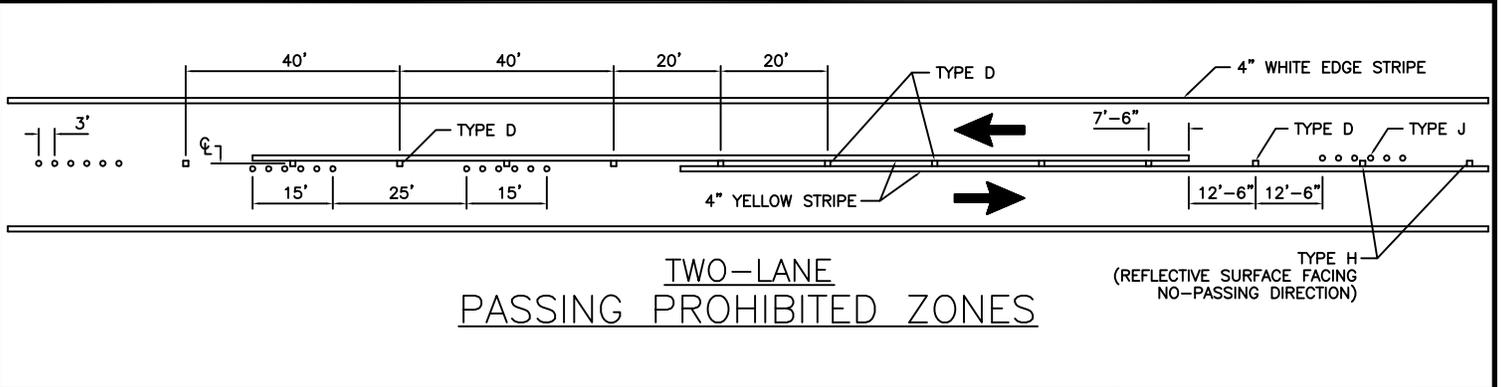
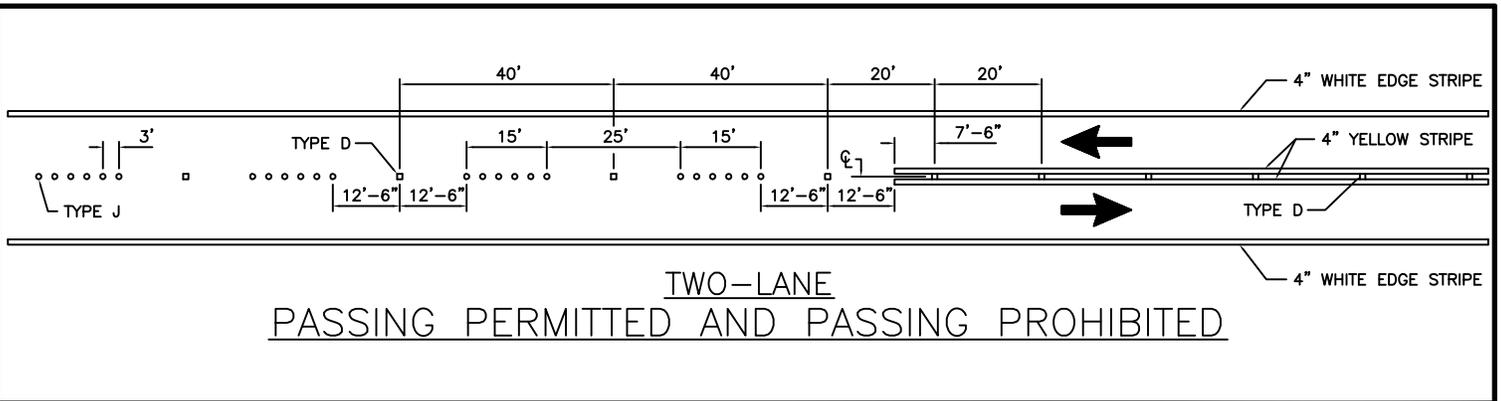
TYPICAL MARKING LAYOUT

**NAVFAC HAWAII
CAPITAL IMPROVEMENTS
PEARL HARBOR**

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OF 1

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NO. 00 01 15-AJ



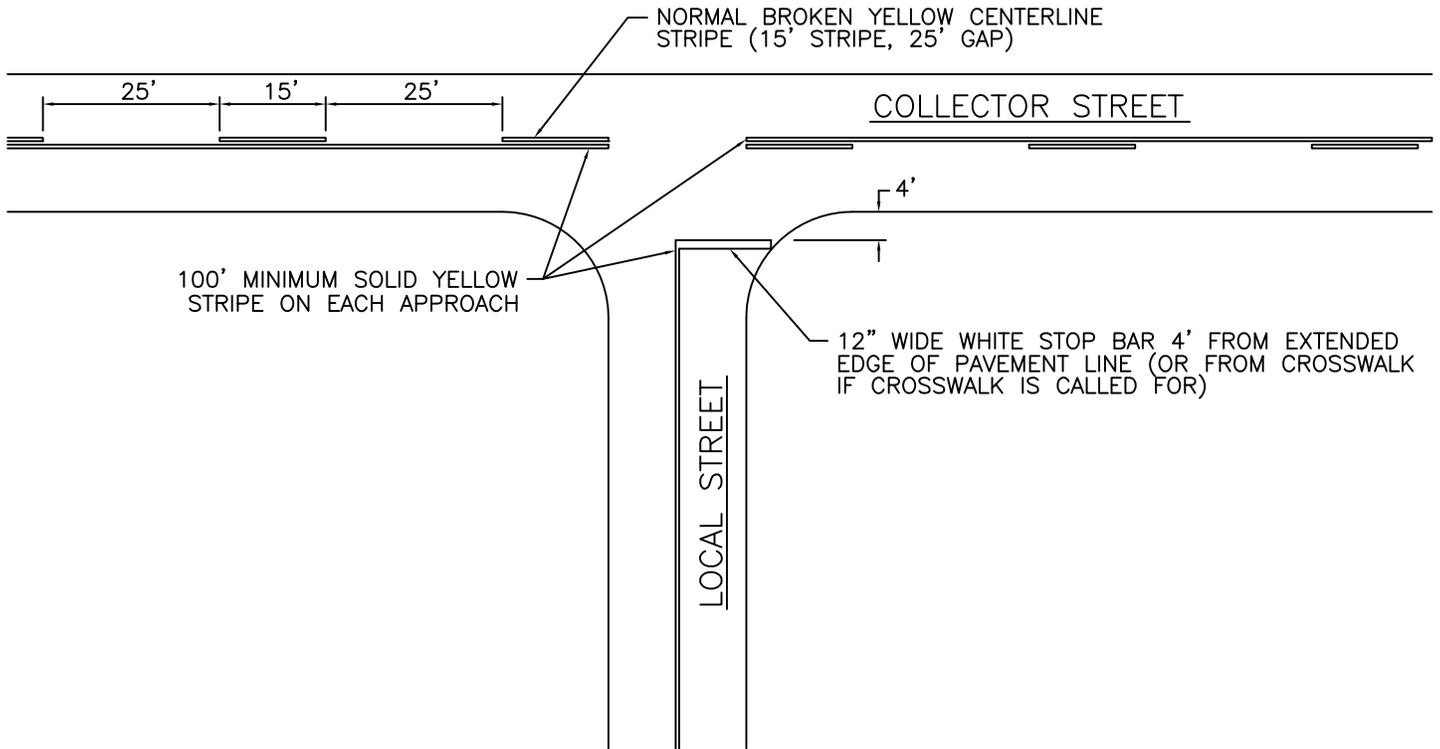
TYPICAL MARKING LAYOUT

**NAVFAC HAWAII
CAPITAL IMPROVEMENTS
PEARL HARBOR**

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SHT 1
OF 1

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NO. 00 01 15-AK



STRIPING NOTES:

1. ALL STRIPING SHALL CONFORM TO THE LATEST EDITION OF THE "MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES FOR STREETS AND HIGHWAYS" (MUTCD).
2. YELLOW CENTERLINES SHALL BE STRIPED ON ALL TWO-WAY COLLECTOR OR HIGHER STREETS.
3. 12" WIDE WHITE STOP BARS SHALL BE STRIPED IN CONJUNCTION WITH EACH "STOP" SIGN.
4. APPROPRIATE NO PASSING MARKINGS SHALL BE STRIPED A MINIMUM OF 100 FEET ON EACH APPROACH TO EVERY INTERSECTION AND/OR AS OTHERWISE CALLED FOR AT OTHER LOCATIONS DESIGNATED IN THE MUTCD.

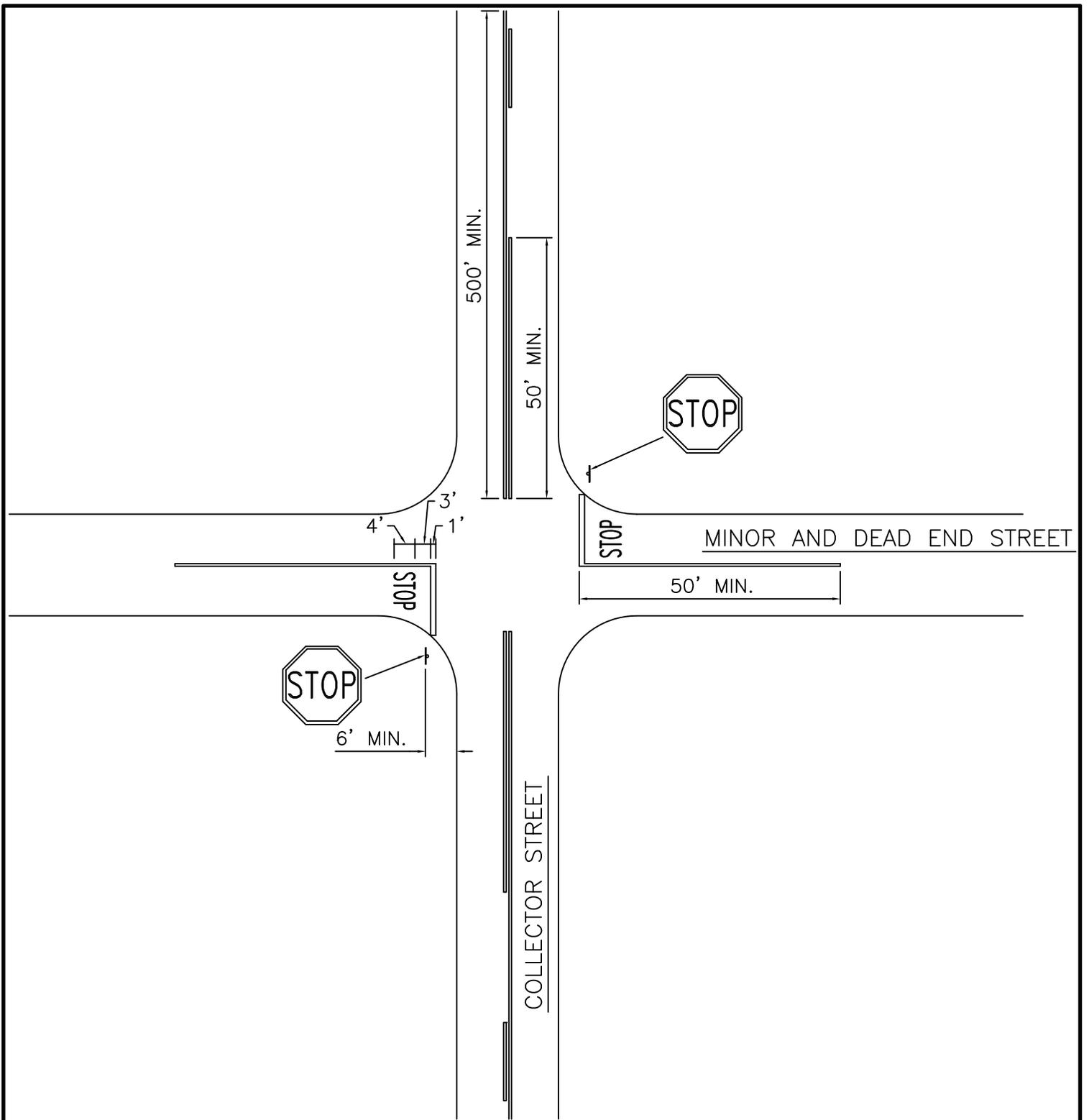
TYPICAL MARKING LAYOUT

**NAVFAC HAWAII
CAPITAL IMPROVEMENTS
PEARL HARBOR**

FILENAME:

