

MILITARY DEPARTMENT
OFFICE OF THE ADJUTANT GENERAL
10601 Bear Hollow Drive
Rancho Cordova, California 95670



Addendum 02

IFB No. 130792 - Joint Forces Training Base Lexington Drive and Lot A Repairs
Joint Forces Training Base - Los Alamitos, CA
9/2/2026 at 2:00 PM

8/14/2026

Please review the following addendum to IFB No. 130792.

1. Attachment 01 – SOW Revise 20260813
2. Attachment 02 – Specification Project Set Revise
3. Attachment 03 – Rate Sheet Revise
4. Attachment 04 – IGE Revise
5. Attachment 05 – Project Drawings Bid Set Revise

The entire set of attached documents has been revised; please ensure you review them thoroughly.

Please note that no verbal information given will be binding upon the State unless such information is issued in writing as an official addendum.

Robert Hawkins
Contracting
Administrator

Attachment 01
SOW Revise 20260813

MILITARY DEPARTMENT
OFFICE OF THE ADJUTANT GENERAL
10601 Bear Hollow Drive
Rancho Cordova, California 95670



Attachment 01

ADDENDUM 02 SCOPE OF WORK

LEXINGTON DRIVE/LOT A

JFTB LOS ALAMITOS

DATE: 13 AUGUST 2026

Statement of Work (SOW)

1. Project Identification & Administrative Context

- **Project Name:** Joint Forces Training Base Lexington Drive Paving w/ Alternative Bid Items 1-4: B-1 Inbound Main Entrance Rehabilitation, B-2 Visitor Vehicle Parking Area Rehabilitation, B-3 New Concrete Slab Transition, Shiloh Way, West Entrance, and B-4 New Concrete Slab Transition, Shiloh Way, East Entrance.
- **Location:** Joint Forces Training Base (JFTB) Los Alamitos, CA 90720

2. Project Background & Mission

- **Installation Profile:** Joint Forces Training Base (JFTB), Los Alamitos is an active, operating military installation and airfield meeting Department of Defense standards. It provides support and training facilities for military units, national, state, and local organizations, and emergency operations.
- **Site Location:** Lexington Drive and Entry Point (ECP - serpentine).
- **Project Mission:** The existing asphalt infrastructure suffers from structural degradation and requires systemic milling, repair, and resurfacing to support ongoing heavy-vehicle installation logistics, transit safety, and base operations.
- **Environmental Enforcement:** JFTB Los Alamitos must meet regulatory requirements to prevent storm water discharge into the sanitary sewer system. This project satisfies the Industrial Wastewater Discharge Class I Permit (Permit No. 3-1-270) issued by the Orange County Sanitation District, and Ordinance No. 36 Section 3(r) of the Los Alamitos Water District, which prohibits connecting surface runoff or drainage systems to the sewage system.

- **Environmental Requirements:**

Erosion/Sedimentation Prevention Measures: Prior to beginning soil disturbance, silt fencing, wattles, straw bales, berms and/or other appropriate measures will be installed in erosion prone areas of the project site, (including staging, storage and vehicle parking areas). Integrity of all erosion prevention Measures will be maintained throughout construction and new devices added were necessary during project construction/training activities.

Dust Control:

Dust will be controlled throughout the construction period by using water or other approved dust control measures, and by phasing soil disturbances to minimize the area of soil disturbed at any one time. Construction shall not occur in high winds (i.e., winds that render watering or other dust control ineffective).

3. General Scope of Work

The Contractor shall furnish all notifications, fees, labor, materials, permits, disposal logistics, equipment, bonds, and warranties required for the complete civil pavement execution, repair, and restriping of Lexington.

3.1 Discrete Component Work Summary

Work includes, but is not limited to, the complete execution or installation of:

Full-Depth Inbound Lane Paving:

- **Geosynthetic Installation:** Install FW500 (or equal) fabric over the prepared subgrade, ensuring proper overlap and tensioning as per manufacturer guidelines.
- **Base/Sub-Base Placement:** Place and compact the 14" sub-base and 8" Class 2 aggregate base in lifts, ensuring density requirements are met before proceeding to the next layer.
- **Paving:** Apply 6" Hot-Mix Asphalt in accordance with Caltrans standards.
- **Site Restoration:** Restore all adjacent areas, curbs, and gutters to original condition.
- **Utility Adjustment:** Digging out and raising vault frames, valve covers, and manhole frames flush to final grade.
- **Traffic Control Safety:** Furnishing flaggers, barricades, signage, and implementing a formal CA MUTCD traffic control plan.

- **Pavement Delineations:** Thermoplastic reflective traffic stripes, crosswalk markings, and blue reflective fire hydrant markers.
-

3.2 Quantities & Structural Performance Breakdown

A. Lexington Drive Base Scope (Approx. 20,500 SF / 2,280 SY)

- **Full-Depth Repair:** Clear, grub, and excavate to the required depth to accommodate the 14" sub-base, 8" base, and 6" HMA.

B. Alternative Bid Items 1-4 (Refer to drawing sheet C3 footprint)

B-1 Inbound Main Entrance Rehabilitation (11,300 SF +/-)

B-2 Visitor Vehicle Parking Area Rehabilitation (843 SF +/-)

B-3 New Concrete Slab Transition, Shiloh Way (West Entrance) (862 SF +/-)

B-4 New Concrete Slab Transition, Shiloh Way (East Entrance) (330 SF +/-)

3.3 Period of Performance & Project Timeline

- **Total Contract Duration:** The Contractor has **365 Calendar Days** from the formal Notice to Proceed (NTP) to finalize all administrative closeouts and deliverables.
- **Advance Notifications:** Submit the names of the Field Superintendent and all subcontractors within **10 working days of contract award**. Provide the project coordinator with a written prospective construction schedule and critical path outline **10 working days prior to mobilization**.
- **Active Construction Window:** Physical site construction work must commence within **10 calendar days** of receiving the NTP. Once field operations begin, all on-site construction must be entirely finalized within **20 working days**, with an upper execution limit not to exceed **120 days** after work starts.
- **Operational Interferences:** All work must be performed in a manner that ensures minimum interruption in, or interference with, the proper execution of government business and vehicle traffic facility.

4. Technical Materials & Execution Specifications

4.1 Surface Preparation & Tack Coating

- **Foundation:** Place asphaltic mixtures only on a prepared, firm, dry, and compacted base foundation layer cleared of loose debris. Potholes,

depressions, and curb/gutter match points must be corrected and cleared. Do not pave during rain or when the roadbed is unstable.

- **Tack Coat Material:** Must utilize **Asphalt Tack Coat Material: Thermoplastic Polymer Modified HPS No Track Tack** (No Track Tack) manufactured by Paramount Petroleum, or a pre-approved equivalent.
- **Application Parameters:** Apply full coverage using a distributor truck at temperatures between **325°F and 425°F**. The targeted application rate shall range between **0.08 to 0.15 gallons per square yard** based on surface conditions.
- **Tracking Cleanup:** If tack coat is tracked onto existing adjacent pavements, the Contractor shall clean it off completely or provide an asphalt slurry seal to restore the pavement at their own expense across the entirety of the haul routes.

4.2 Asphalt Concrete (AC) & Compaction Controls

- **Mix Gradation:** Asphalt concrete used for remove-and-replace repairs within the roadway shall be **Class and Grade A-PG 64-10**. An asphalt concrete mix of **C2 gradation** may be used exclusively for leveling layers.
- **Spreading:** The Contractor shall spread and distribute AC pavement in strict accordance with **Section 302-5 of the SSPWC 2021** (Greenbook).
- **Compaction Target:** Final rolled pavement compaction must reach a minimum of **95 percent of the density** obtained with the California Compactor per test Method No. Calif. 304. Soil backfill compaction must reach **95% in the upper 2 feet** and **90% for depths below 2 feet**.
- **Independent Testing:** The Contractor shall hire an **independent engineering company** to conduct compaction testing via a properly calibrated nuclear testing device or cores. Compaction test results must be submitted directly to the project coordinator.

4.3 Asphalt Thickness Testing & Field Verification

To ensure conformity with design thickness profiles, structural tolerances, and to prevent premature pavement degradation, strict thickness compliance protocols shall be enforced.

- **Testing Methods:** The Contractor's independent engineering firm shall verify final compacted layer thicknesses using core extraction methods (ASTM D3549 / Standard Test Method for Thickness or Height of Compacted Asphalt Mixture Specimens) or calibrated non-destructive radar modeling where approved.
- **Frequency Requirements:**

- **Paving Sections (Lexington Drive):** Core extraction tests must be executed at a minimum frequency of one (1) test location per every 500 Linear Feet of paved lane alignment, or every 1,000 Square Yards of placed area.
- **Acceptance Tolerances:**
 - The average thickness of the finished layer must meet or exceed the target layout dimension (2.0 inches for overlay sections; 6.0 inches for full-depth patches).
 - No individual point core measurement shall deviate below the target specifications by more than **0.25 inches**.
- **Deficient Materials Rectification:** Any paved sections exhibiting individual core readings deficient by more than 0.25 inches below design targets shall be flagged. The Contractor shall be required to completely mill out, remove, and replace the deficient area to the specified full depth across the entire structural lane or area boundary width at zero additional cost to the Government.
- **Reporting:** Certified laboratory reports logging core location details, station labels, and exact physical depth caliper results must be formally attached to the progress invoicing data package. Patch holes generated via core testing must be filled immediately with fresh hot asphalt and compacted flush by the Contractor.

4.4 Utility Adjustments to Grade

- **Adjustment Timeline:** Within **48 hours** from the completion of paving, the Contractor shall dig out manhole frames, vault frames, and covers and adjust them to fit the new finished surface grade.
- **Prohibitions:** The use of cast iron raising rings to adjust manhole frames is strictly prohibited.
- **Separation Paper:** Before paving over utility fixtures, cover them with either tarpaper or construction paper to facilitate clean separation of the new asphalt from the covers.

4.5 Striping & Permanent Markings

- **Pre-Mapping:** The Contractor must locate and map all existing pavement markings prior to milling to guarantee accurate replacement. Provide a pavement marker layout plan to the project coordinator for approval prior to applying permanent markings.

- **Temporary Marks:** Apply temporary markings immediately in preparation for permanent lines upon core asphalt cure time. Remove all temporary paint markings upon final project completion.
- **Permanent Thermoplastic Application:** Exactly **30 days** after the placement of HMA, restripe the roadway with reflective glass bead-embedded **thermoplastic traffic stripes** conforming to California DOT (Caltrans) highway traffic standards.
- **Fire Hydrant Markers:** Provide and install **two (2) blue reflective pavement markers** at each existing fire hydrant (one on top of the curb, and one placed 3 feet toward the hydrant from the centerline or median curb).

5.0 Regulatory, Code, and Licensing Requirements

5.1 Compliance Standards

Per "The Federal Facilities Act 1992," all work shall conform to trade standards, federal rules, and local building codes, ordinances, and regulations listed in the construction specifications.

- **Applicable Codes:** The contractor must follow the California Building Code (CBC), Uniform Building Code (UBC), and Department of Defense Instructions.
- **Exemption Status:** The project will not require a building or grading permit from the City of Los Alamitos or the County of Orange and is not required to submit a local Low Impact Development (LID) Plan or Water Quality Management Plan (WQMP).
- **Conflict Resolution:** The Contractor shall report any inconsistencies, conflicts, or omissions in "The Codes" or design documents to the project coordinator for interpretation prior to performing the affected work.

5.2 Unified Facilities Criteria (UFC)

The contractor must follow these specific federal criteria to the extent applicable for project engineering elements:

- **UFC 1-200-01:** DoD Building Code
- **UFC 3-190-06:** Protective Coatings and Paints
- **UFC 3-201-01:** Civil Engineering
- **UFC 3-220-01:** Geotechnical Engineering
- **UFC 3-250-01:** Pavement Design for Roads and Parking Areas
- **UFC 3-260-01:** Airfield and Heliport Planning and Design
- **UFC 3-260-02:** Pavement Design for Airfields

- **UFC 3-301-01:** Structural Engineering

5.3 Contractor Qualifications & Licensing

- **Experience Mandate:** The Contractor/Applicator must be a company specializing in performing this specific scope of civil asphalt and concrete work, with a minimum of **five (5) years** of documented experience.
 - **Certification Submittal:** Required experience certifications must be explicitly presented within the contractor's initial bid package. Failure to provide this certification at the time of the bid opening will be used as grounds for immediate bid rejection.
 - **State Registration:** Prior to beginning work, the General Contractor shall ensure they are actively registered with the **California Department of Industrial Relations (DIR)**.
 - **Sourcing Standards:** All materials and equipment must be new and must strictly comply with the **Buy American Act** (Made in America Act).
-

6.0 Administrative, Safety, & Submittal Requirements

6.1 Safety & Personnel Submittals

Prior to beginning work, the Contractor must submit and receive approval for:

- **Safety Plan:** Fully compliant with CAL-OSHA standards and federal regulations.
- **Appointment Letters:** Formal designations for the Site Superintendent, Quality Control (QC) Officer, and Site Safety Officer.
- **On-Site Supervision:** The Site Superintendent and Safety Officer (or an approved alternate) must always be present on-site when physical work is being performed.
- **Superintendent & Subcontractor List:** Provide the named Field Superintendent and a complete list of subcontractors to the PM within **10 working days** of contract award. The assigned Superintendent must be present whenever work occurs. Neither the Field Superintendent nor subcontractors may be changed without clear justification and written approval by the Contract Manager (CM).