SHT 1
OF 1

SK
NO. 00 01 15-AL



INTERSECTION OF TWO-LANE ROADS

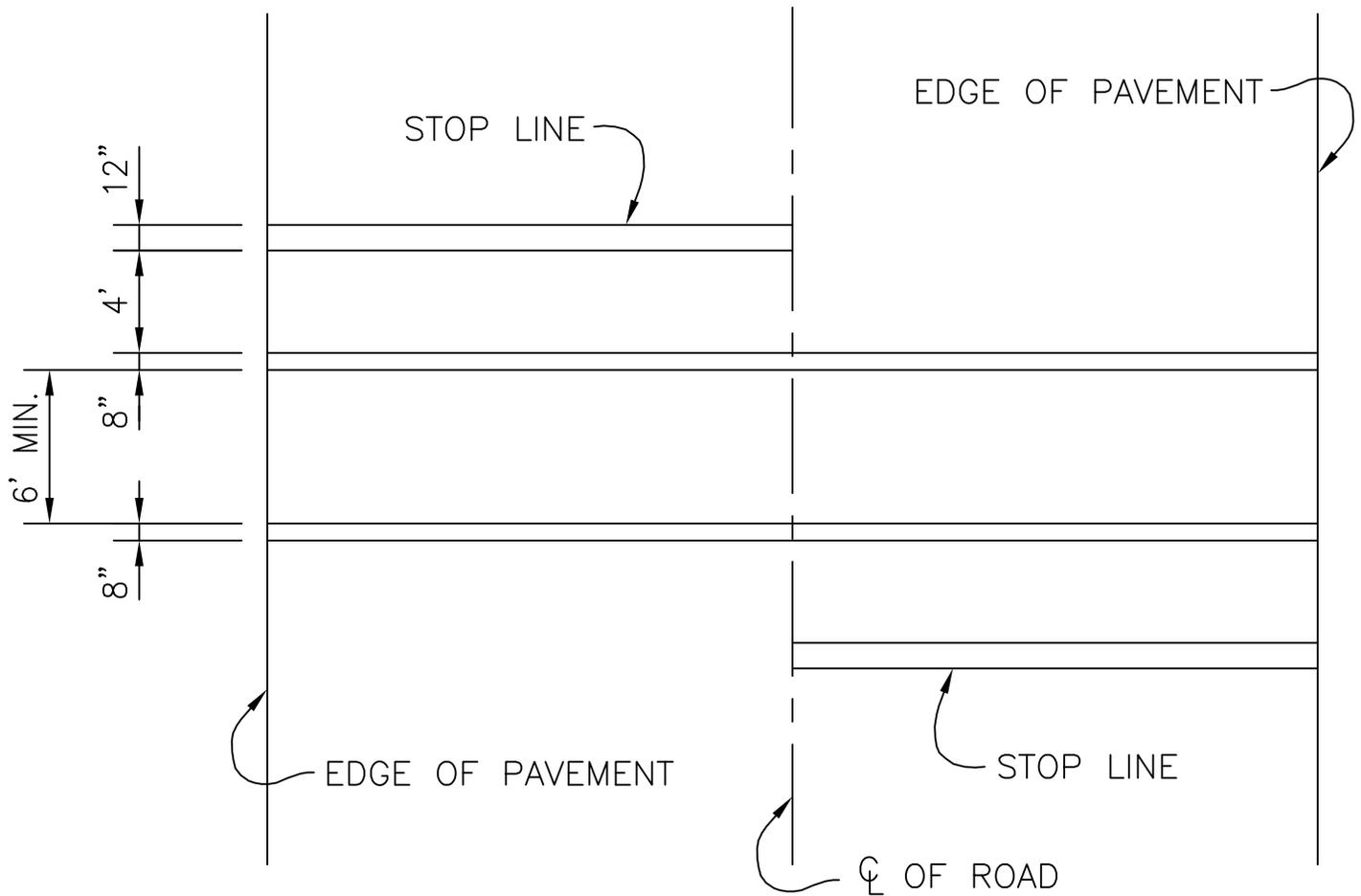
TYPICAL MARKING LAYOUT

**NAVFAC HAWAII
CAPITAL IMPROVEMENTS
PEARL HARBOR**

FILENAME:

SHT 1
OF 1

SK
NO. 00 01 15-AM



TYPE "A" CROSSWALK

NOTE:

1. CROSSWALKS AND STOP LINES TO BE PAINTED WITH WHITE TRAFFIC PAINT.

REF:

F.H.A. MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES FOR STREETS AND HIGHWAYS – MILLENIUM EDITON.

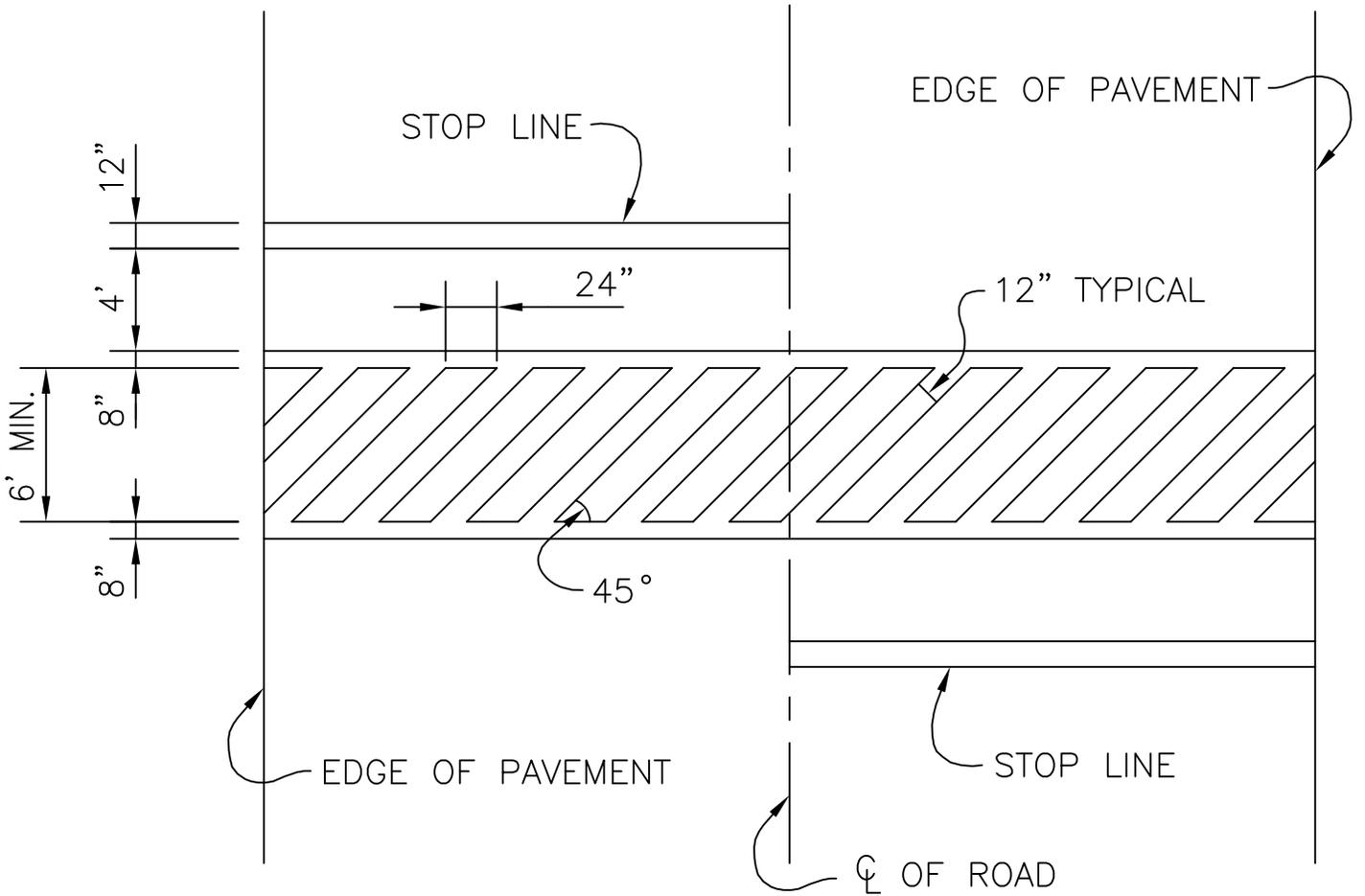
TYPE 'A' CROSSWALK DETAIL

**NAVFAC HAWAII
CAPITAL IMPROVEMENTS
PEARL HARBOR**

FILENAME:

SHT 1
OF 1

SK
NO. 00 01 15-AN



TYPE "B" CROSSWALK

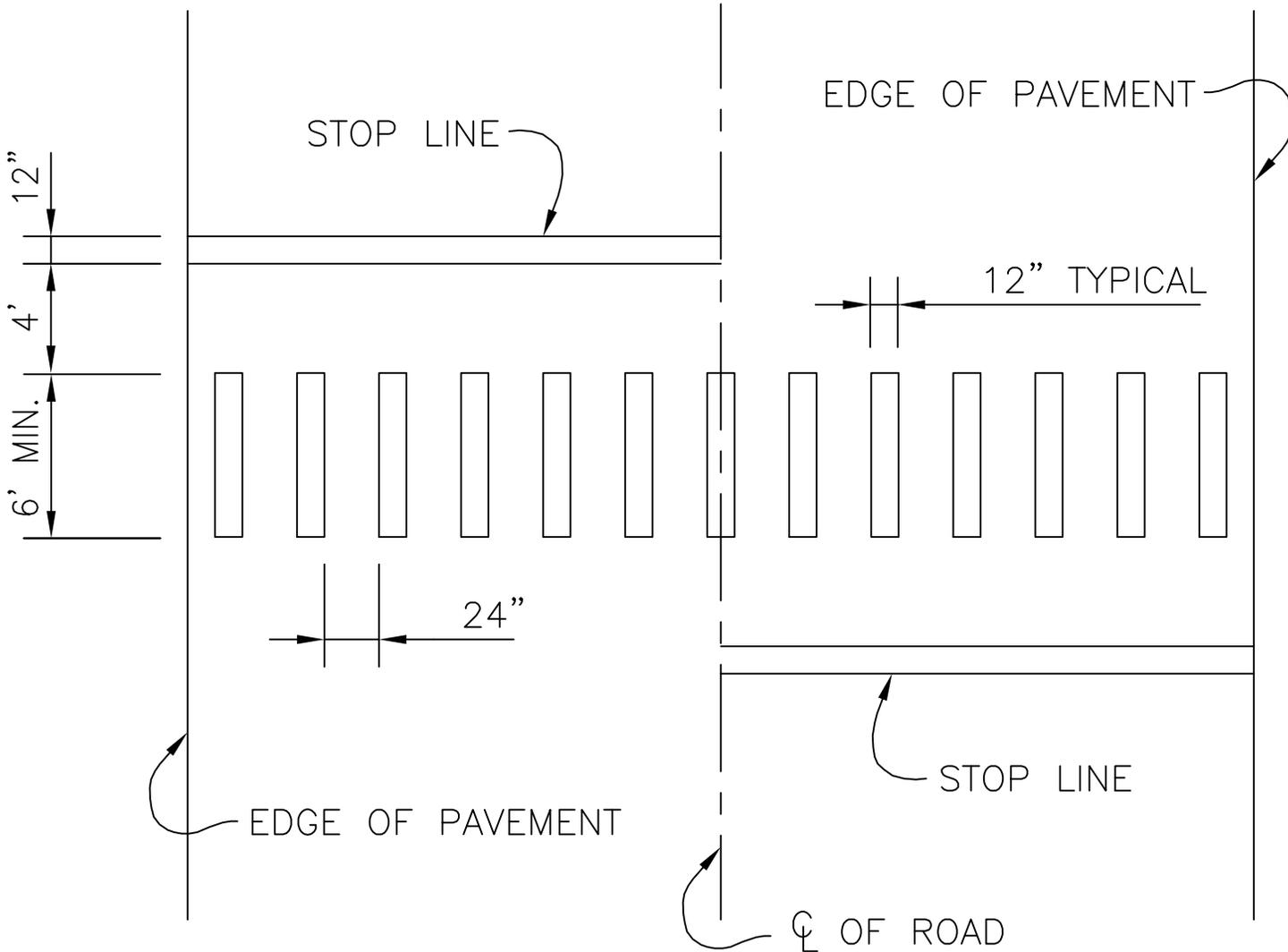
NOTE:

- CROSSWALKS AND STOP LINES TO BE PAINTED WITH WHITE TRAFFIC PAINT.

REF:

F.H.A. MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES FOR STREETS AND HIGHWAYS – MILLENNIUM EDITON.

TYPE "B" CROSSWALK DETAIL	NAVFAC HAWAII CAPITAL IMPROVEMENTS PEARL HARBOR				
FILENAME:	<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 50%;">SHT 1</td> <td style="width: 50%;">SK</td> </tr> <tr> <td>OF 1</td> <td>NO. 00 01 15-AO</td> </tr> </table>	SHT 1	SK	OF 1	NO. 00 01 15-AO
SHT 1	SK				
OF 1	NO. 00 01 15-AO				



TYPE "C" CROSSWALK

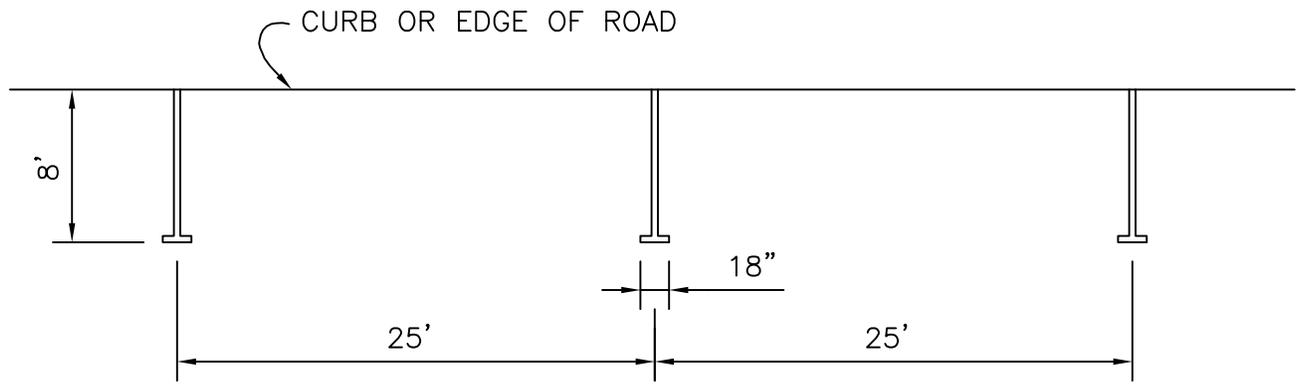
NOTE:

1. CROSSWALKS AND STOP LINES TO BE PAINTED WITH WHITE TRAFFIC PAINT.

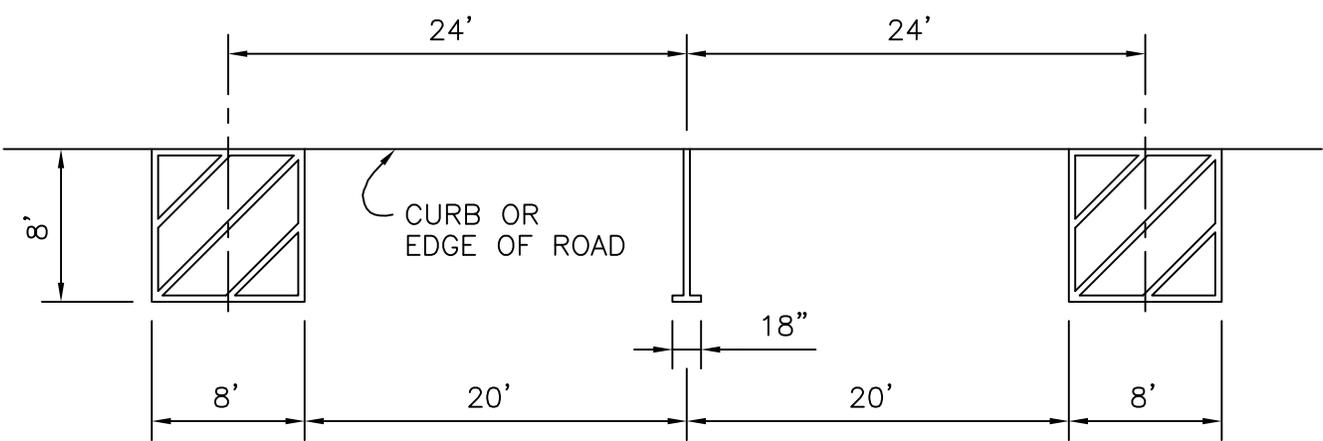
REF:

F.H.A. MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES FOR STREETS AND HIGHWAYS – MILLENIUUM EDITION.

TYPE "C" CROSSWALK DETAIL	NAVFAC HAWAII CAPITAL IMPROVEMENTS PEARL HARBOR				
FILENAME:	<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 50%;">SHT 1</td> <td style="width: 50%;">SK</td> </tr> <tr> <td>OF 1</td> <td>NO. 00 01 15-AP</td> </tr> </table>	SHT 1	SK	OF 1	NO. 00 01 15-AP
SHT 1	SK				
OF 1	NO. 00 01 15-AP				



TYPE I



TYPE II

NOTE:

1. ALL STRIPING SHALL BE PAINTED WHITE AND 4" WIDE.

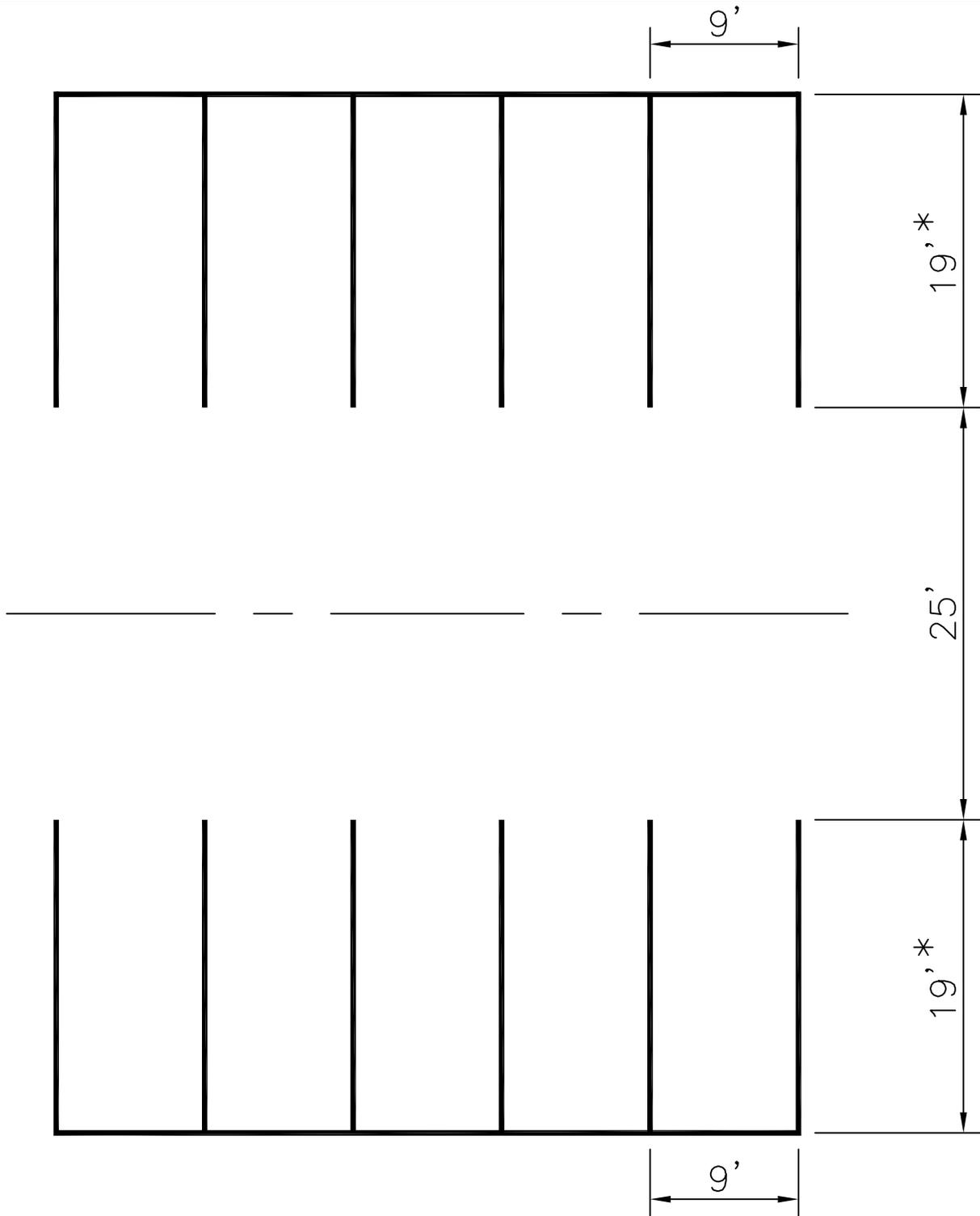
PARALLEL PARKING STALLS

**NAVFAC HAWAII
CAPITAL IMPROVEMENTS
PEARL HARBOR**

FILENAME:

SHT 1
OF 1

SK
NO. 00 01 15-AQ



NOTE:

1. ALL STRIPING SHALL BE PAINTED WHITE AND 4" WIDE.

* FOR PERIMETER PARKING ONLY--USE 16' WHEN OVERHANG IS PERMITTED.