6.2 Material & Product Submittals

- **Product Data:** Submit comprehensive product data for all membranes, crickets, boards, adhesives, and flashings used in the work for this project **five (5) working days** prior to the beginning of any physical site work.

- **Equipment Submittals:** Submit for approval all necessary residual equipment documentation for the operation of the completed project, including manufacturer catalogs and engineering specifications, to the Contract Manager after contract award.

6.3 Scheduling, Mobilization, and Logistics Notices

- **Mobilization Notice:** Notify the PM in writing **10 working days** in advance of mobilization. Provide a prospective construction schedule highlighting keystone events and the critical path.
 - **Temporary Logistics:** Coordinate the installation and use of any required temporary services (crane staging, barricades, power, lighting, and traffic control) with the PM **10 working days** prior to installation. Remove all temporary services and clean the space upon project completion.
 - **Final Inspection Notice:** Notify the PM/CM in writing of the anticipated final inspection date **5 working days** in advance.
-

7.0 Base Logistics, Hours, & Security Regulations

7.1 Hours of Operation & Staging Constraints

- **Standard Shift:** All work provided under this contract shall normally be accomplished between **7:00 AM and 4:00 PM, Monday through Friday**, excluding federal and state holidays, unless otherwise approved by facility authorities.
- **Staging Limitations:** Material storage directly on the bare ground or any improved, unprotected street surface is prohibited. Construction site storage is limited strictly to a two-day operational capacity. Excess machinery and supplies must be housed off-site in an approved yard.
- **Weekend Policy:** Storing materials on facility streets over weekends is forbidden without express written permission. All equipment left out overnight must feature reflectors and barricades.

7.2 Traffic Control Systems

- **CA MUTCD Compliance:** Implement a comprehensive Traffic Control Plan conforming to the minimum requirements of the California Department of Transportation's Manual on Traffic Control Devices (**CA MUTCD 2014**).
- **Flaggers:** Furnish flaggers equipped and appareled in accordance with the CA MUTCD 2014 "Flagger Control" section at the Contractor's expense.
- **Emergency Routing:** Emergency vehicles must be granted uninterrupted, zero-delay passage through the construction zones always.

7.3 Base Access & Gate Clearance

- **Clearance Submission:** Provide the PM with the legal names of all personnel requiring entry at least **3 days** prior to arrival for security vetting and approval.
 - **Gate Delays:** Delays at vehicle or pedestrian check-in gates are common due to strict security procedures. Any loss of time resulting from gate checks shall be borne entirely by the Contractor.
 - **Vehicle & ID Requirements:** All personnel must enter through the main facility entrance. To obtain entry, personnel must present a current vehicle registration, proof of valid vehicle insurance, and an approved Federal Identification (e.g., U.S. Passport, U.S. Military ID, REAL ID Driver's License).
 - **Site Searches:** Periodic fire prevention inspections and site searches may be executed. The Contractor must furnish facility authorities with tagged keys to access all locked areas within the worksite. The Government is not liable for inspection-related losses.
-

8.0 Environmental, Hydrology, & Waste Management

8.1 Civil Hydrology & Discharge Controls

- **Outfall Restrictions:** The project discharges through an existing culvert connecting to the concrete-lined Rossmoor Storm Channel. Post-developed peak flow rates must not exceed pre-developed peak flow rates. Infiltration and attenuation will be driven by integrated storm water detention basins, gravel beds, and subsurface perforated pipe systems.
- **SWPPP Requirements:** Because project footprints will result in a ground disturbance exceeding one acre, a formal **Storm Water Pollution Prevention Plan (SWPPP)** is required in accordance with the State of California State Water Resources Control Board (SWRCB) within the Santa Ana Regional Water Quality Control Board (RWQCB) jurisdiction.
- **Climate Limits:** Do not apply construction materials during unsuitable weather or when ambient temperatures fall below **50°F**. Do not expose site materials vulnerable to water or sun damage in quantities greater than can be completely weatherproofed within the same workday.

8.2 Cultural Resources & Ground Disturbance Restrictions

- **Footprint Limitations:** All grading activities, construction vehicle traffic, and staging must be restricted to existing roads and remain strictly within the project footprint.

- **Inadvertent Discovery Protocol:** Workers must monitor ground-disturbing activities for unknown archaeological resources or human remains. If any historical artifacts, prehistoric tools, stone chipping debris, hearths, bones, shells, or historic trash are encountered:
 1. **Halt all work immediately** within a **50-foot radius** of the discovery.
 2. **Secure the area** to prevent further disturbance.
 3. **Contact the Environmental Office immediately** via phone (*John Sharp*: 916-854-1477 or *Lauren Mount*: 916-854-1489).
 4. Work shall not resume until written approval is issued by the Environmental Office.

8.3 Solid Waste Handling & Recycling Mandates

- **Owner Property Protection:** All demolished materials, milled asphalt, and removed equipment remain the specific property of the Owner. No items shall be removed from the job site until written approval is explicitly given.
- **Off-Site Disposal:** Approved debris and construction waste shall be hauled away from the job site to an approved landfill at the Contractor's sole expense. Open burning is strictly prohibited. Debris must be removed daily and must never block facility roads.
- **Recycling Requirements:** All demolition and construction waste must be transported off post to a certified **50% recycling waste facility**.
- **Tracking Receipts:** The Contractor must keep a record of all project waste generated and diverted **by weight** (per CA AB 75 and Executive Order 13514). Provide copies of weigh master receipts identifying exact weights, material types, and facility names to the project coordinator and the Solid Waste Program Manager (brian.a.pierskalla.nfg@army.mil).

9.0 Site Execution, Quality Assurance, & Deficiency Tracking

9.1 Field Verification & Damage Liability

- **Field Verification:** Field-verify all dimensions and conditions, reporting discrepancies to the PM prior to finalizing bids or starting construction.
- **Obstruction Discovery:** The Contractor must not willfully proceed with construction when unknown physical obstructions or grade differences are discovered. Bring these conditions to the PM's attention immediately; failure to notify transfers full financial and structural responsibility for subsequent revisions to the Contractor.

- **Infrastructure Protection:** All finished work of others or active utility lines damaged during the execution of work under this contract shall be replaced or restored to its original condition by the Contractor at their own expense.

9.2 QA Deficiency Tracking & Technical Precedence

- **Stringency Clause:** Where the cited references, technical specifications, or drawings contain more than one detail for a specific purpose, the most stringent condition shall govern.
- **Remediation Windows:** Deficiencies identified during field inspections shall be corrected by the Contractor within two (2) working days of notification. All corrected actions will be re-evaluated and verified during the Final Inspection.

9.3 Daily Housekeeping Standards

- **Daily Clean Up:** The Contractor shall clean up all debris and discarded materials resulting from daily construction operations prior to the completion of each workday.
- **Broom Clean Surface:** All exterior surfaces adjacent to the premises, including paths, walkways, and access tracks used during the construction day, must be left broom clean before leaving the site.

10.0 Project Closeout, Warranties, & Invoicing

10.1 Comprehensive Warranty Terms

- **Asphalt Structural Warranty (2 Years Minimum):** Asphalt restoration and asphalt overlay shall be warranted against raveling, potholes, and alligator cracking for a minimum of 2 years from the date of application. Depressions that occur within the 2-year warranty period shall be removed in their entirety, replaced, and restriped at no additional cost to the government.
- **Markings Warranty (1 Year Minimum):** Sealcoat and re-striping/re-painting shall be warranted against washing-off, peeling-off, and abnormal wearing-off for 1 year from the date of application.
- **Unified Project Warranty Certificate:** Provide a unified project warranty certificate alongside an applicator's performance warranty covering workmanship and the direct repair of any installation defects at zero cost to the Government.

10.2 Closeout Packet Delivery

Upon successful project completion, the Contractor must turn over an organized closeout packet to the PM before final project acceptance and release of final retention. This packet must include:

- Completed lien waivers, material warranties, and contractor guarantees.
- Instruction handbooks, operating manuals, and properly tagged project keys.
- Certified off-site disposal manifests, weight spreadsheets, and recycling master tickets approved by facility managers.

10.3 Invoicing & Billing Terms

- **Submission Protocol:** All invoices must be submitted directly to the Project Manager for verification before they can be processed for payment.
 - **Billing Frequency:** Invoices may only be submitted once a month.
 - **Materials Installed Mandate:** The Contractor is only permitted to bill for work and materials that are fully installed and verified at the time of invoice submission. No advanced billing for uncompleted milestones or uninstalled on-site material inventory is permitted.
-

11.0 SOW Deliverables & Compliance Checklist

- **Pre-Construction Package (Due 5-10 Days Prior to Start):**
 - Performance & Payment Bonds (if total contract >\$25k).
 - CA MUTCD 2014-compliant Traffic Control Plan.
 - Construction Gantt Chart Schedule reflecting the active 20 working-day timeline.
 - Named Field Superintendent & Subcontractor List.
 - Formal CAL-OSHA Safety Plan & Key Personnel Appointment Letters.
 - Pre-Paving Street Marking Mapping & Approved Marker Layout Plan.
 - Base Access Gate Clearance Submission (Legal Names submitted 3 days prior).
- **Material Quality & Test Submittals (Due 5 Days Prior to Paving):**
 - Certified Product Data for HMA Class A-PG 64-10 and C2 leveling mixes.
 - Paramount Petroleum No Track Tack technical certifications.
 - Recyclable Paving Fabric product datasheets.
 - Concrete/soil-treated material initial design weights.
- **Mid-Project Package (During Construction):**
 - Independent Testing Firm Certified Compaction Density Reports (95% target verification).
 - **Certified Independent Field Asphalt Core Thickness Test Data Log sheets (conforming to Section 4.3 standards).**

- Form 3394 Post-Accident Report logs (if applicable, due within 3 days of an event).
- **Project Closeout Package (Post-Construction):**
 - Solid Waste Tonnage Spreadsheet and Certified Recycling Facility Weight Tickets.
 - Signed 2-Year Structural Asphalt & 1-Year Paint Marking Warranties.
 - Property handover items including operation handbooks and tagged project keys.

END OF SCOPE OF WORK

Attachment 02
Specification Project Set

Attachment 02



CALIFORNIA MILITARY DEPARTMENT CA Facilities Engineering

JOINT FORCES TRAINING BASE LEXINGTON DRIVE ASPHALT REPAIR August 2026

**Joint Forces Training Base
11206 Lexington Drive
Los Alamitos, California 90720**

SECTION 00 01 10

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APPENDIX II – SUBMITTAL LOG

Submittal List
Submittal Log

END OF DOCUMENT

SECTION 01 11 00

SUMMARY OF THE WORK

PART 1 GENERAL

1 SCOPE

- 1.1 The contractor shall furnish all materials and labor to complete the full depth rehabilitation of Lexington Drive inbound lane, as shown on plans.
 - 1.1.1 Contractor to provide all the material, labor and equipment to achieve the road paving section shown on plans.
 - 1.1.2 AC, Concrete or other is to be removed and deposited at nearest adjacent recyclers.
 - 1.1.3 Undesirable soil; (stabilized sub base section material) not able to be compacted or found to be unsuitable shall be removed from the work area at the contractor's expense and deposited at spoils site on JFTB base, directed by DPW.
 - 1.1.3.1 All balance materials; required fill (subbase section material) to meet the product outlined in the plans and specifications is to be provided by the contractor.
- 1.2 The contractor shall supply all materials and labor to provide traffic patterns suitable to JFTB personnel for the closing of any Work areas or areas required to complete the Work.
 - 1.2.1 Signs, fencing, cones, etc. are to be part of the work.
- 1.3 The contractor shall restripe to match existing striping and plane the edges of the pavement to ensure asphalt is flush with existing concrete gutters.
 - 1.3.1 Restriping to include lanes, speed bumps and all other items mentioned in SOW or to exist prior to work.
- 1.4 The contractor shall submit separately Alternate Bid Item (ABI) #1-#4 as shown on plans
 - 1.4.1 #1 Demo + <all WORK required to complete> Asphalt work at Entry adjacent to ACP
 - 1.4.2 #2 Demo + <all WORK required to complete> conc and vehicle parking work adjacent to ACP
 - 1.4.3 #3 Demo + <all WORK required to complete> conc drive area on Shiloh way
 - 1.4.4 #4 Demo + <all WORK required to complete> conc swale/valley gutter area on Shiloh way
- 1.5 Any materials that are suitable for recycling shall be recycled.
- 1.6 Accomplish all work in accordance with the drawings and specifications contained herein.
- 1.7 Accomplish all work in accordance with California Building Codes (2025 Editions).

- 1.8 Perform the above-mentioned work at the Joint Forces Training Base 11206 Lexington Drive, Los Alamitos, California, 95678.

2 CONTRACT MANAGER

- 3 Wherever in these specifications the abbreviation CM is referenced, it shall be the same as if the term Contract Manager/Project Manager is referenced.