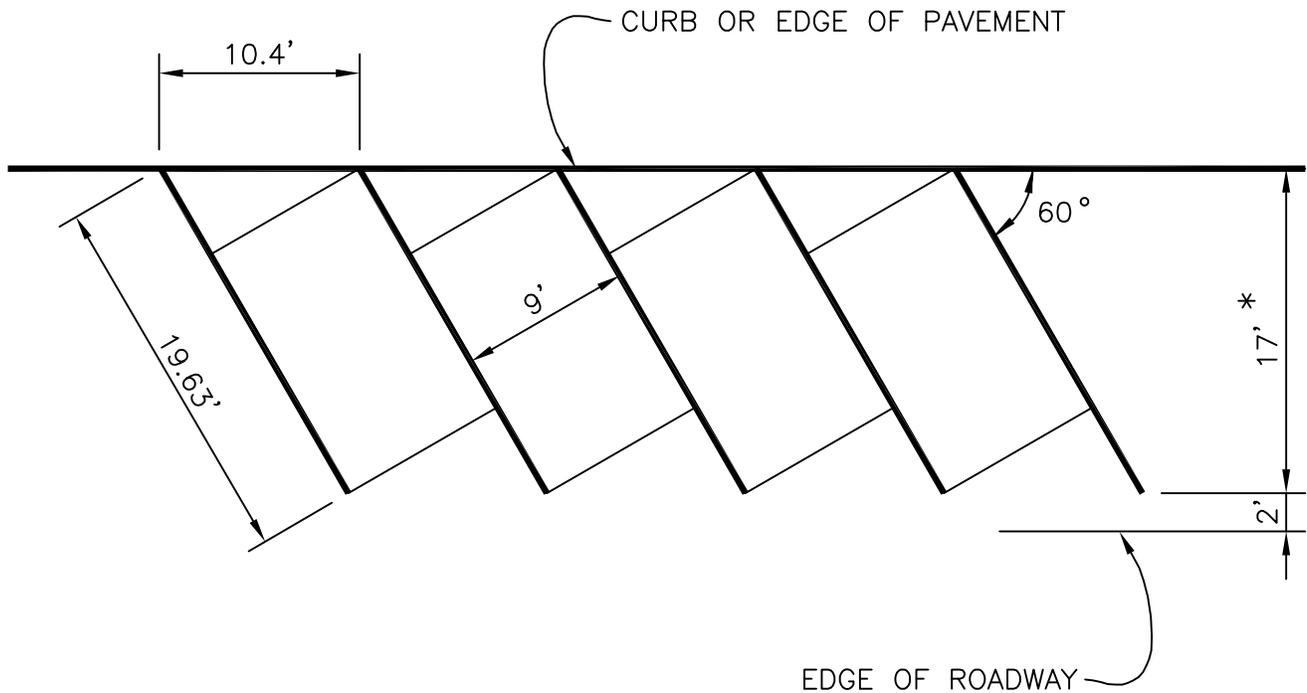
90° PARKING STALLS

**NAVFAC HAWAII
CAPITAL IMPROVEMENTS
PEARL HARBOR**

FILENAME:

SHT 1
OF 1

SK
NO. 00 01 15-AR



NOTE:

1. ALL STRIPING SHALL BE PAINTED WHITE AND 4" WIDE

* ADD 3' WHEN OVERHANG IS NOT PERMITTED

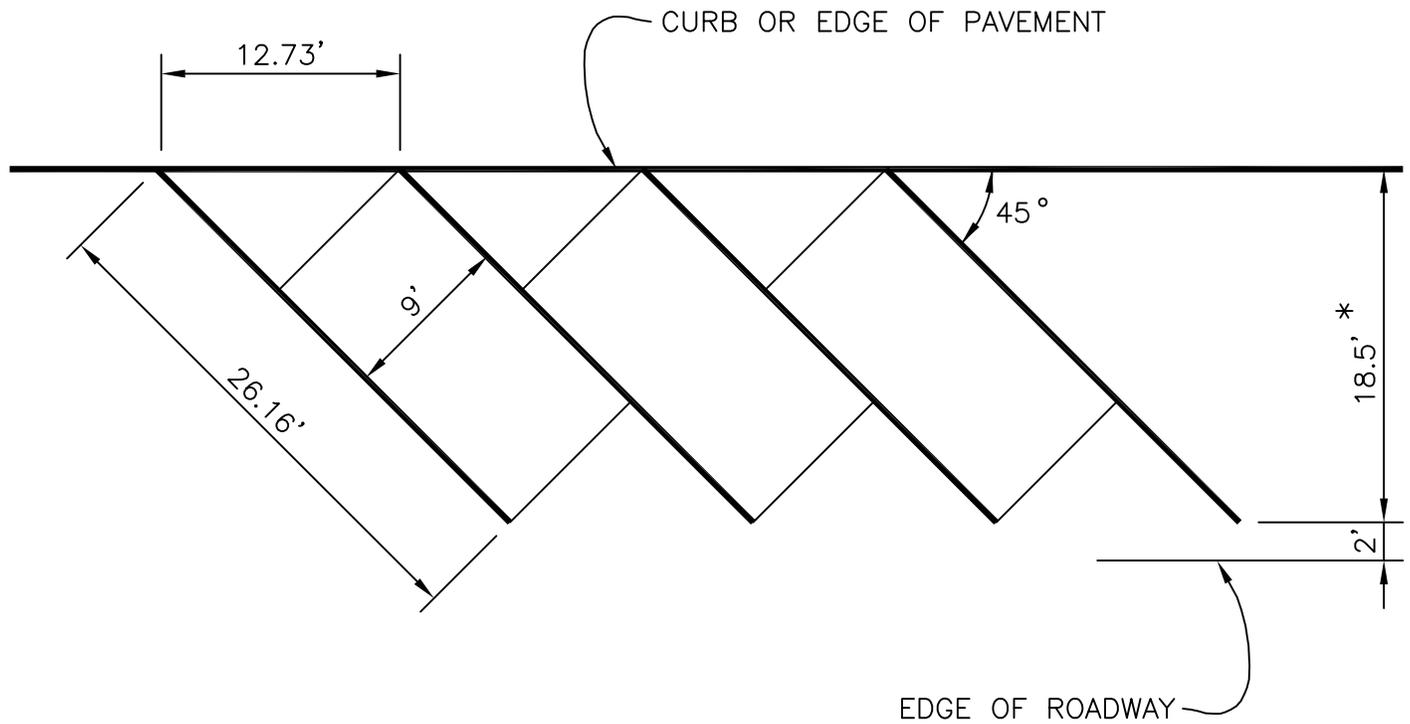
60° PARKING STALLS

**NAVFAC HAWAII
CAPITAL IMPROVEMENTS
PEARL HARBOR**

FILENAME:

SHT 1
OF 1

SK
NO. 00 01 15-AS



NOTE:

1. ALL STRIPING SHALL BE PAINTED WHITE AND 4" WIDE

* ADD 3' WHEN OVERHANG IS NOT PERMITTED

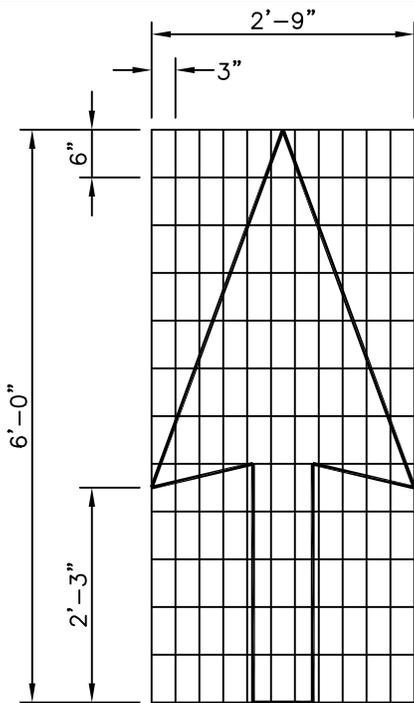
45° PARKING STALLS

**NAVFAC HAWAII
CAPITAL IMPROVEMENTS
PEARL HARBOR**

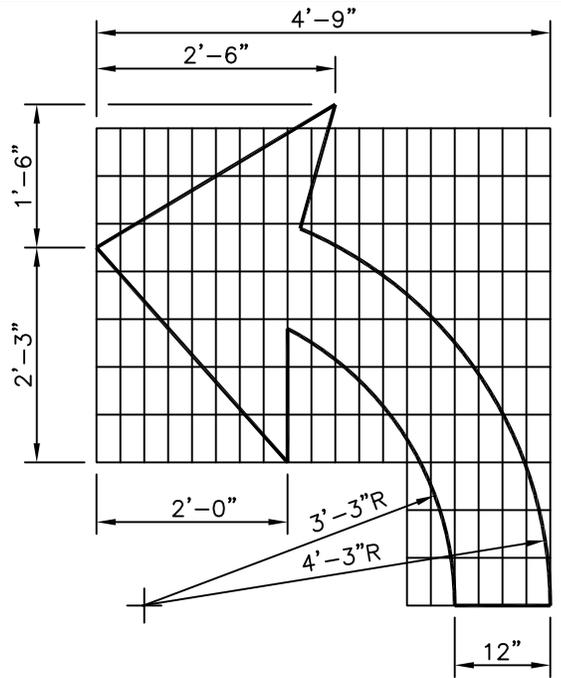
FILENAME:

SHT 1
OF 1

SK
NO. 00 01 15-AT



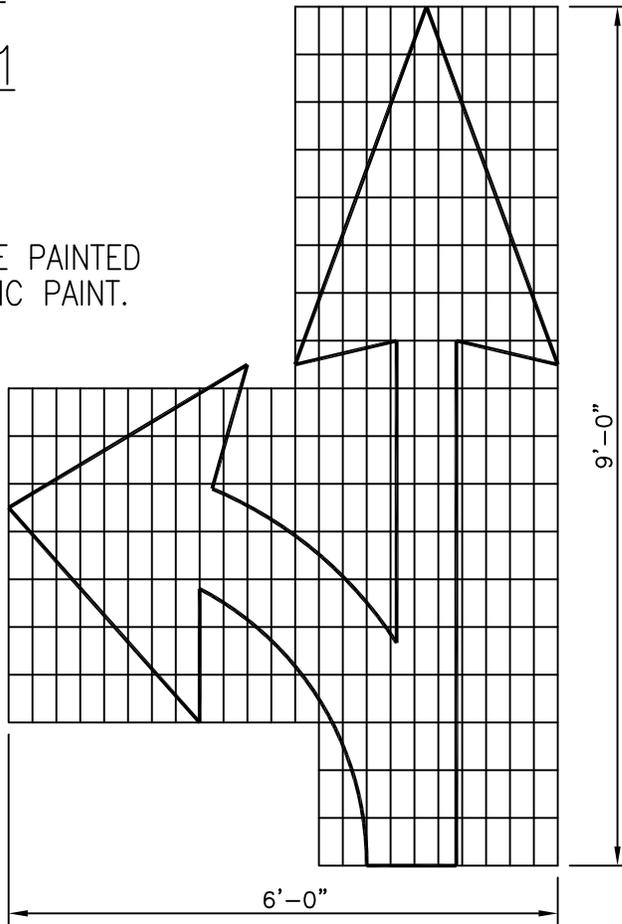
TYPE 1



TYPE 2L

NOTE

1. ARROWS SHALL BE PAINTED WITH WHITE TRAFFIC PAINT.



TYPE 3L

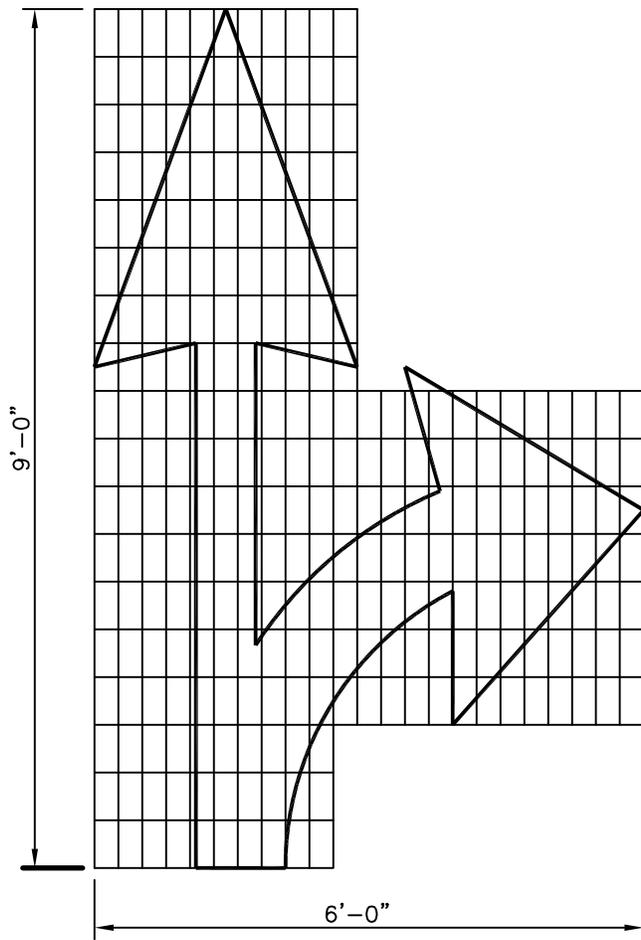
ARROW DETAIL

NAVFAC HAWAII
CAPITAL IMPROVEMENTS
PEARL HARBOR

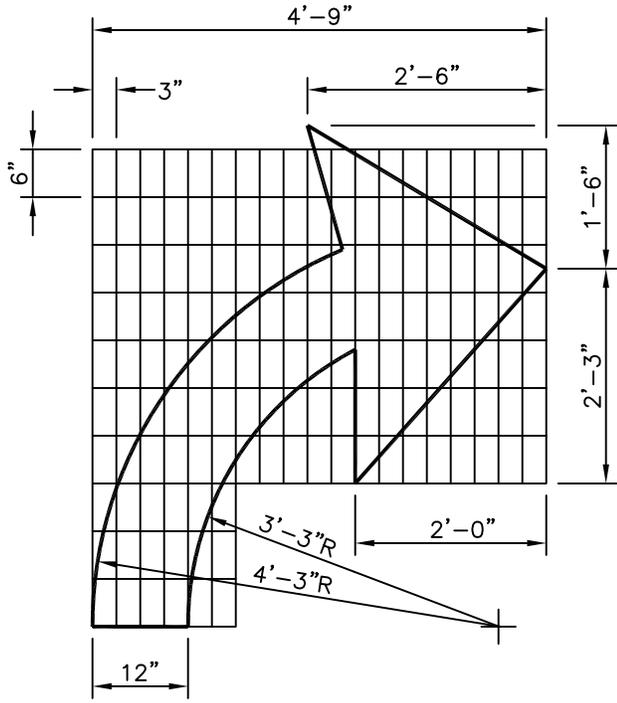
SHT 1
OF 1

SK
NO. 00 01 15-AU

FILENAME:



TYPE 3R



TYPE 2R

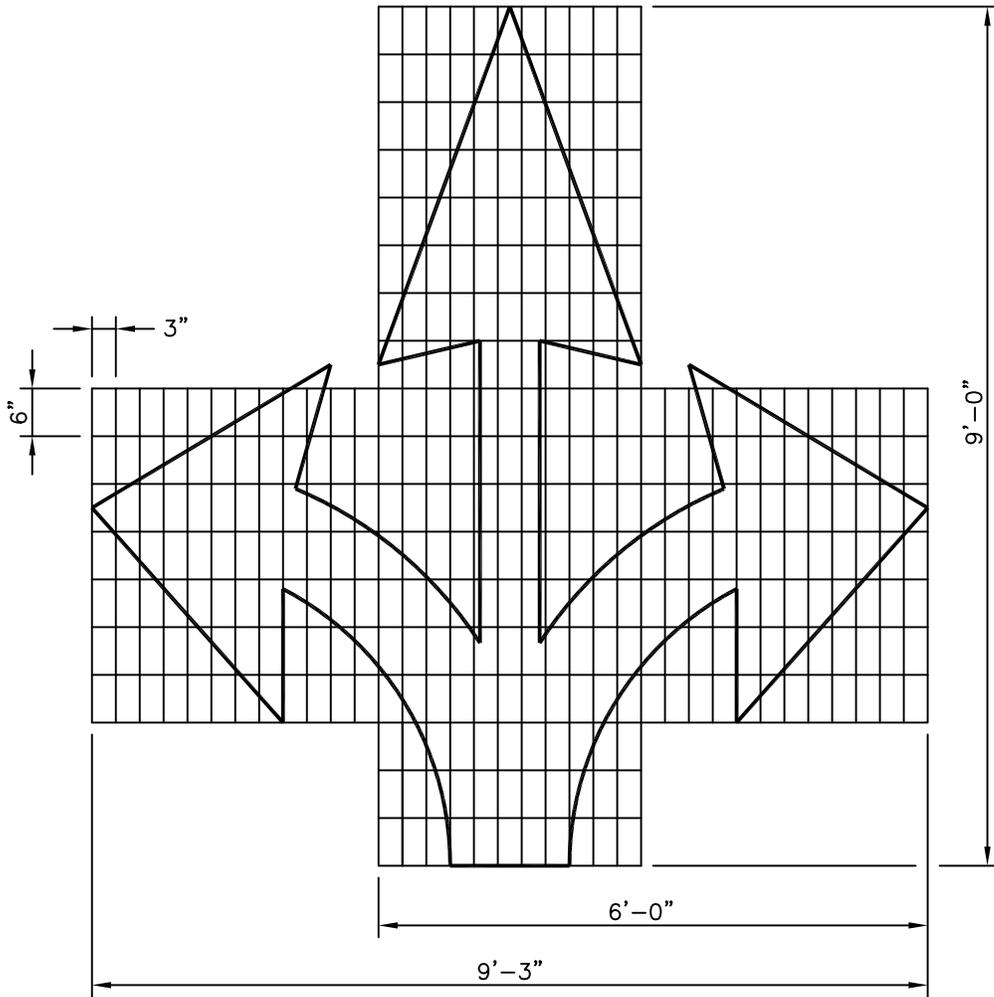
NOTE
 1. ARROWS SHALL BE PAINTED WITH WHITE TRAFFIC PAINT.

ARROW DETAIL

**NAVFAC HAWAII
 CAPITAL IMPROVEMENTS
 PEARL HARBOR**

SHT	1	SK
OF	1	NO. 00 01 15-AV

FILENAME:



TYPE 4

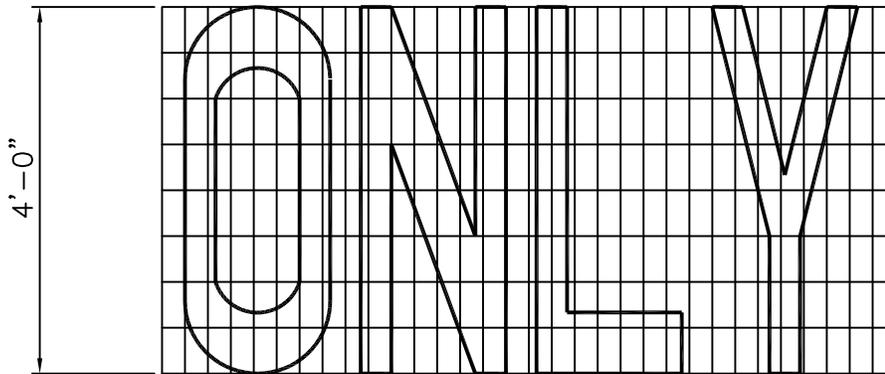
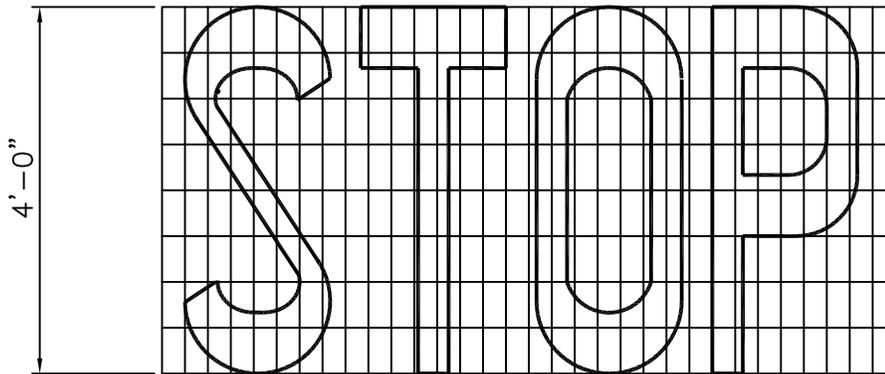
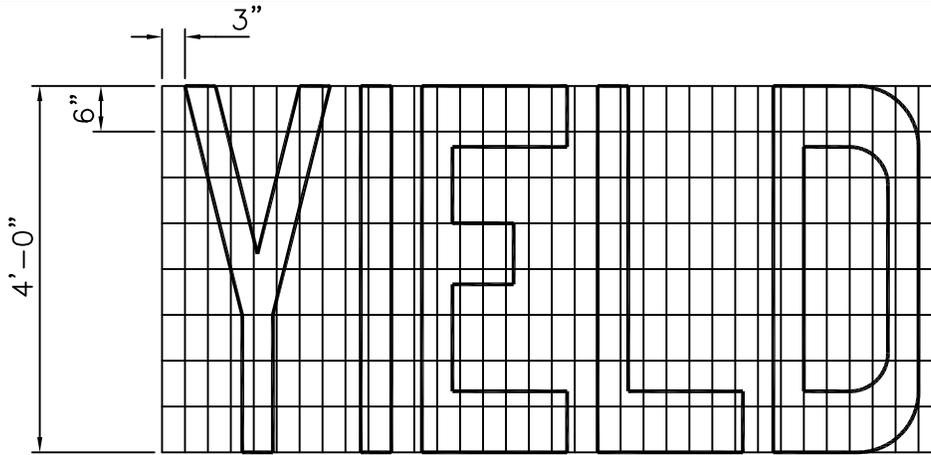
NOTE
 1. ARROWS SHALL BE PAINTED WITH WHITE TRAFFIC PAINT.

ARROW DETAIL

**NAVFAC HAWAII
 CAPITAL IMPROVEMENTS
 PEARL HARBOR**

FILENAME:

SHT	1	SK
OF	1	NO. 00 01 15-AW



NOTES:

1. ALL WORDS SHALL BE PAINTED WITH WHITE TRAFFIC PAINT.
2. A STOP LINE 12" WIDE SHALL BE USED WITH THE WORD "STOP" AND SHALL BE LOCATED 4 FEET IN ADVANCE OF AND PARALLEL TO THE NEAREST CROSSWALK LINE, OR FROM 4 TO 30 FEET FROM NEAREST EDGE OF THE INTERSECTING ROAD. THE DISTANCE BETWEEN THE WORD "STOP" AND THE LINE SHALL BE 3 FEET.
3. THE WORD "STOP" SHALL NOT BE USED UNLESS ACCOMPANIED BY A STOP LINE AND STOP SIGN.

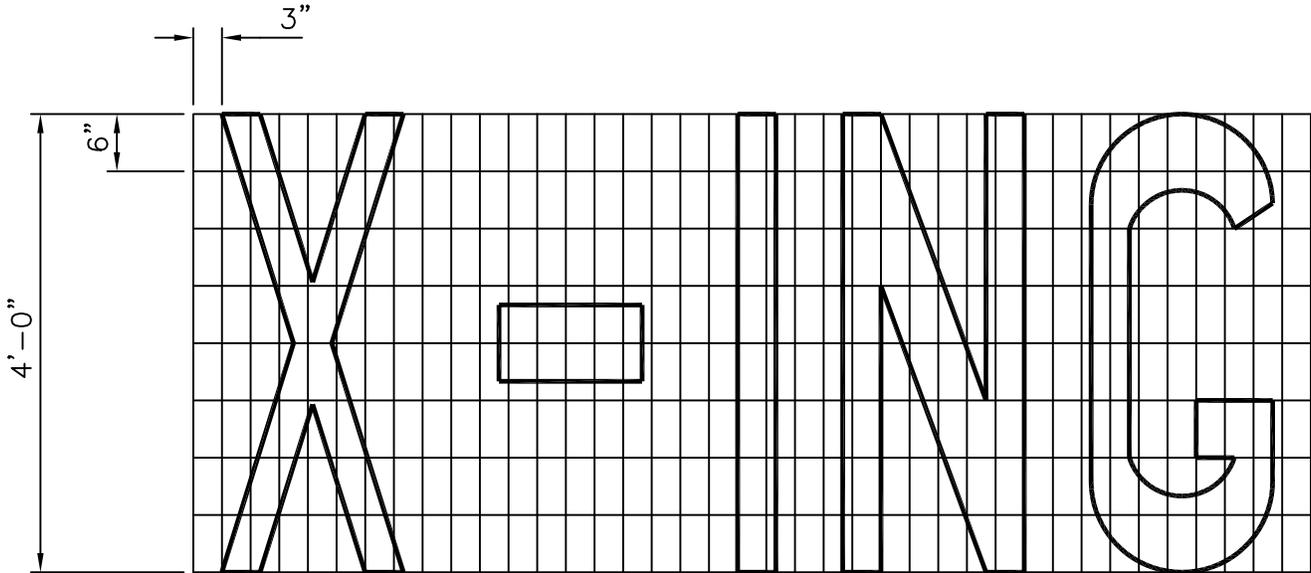
PAVEMENT WORD MARKINGS

**NAVFAC HAWAII
CAPITAL IMPROVEMENTS
PEARL HARBOR**

FILENAME:

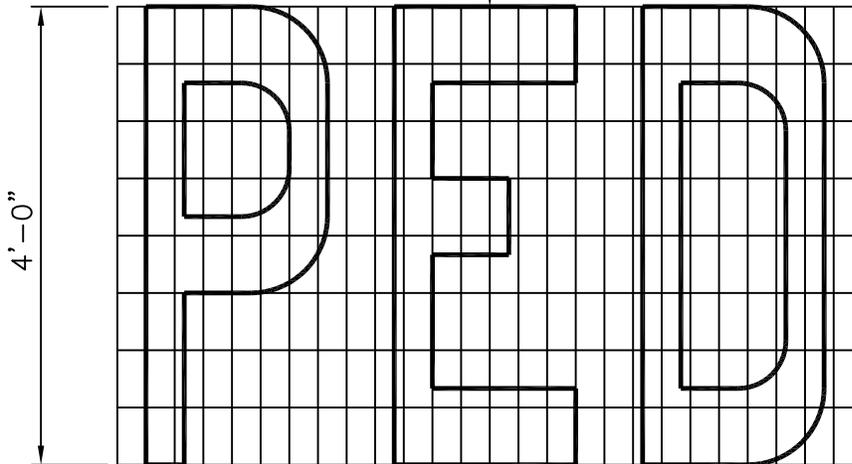
SHT 1
OF 1

SK
NO. 00 01 15-AX



NOTE:

FOR ALL MESSAGES CONSISTING OF MORE THAN ONE WORD
THE SPACE BETWEEN LINES SHALL BE 16 FEET



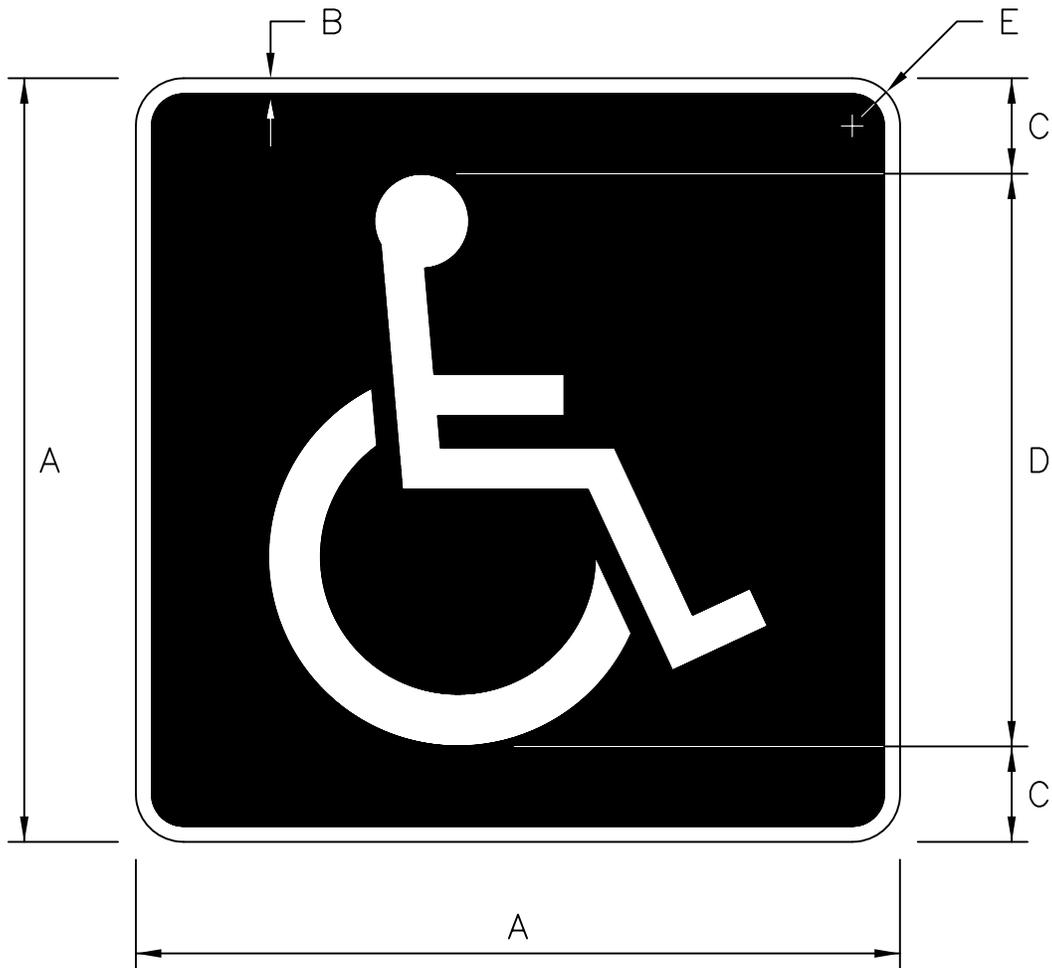
PAVEMENT WORD MARKINGS

**NAVFAC HAWAII
CAPITAL IMPROVEMENTS
PEARL HARBOR**

FILENAME:

SHT 1
OF 1

SK
NO. 00 01 15-AY



SIGN	DIMENSIONS (INCHES)				
	A	B	C	D	E
MIN & STD*	24	$\frac{1}{2}$	3	18	$1\frac{1}{2}$
SPECIAL	30	$\frac{3}{4}$	$3\frac{3}{4}$	$22\frac{1}{2}$	$1\frac{7}{8}$