4 ENGINEER/CONSTRUCTION INSPECTOR

- 4.1 Wherever the specifications direct the Contractor to the ENGINEER/INSPECTOR OF Record (IOR) for appropriate determination, the Contractor will direct his inquiries to the State Military Department, 10601 Bear Hollow Drive, Rancho Cordova, California 95670, ATTN: Chief of Engineering Phone: (916) 854-3546.

5 CONTRACTOR'S RESPONSIBILITY

- 5.1 Nothing contained in these specifications shall relieve the contractor from the responsibility of visiting the site, accurately measuring the work or otherwise ensuring that the quantities used in preparing his bid are the actual quantities of the work to be accomplished under the contract. By submitting a bid, the contractor confirms that he has visited the aforementioned site and verifies that the quantities used in preparing his bid are the actual quantities of the work to be accomplished under the contract.

- 5.2 The Contractor shall maintain a competent foreman, English speaking, to continuously supervise the work, with authority to discard unsuitable materials and remove unsatisfactory workmen from the project.

6 VEHICLE MOVEMENT

- 6.1 The following applies to all vehicles, except emergency vehicles responding to an emergency:
- 6.2 Vehicles shall observe posted speed limits on post at all times. Vehicles operated when in close proximity to military vehicles or buildings shall not exceed 5 MPH maximum.
- 6.3 Vehicles will not be backed without a ground guide.
- 6.4 All vehicles which do not require the engine to be running for contract purposes will have the ignition turned off and the parking brake set and the vehicle's transmission placed in park.

7 CONTRACTOR'S STORAGE AREA AND PERSONNEL

- 7.1 The CM will designate an area that the contractor may use as a storage area. The contractor shall contact the CM/PM for information regarding

parking areas to be used for the contractors' equipment and by contractor personnel and any restrictions that will be placed on contractor personnel while on the job site.

8 MATERIAL SUBMITTALS

- 8.1 The contractor shall submit to the CM for approval one (1) copy in writing, of a complete list of material submittals and equipment to accomplish the specified work.
- 8.2 Submittals shall comply with Section 01 33 00 of these specifications. Transmit submittals (from Submittal List) on Submittal Log (the list and a blank log is provided after Section 01 33 00).
- 8.3 The CM must receive submittals for Specification identified materials (no substitutions permitted) within ten (10) working days after receiving the "Proposed Contract" for signature.
- 8.4 Receipt of Submittals that substitute an "or equal" are required within fifteen (15) days after date of the Contract Agreement.
- 8.5 Do not start work until the CM approves all project submittals, issues special instructions, and a "Notice of Award" is received from the CM.

9 APPROVAL OF PROCEDURES

- 9.1 The manufacturer's recommended installation procedures and these specifications, will serve as a basis for inspection and acceptance or rejection of actual installation procedures used on the work.
- 12.2 Project Drawings are valid for construction only when stamped, signed and approved for construction by the Architect/Engineer(s) of Record.
- 12.3 Project Specifications are valid for construction when:
- 12.4 The cover sheet is dated and signed by the Architect of record
- 12.5 ALL included Sections bear dates on or before that shown on the signed cover sheet.

13 ORDINANCES AND REGULATIONS

- 13.1 All work shall be accomplished in accordance with all local, State and Federal regulations. Permits and fees shall be the responsibility of the contractor at no additional cost to the Government.

14 WORKING HOURS

- 14.1 The work site will be available for contractor's activities from 8:00 a.m. until 4:30 p.m. Monday through Friday. The site will not be available for contractor's activities on weekends and State or Federal holidays.
- 14.2 The Contractor shall receive written approval from the Project Manager before implementing any form of compressed or alternative

work schedule.

- 14.3 The Contractor shall schedule operations so as not to conflict with airfield operations.

15 SCHEDULING AND INSPECTION

- 15.1 Within fifteen (15) calendar days after receipt of Notice to Proceed, and before commencing work, the contractor shall submit in writing to the Project Manager for approval, the complete scope of work and the procedures and sequence required to complete the work.
- 15.2 The contractor shall work directly with the CM and IOR on work scheduling and inspection procedures prior to starting any work.

16 AS-BUILT DRAWINGS

- 16.1 The contractor shall provide one (2) full and accurate hardcopy sets of as-built drawings per Specification Sections 01 33 00 and 01 70 00, for the work accomplished by all trades for this contract marked up in a neat and understandable manner, submitted to the CM/PM upon completion of the work and prior to issuance of a Certificate of Completion.

PART 2 PRODUCTS

17 MATERIALS

- 17.1 All materials for use under this project shall meet or exceed the standards of quality hereinafter set forth and per Section 01 60 00.

PART 3 EXECUTION

18 QUALITY CONTROL

- 18.1 To ensure proper project quality control and required record keeping, the contractor shall comply with Section 01 45 00.10 20.

19 CONTRACT CLOSEOUT

- 19.1 Contract closeout requires contractor compliance with Section 01 70 00.

END OF SECTION

SECTION 01 26 13

CHANGES IN THE WORK

PART 1 - GENERAL

1.1 SUMMARY

- A. Changes in the Plans and Specifications requested in writing by the Contractor, which do not materially affect the Work, and which are not detrimental to the Work or to the interests of the Agency, may be granted by the CM. Nothing herein shall be construed as granting a right to the Contractor to demand acceptance of such changes.
- B. The CMD may change the Plans and Specifications, character of the work, or quantity of work provided the total arithmetic dollar value of all such changes, both additive and deductive, does not exceed 25 percent of the contract price. Should it become necessary to exceed this limitation, the change shall be by written Supplemental Agreement between the Contractor and the CMD, unless both parties agree to proceed with the change-by-change order.
- C. Change Orders shall be in writing and shall state the dollar value of the change or establish the method of payment, any adjustment in the Contract time of completion, and when negotiated prices are involved, shall provide for the Contractor's signature indicating acceptance.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION

3.1 CHANGE ORDERS

- A. No cost change orders:
 - 1. Contract Documents are complementary; therefore, before starting each portion of Work, carefully study and compare various Drawings, Specifications and any other Contract Documents, coordination drawings, shop drawings, prior correspondence, or documentation related to that portion of Work, as well as information furnished by CMD.
 - 2. Contractor and Subcontractors shall evaluate and take field measurements of any existing conditions related to that portion of Work and shall observe any conditions at site affecting Work.
 - 3. Contractor and subcontractors acknowledge that all documents pertaining to Work have been examined, have examined character of site and any existing conditions, and are satisfied with nature of Work, and all other matters which can in any way affect Work.
 - 4. In the event of inconsistency between portions of Contract Documents or within Contract Documents; provide better quality or greater quantity of Work, and comply with more stringent requirement, either or both in accordance with Architect's interpretation.
 - 5. Any errors, inconsistencies or omissions discovered in Contract Documents shall be reported promptly to Architect as a properly prepared and timely RFI.

6. Contractor and Subcontractors are not required to ascertain Contract Documents are in accordance with applicable laws, statutes, ordinances, codes, and rules and regulations, unless they bear upon construction means, methods, techniques or safety and health precautions, but any nonconformity discovered by or made known shall be reported promptly as a RFI.
 7. If Contractor or Subcontractor fail to give such notice and knowingly proceeds with Work affected by errors or omissions in Contract Documents, Contractor shall correct any such errors, inconsistencies, or omissions at no additional cost.
- B. Contractor's and Subcontractor's Responsibilities:
1. When interpretation, clarification, or explanation of portion of Construction Documents is needed by Contractor, Subcontractor, Vendor or Supplier, the request shall be processed through Contractor:
 - a. Review request for completeness, quality, proper referencing to drawing or specification section and reason submitted.
 - b. If a request is not acceptable it shall be sent back to the submitter with comments regarding the reason for being returned.
 - c. Make every attempt to validate, resolve or respond to RFI by thoroughly researching and reviewing Contract Documents and field conditions.
 - d. Respond to RFI accordingly if the review of RFI discloses a response or is related to coordination of construction or other issue not related to Contract Documents.
 - e. If unable to respond to request, it shall be restated in clear, concise, correct, complete and easily understood manner, and rewritten, if necessary, additional information included if necessary, and only then submitted to Architect for response.
 2. Request for interpretation, clarification or explanation of Contract Documents shall be submitted to CMD in writing:
 - a. List specific Contract Documents reviewed when seeking information being requested.
 - b. Reference all applicable Contract Drawings by sheet number, section, detail, room number, door number, etc., Specifications by section and paragraph number, and reference any other relevant documents.
 - c. The field titled "Regarding" on attached RFI form must be clear for future reference in reports or correspondence.
 - d. Clearly state request and provide Contract Document references and any additional information needed so request can be fully understood, including sketches, photos, or other reference material.
 - e. Fully assess issues, suggest any reasonable solutions, and include various factors, including potential costs, schedule impacts, if any, and recommendations which will aid in determining a solution or response. If a reasonable solution cannot be suggested, a statement to that effect should be so stated.
 - f. Indicate reason request is being submitted.
 - g. Any critical RFI's requiring a rapid response shall clearly indicate such with an explanation as to why RFI is critical.
 - h. Priority for responses shall be indicated when multiple RFI's are submitted within a short period of time.
 3. Copies of responses to RFI's shall be distributed to all parties affected.
 4. A response to RFI shall not be considered a notice to proceed with a change that may revise the Contract Sum or Contract Time, unless authorized by CMD in writing.
 5. If response to RFI is determined incomplete, it shall be resubmitted with reason response is unacceptable and any necessary additional information within five (5) days of time of receipt of response to RFI.
 6. If determined or believed that additional cost or time is involved because of clarifications,

interpretations or instructions issued by Architect in response to a RFI, resubmit RFI within five (5) days of receipt of response with reason and alternate solution or suggestion for performing work at no additional cost. If no other solution is possible or desirable, submit Claim in accordance with the Contract Documents within twenty-one (21) days of receipt of response to the RFI.

C. RFI Submittal Format:

1. Request for information shall be submitted to Architect on RFI form provided at end of this section, or form provided by Architect in electronic text file format, or in similar format acceptable to Architect:
 - a. RFI's shall be assigned unique numbers in sequential order (1, 2, 3, 4, etc.).
 - b. A resubmitted RFI or a previously answered RFI requiring revising or further clarification shall be submitted using original RFI number preceded by ".1" to indicate revision one of RFI (i.e.: RFI No. 34.1 for revision 1 to RFI No. 34).
 - c. RFI form shall be electronically filled out and emailed to Architect's designated representative in text file format. Attachments shall be in electronic text or PDF file format. Photo attachments may be in JPG format.

D. Architect's Response to Request for Information (RFI):

1. Clarifications, interpretations, and decisions of Architect in response to RFI will be consistent with intent of and reasonably inferable from Contract Documents, and will be in writing, and if determined to be necessary by Architect, will be provided in form of drawings and other attachments or both.
2. When making such interpretations and initial decisions, Architect will endeavor to secure faithful performance by both CMD and Contractor, will not show partiality to either and will not be liable for results of interpretations or decisions so rendered in good faith.
3. Architect's decisions on matters related to aesthetic effects will be final if consistent with intent expressed in Contract Documents.
4. Architect will not undertake to settle differences between Contractor, Subcontractors, trades suppliers, fabricator or manufacturer, or act as arbiter as to which Subcontractor, trade, supplier, or manufacturer is to furnish or install various items indicated or required.
5. Architect shall provide responses to RFI's with reasonable promptness, but will endeavor to respond within twenty-one (21) days from date of receipt:
 - a. If multiple RFI's are submitted on the same day or within a five (5) day period, review time may be extended by mutual agreement of parties.
 - b. Architect will provide a written response to RFI if Architect believes response only involves an interpretation, clarification, supplemental information or orders a minor change in Work not involving an adjustment in Contract Sum or extension of Contract Time, and is not inconsistent with intent of Contract Documents, and shall be binding.
 - c. If Architect believes response may result in a change to Contract Sum or Contract Time, response will indicate that a change document will be issued for the response, and appropriate change document will be issued indicating changes to Contract Documents.
 - d. Architect will provide any additional or supplemental drawings, specifications or other information as Architect may deem necessary to facilitate response.
6. Architect may return RFI without response for following reasons:
 - a. Unclear.
 - b. Incomplete.
 - c. Detailed information not provided.
 - d. Is related to construction means, methods or techniques.
 - e. Is related to health or safety measures.
 - f. Is due to Contractor's lack of adequate coordination.

- g. Is considered a "Substitution Request."
 - h. Is due to non-conformance.
 - i. Response is required by another party.
- E. If requested information is available from careful study and comparison of Contract Documents, field conditions, other CMD-provided information, coordination drawings, or prior Project correspondence or documentation, Architect may invoice CMD as a change in services for costs involved in Architect's review, analysis, responding and processing of such RFI:
 - 1. The contractor shall reimburse CMD for such costs.

END OF SECTION

SECTION 01 30 00

ADMINISTRATIVE REQUIREMENTS

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.

A. OCCUPATIONAL SAFETY AND HEALTH ADMINISTRATION (OSHA)

- | | | |
|----|-------------|--|
| 1. | 29 CFR 1910 | Safety and Health Regulation in General Industry |
| 2. | 29 CFR 1926 | Safety and Health Regulations for Construction |

1.2 SUBMITTALS

Government approval is required for submittals. Refer to section 01 33 00 Submittal Procedures for instruction.