COLORS

LEGEND – WHITE (REFL)
 BACKGROUND – BLUE

* SMALLER SIZE PANELS MAY BE USED AS
 APPLICABLE WITHIN TERMINAL AREAS

TYPICAL HANDICAP LOGO

**NAVFAC HAWAII
 CAPITAL IMPROVEMENTS
 PEARL HARBOR**

FILENAME:

SHT 1
 OF 1

SK
 NO. 00 01 15-AZ



HANDICAP LOGO - PROPORTION

**NAVFAC HAWAII
CAPITAL IMPROVEMENTS
PEARL HARBOR**

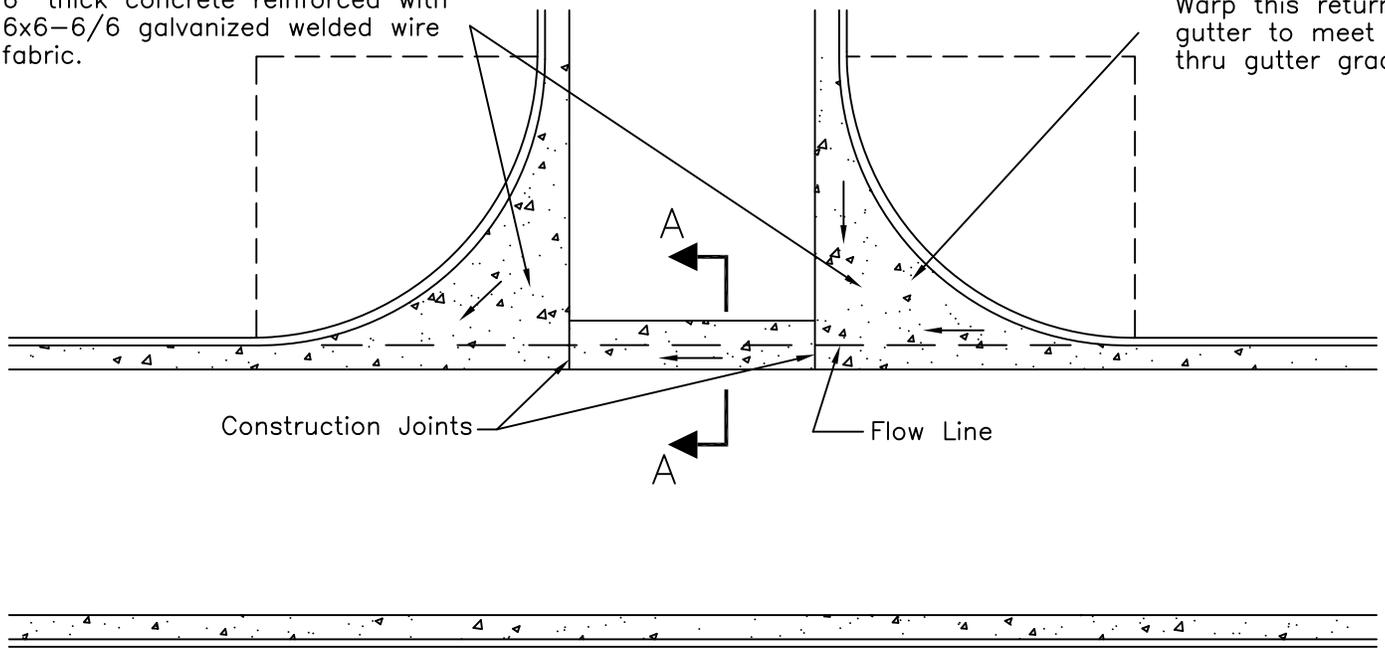
FILENAME:

SHT 1
OF 1

SK
NO. 00 01 15-BA

6" thick concrete reinforced with 6x6-6/6 galvanized welded wire fabric.

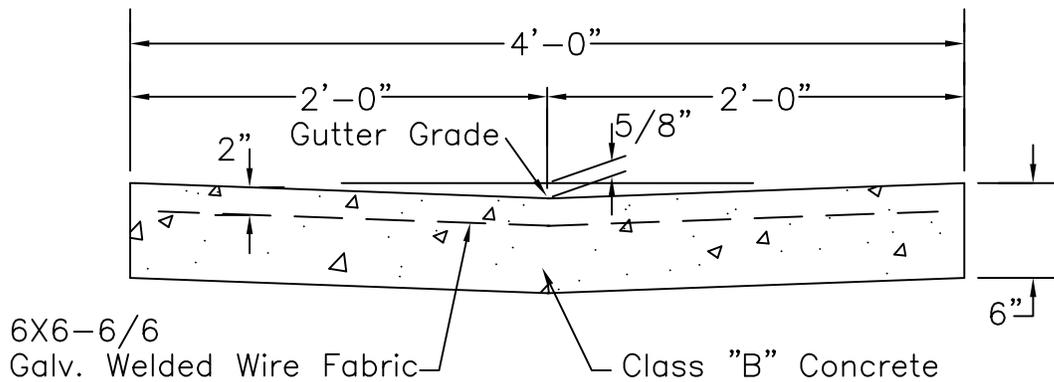
Warp this return gutter to meet thru gutter grades



PLAN
NOT TO SCALE

NOTE:

Construction joints shall be keyed construction joints with tie bars.



SECTION A-A
NOT TO SCALE

THROUGH GUTTER

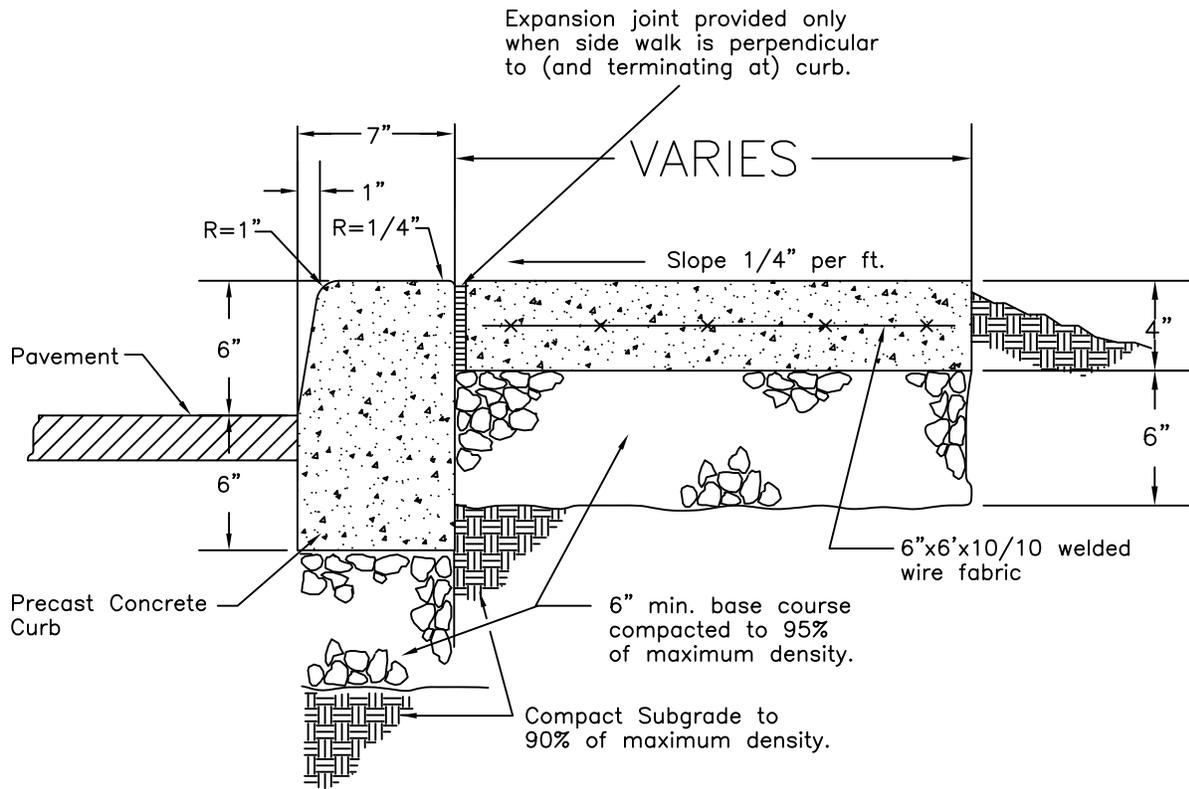
CONCRETE THROUGH GUTTER

**NAVFAC HAWAII
CAPITAL IMPROVEMENTS
PEARL HARBOR**

FILENAME:

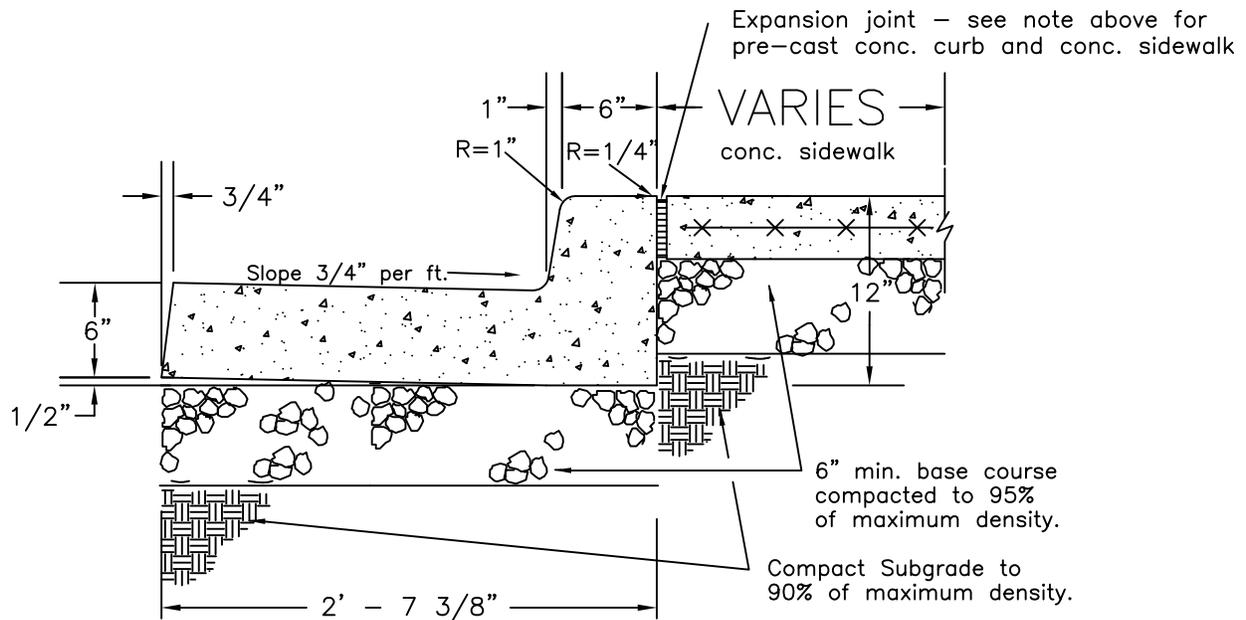
SHT 1
OF 1

SK
NO. 00 01 15-BB



PRE-CAST CONCRETE CURB AND CONCRETE SIDEWALK

NOT TO SCALE



COMBINATION CURB AND GUTTER SECTION

NOT TO SCALE

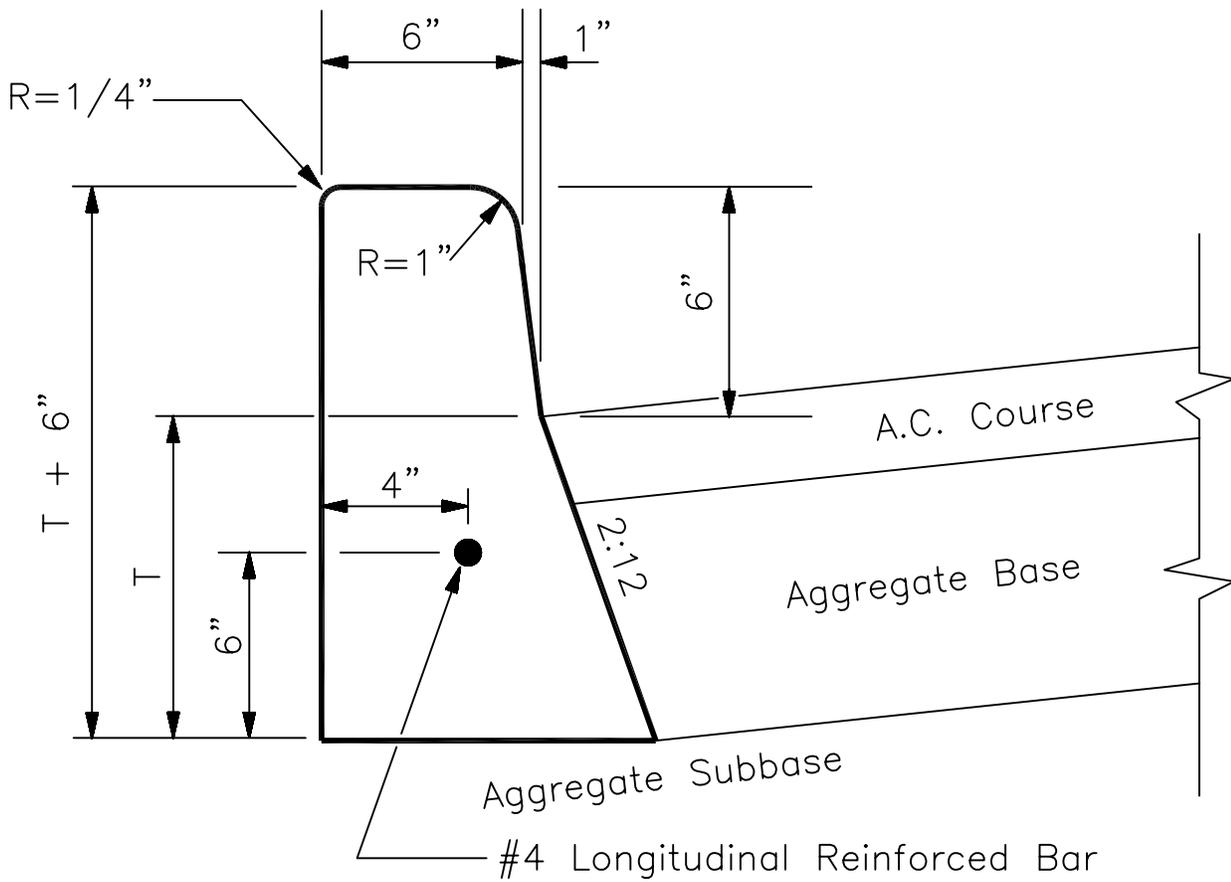
INSTALLATION OF CONCRETE SIDEWALK

**NAVFAC HAWAII
CAPITAL IMPROVEMENTS
PEARL HARBOR**

FILENAME:

SHT 1
OF 1

SK
NO. 00 01 15-BC



CAST-IN-PLACE CONCRETE CURB

NOT TO SCALE

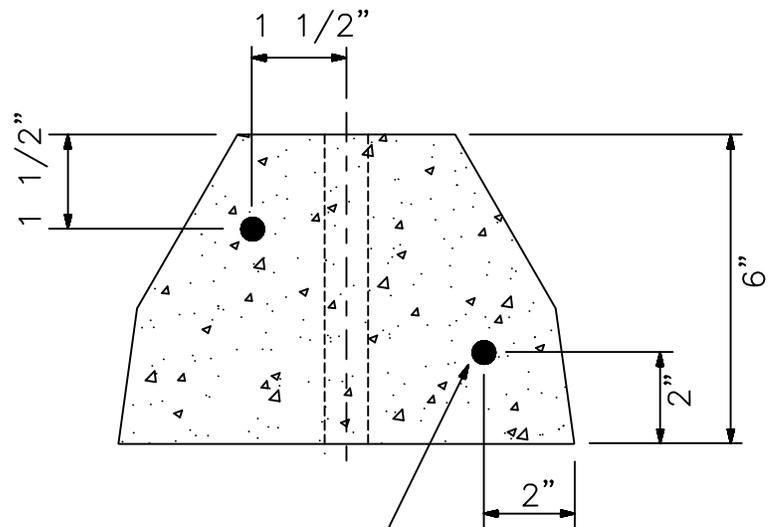
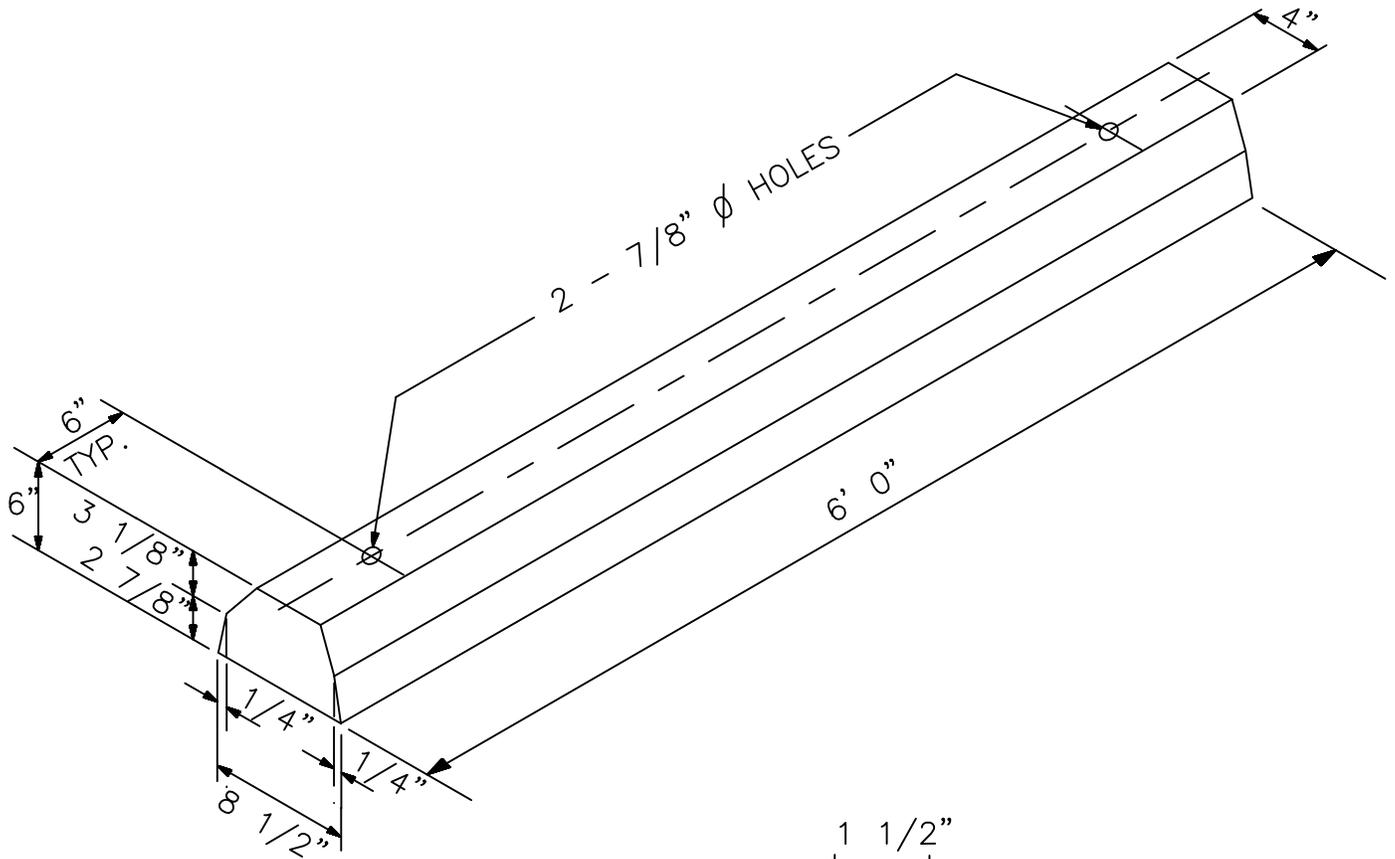
CAST-IN-PLACE CONCRETE CURB

**NAVFAC HAWAII
CAPITAL IMPROVEMENTS
PEARL HARBOR**

FILENAME:

SHT 1
OF 1

SK
NO. 00 01 15-BD



2 - #3 REBAR
CONTINUOUS

TYPICAL SECTION

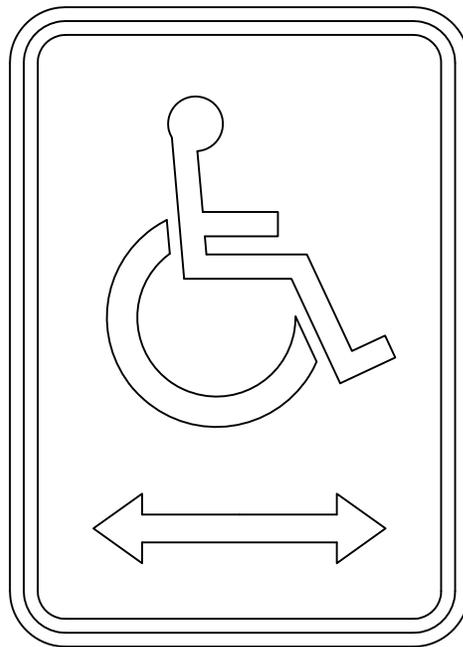
6' CONCRETE PARKING BUMPER STANDARD

**NAVFAC HAWAII
CAPITAL IMPROVEMENTS
PEARL HARBOR**

FILENAME:

SHT 1
OF 1

SK
NO. 00 01 15-BE



TYPICAL HANDICAP SIGNS

**NAVFAC HAWAII
CAPITAL IMPROVEMENTS
PEARL HARBOR**

FILENAME:

SHT 1
OF 1

SK
NO. 00 01 15-BF