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 300 minimum resolution in [JPEG] file format showing the sequence and progress of work. Take a minimum of 2 digital photographs each week throughout the entire project from a minimum of two views from points located by the Contracting Officer. Submit with the monthly invoice one set of digital photographs on a thumb drive cumulative of all photos to date or as directed by the Project Manager.

1.4 MINIMUM INSURANCE REQUIREMENTS

Provide the minimum insurance coverage required by the contract, during the entire period of performance under this contract. Provide other insurance coverage as required by California state law.

1.5 FIRST TIER CONTRACTOR REQUIREMENTS FOR ASBESTOS CONTAINING MATERIALS

Accomplish all contract requirements of Section 02 82 00 Asbestos Remediation, assigned to the Private Qualified Person, Designated Competent Person, directly with a first-tier subcontractor.

1.6 SUPERVISION

1.6.1 Minimum Communication Requirements

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

1.6.2 Superintendent Qualifications

The project superintendent must have a minimum of 5 years' experience in construction with at least 5 of those years as a superintendent on projects similar in size and complexity. The individual must be familiar with the requirements of OSHA 29 CFR 1910. The individual must be capable of interpreting a critical path schedule and construction drawings. The qualification requirements for the alternate superintendent are the same as for the project superintendent. The Contracting Officer may request proof of the superintendent's qualifications at any point in the project if the performance of the superintendent is in question.

For routine projects where the superintendent is permitted to also serve as the Quality Control (QC) Manager as established in Section 01 40 00 Quality Control, the superintendent must have qualifications in accordance with that section.

1.6.2.1 Duties

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

1.6.3.1 Contract Manager/Project Manager Qualifications

The Project Manager must have a minimum of 5 years' experience as a Project Manager or Superintendent on projects of similar size and complexity.

1.6.4 Non-Compliance Actions

The Project Superintendent is subject to removal by the Contracting Officer for non-compliance with requirements specified in the contract and for failure to manage the project to ensure timely completion. Furthermore, the Contracting Officer may issue an order stopping all or part of the work until satisfactory corrective action has been taken.

No part of the time lost due to such stop orders is acceptable as the subject of claim for extension of time for excess costs or damages by the Contractor.

1.7 MEETINGS

1.7.1 PRECONSTRUCTION MEETING

- A. After award of the contract but prior to commencement of any work at the site. The CM will schedule and preside over meetings at the Project Site prior to Contractor occupancy.
- B. Attendance Required: CM, Architect/Engineer, Contractor, major Subcontractors, and Inspector of Record.
- C. The meeting will be chaired by the CM and minutes taken by the contractor.
- D. Location, time, and date will be determined by the CM.

- E. The subjects to be reviewed include, but are not limited to:
1. Introduction.
 2. Construction Coordination.
 3. Correspondence.
 4. Submittals.
 5. Permits.
 6. Dust Control.
 7. Schedule.
 8. Survey Control.
 9. Contractor's Representative.
 10. Testing and Inspection.
 11. Contractor Reporting Requirements.
 12. Changes and Clarifications.
 13. Clean-up.
 14. As-Built Documents.
 15. Prevailing Wage Requirements.
 16. Environmental Protection, Plan and Procedures.
 17. Temporary Facilities Construction.
 18. Notice of Labor Disputes.
 19. Progress Payments.
 20. Site Regulations.
 21. Security.
 22. Operation and Maintenance Data.
 23. Training Requirements.
 24. General Discussion.
- F. Contractor Representative: Record minutes and distribute copies to participants within two days after meeting, with one copy each to Architect/Engineer, and those affected by decisions made.

1.7.2 WEEKLY CONTRACTOR MEETINGS

- A. Once a week during the Contract period, the Contractor shall meet at the Work Site with the CM.
- B. Time and location of the meeting will be determined during the Preconstruction Conference.
- C. The Contractor will serve as chairman and take minutes of meetings.
- D. Topics for discussion will include schedule, requests for information, disputed items, Preliminary Change Order (PCO) and Change Order (CO) status, Quality control, submittals, exception notices, and other topics as required.

1.7.3 PREINSTALLATION CONFERENCES

- A. Prime Contractor shall convene a preconstruction conference for items of Work contained in each Division of the Specifications, each trade within the Division, and each subcontractor within the Division.
 1. Convene a preconstruction conference prior to commencing the Work of the Section, trade, or subcontractor.

2. Require attendance of each subcontractor and each trade directly affecting or affected by the Work within the Division.
 3. Convene additional conferences when required by the individual Section.
 4. Prepare an agenda, preside over the conference, and record minutes, and distribute copies within two days after the conference to participants, with two copies to the Project Manager.
 5. Review conditions of installation, coordination, preparation, approved submittals, Contract Documents, and means and methods planned to be used to perform the Work.
- ii. Within 15 days after Notice to Proceed, submit a proposed list of preconstruction conferences, and items of Work to be covered, for approval by the Project Manager.

1.7.4 CONTRACT CLOSEOUT MEETING

- A. Schedule Project closeout meeting with sufficient time to prepare for requesting Substantial Completion. Preside over meeting and be responsible for minutes.
- B. Attendance Required: Contractor, CM, Inspector of Record and Architect/Engineer, and others appropriate to agenda.
- C. Notify CM/PM five days in advance of meeting date.
- D. Minimum Agenda:
 1. Start-up of facilities and systems.
 2. Operations and maintenance manuals.
 3. Testing, adjusting, and balancing.
 4. System demonstration and observation.
 5. Operation and maintenance instructions for Owner's personnel.
 6. Contractor's inspection of Work.
 7. Contractor's preparation of an initial "punch list."
 8. Procedure to request Architect/Engineer inspection to determine date of Substantial Completion.
 9. Completion time for correcting deficiencies.
 10. Inspections by authorities having jurisdiction.
 11. Certificate of Occupancy and transfer of insurance responsibilities.
 12. Partial release of retainage.
 13. Final cleaning.
 14. Preparation for final inspection.
 15. Closeout Submittals:
 - a. Project record documents.
 - b. Operating and maintenance documents.
 - c. Operating and maintenance materials.
 - d. Affidavits.
 16. Final Application for Payment.
 17. Contractor's demobilization of Site.
 18. Maintenance.

1.14 ELECTRONIC MAIL (E-MAIL) ADDRESS

Establish and maintain electronic mail (e-mail) capability along with the capability to open various electronic attachments such as text files, pdf files, and other similar formats. Within 10 days after contract award, provide the CM a single (only one) e-mail address for electronic communications from the CM 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 or terrorist threats. Multiple email addresses are not allowed.

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

PART 2 PRODUCTS - Not Used

PART 3 EXECUTION

3.1 ALTERATION PROCEDURES

- A. Employ skilled and experienced installer to perform alteration and renovation Work.
- B. Remove unsuitable material not marked for salvage, including rotted wood, corroded metals, and deteriorated masonry and concrete. Replace materials as specified for finished Work.
- C. Remove debris and abandoned items from area and from concealed spaces.
- D. Prepare surface and remove surface finishes to permit installation of new Work and finishes.
- E. Close openings in exterior surfaces to protect existing Work from weather and extremes of temperature and humidity.
- F. Where new Work abuts or aligns with existing Work, provide smooth and even transition. Patch Work to match existing adjacent Work in texture and appearance.
- G. Patch or replace portions of existing surfaces that are damaged, lifted, discolored, or showing other imperfections.

End of Section

SECTION 01 30 10 15

CMD Amended November 2023

COLLABORATION SOFTWARE

1. SUMMARY

- a. Contractor shall utilize web-based construction project management collaboration software commonly known as Procore (www.procore.com) to submit, track, distribute and fully collaborate on project documentation and action items. Wherein this specification references Procore it shall mean the California Military Department (CMD) Procore account.
- b. The intent of utilizing a web-based construction management application is to reduce cost and schedule risk, improve quality and safety, and maintain a healthy team dynamic by improving information flow, reducing non-productive activities, reducing rework, and decreasing turnaround times.

2. SOFTWARE USAGE (including but not limited to)

a. Daily Log

- i. Using the Daily log tool within Procore, Contractor shall provide a separate daily log entry for the Superintendent, Site Safety and Health Officer and Quality Control team (as defined elsewhere in this contract). Should contractor already have an established process for documenting Daily work activities, Safety and QCM, the CMD may, at its sole discretion, permit the use of some or all of the contractors' reports provided they are uploaded at the end of each day into Procore Daily log tool as directed by the Department.
- ii. The contractor shall upload pictures daily when work is performed. A reasonable number of pictures shall be taken to illustrate the work of the project but in any event no less than 10 photos daily, if work is interior and exterior there shall be 10 of each area of work. Photos shall be made available to the entire project team, loaded directly into the Procore platform, using the "Photos" tool and provided relevant naming convention to permit search features at a later date. These uploads shall be in addition to those required in Section 01 30 00 (if addressed) and elsewhere in the contract.

b. Directory

- i. The contractor shall input and update (as required) the Procore project directory to include all key project team members. As directed by the CMD, subcontractors may not be required to participate within the Procore project. Should CMD require participation of subcontractors using Procore, participation will be at no additional cost or expense.

c. Deficiency Tracking

- i. The contractor shall respond promptly to deficiencies and observations identified in PROCORE and do so in accordance with the terms and conditions of this contract. This is in addition to other deficiency requirements of this contract.

01 30 00 10 - 1

d. Documents

- i. Contractor will, as directed by the Department, utilize the Procore “Documents” storage location for miscellaneous project documents. The contractor shall not upload documents unless directed by the Department. Documents loaded shall have a naming convention of title/subject to permit search functions of the Procore system.
- ii. The contractor shall use proper version control and check out files, without compromising access to all previous revisions.

e. Drawings

- i. Project Drawings will be in the Drawings tool of Procore. All drawing revisions shall be made in Procore and it shall be the contractors' sole responsibility for contract adherence. The contractor shall, as directed by the Department, maintain the contractually required “as built” drawings in the Procore.

f. Invoicing

- i. If requested by the Department, the Contractor shall utilize Procore Invoicing tool for invoice submission. Invoicing shall be submitted as further defined in this contract using AIA forms uploaded as attachments to each submission.

g. Inspections

- i. Contractor shall utilize the Procore platform as directed by CMD for all project inspection requests. The inspection process shall be as defined elsewhere in the contract documents.

h. Meetings

- i. Contractor shall utilize Procore Meetings tool to create, edit, host, and post all meeting minutes. Prior Meeting minutes shall remain accessible through the duration of the project. At the sole discretion of the department, the contractor may be permitted to utilize existing meeting practices if they meet the intent of the government, in which case contractor shall ensure a record copy of any such meeting is posted in Procore within 24 hours of the event or as directed by the department.
- ii. Contractor will record and distribute meeting minutes and action items via the Meetings tool within the Procore software.

i. Mobile Accessibility

- i. Contractor shall provide at least one mobile (Apple or Android) tablet or computer (phone is not acceptable) with the Procore App installed for the use of Contractor’s team for the duration of the project. The contractor is responsible for ensuring a reliable internet connection for the device.

j. Photos

- i. The contractor shall utilize Procore Photos tool or other tools as directed to upload and view photos from web and mobile.
- ii. Contractor shall utilize Procore to markup or comment on photos to clarify the intent of RFI’s etc.

k. Punchlist

- i. All punch list items will be managed through the Procore software.
- ii. Contractor shall utilize Procore to create and manage punch list items utilizing mobile products and link them to specific locations on the drawings.
- iii. Punchlist items will be created by the Contractor while walking with the CMD and applicable consultants.
- iv. Contractor shall utilize Procore to distribute punch list items and to mark them as resolved with photographic proof of resolution as required.
- v. Unless otherwise agreed in writing, Punchlist Items may not be closed if a representative from the CMD or applicable consultant acting on behalf of CMD is not present.

l. Requests for Information (RFIs)

- i. Contractor shall utilize the RFI tool within Procore to create and process RFIs with assignees, due dates and attachments.
- ii. Contractor shall fully complete the RFI tool request form for each RFI, posting the RFI to the drawing(s) and link all relevant specifications, photos, etc. in the Procore RFI tool whenever submitting RFI's to the CMD. Failure to do so will result in immediate rejection and be deemed a review by the CMD as defined elsewhere in the contract documents.
- iii. If project includes design, drawings will be provided to the CMD in accordance with the following requirements:

<https://support.procore.com/faq/how-can-i-improve-the-accuracy-of-on-my-drawings>

m. Schedule

- i. The contractor shall provide native files as required by Procore and as defined elsewhere in the contract documents. Procore accepts typical scheduling software such as Microsoft Project, Primavera P3, or Primavera P6.

n. Specifications

- i. Project Specifications will be uploaded into Procore. Any project revisions will be made in Procore, and it shall be the contractors' sole responsibility to stay abreast of any changes including contract modifications.

o. Submittals

- i. The contractor shall maintain the submittal register in Procore of all submittals as directed by the CMD.
- ii. The contractor shall submit all submittals through the Procore "Submittals" tool utilizing the multi-step approval workflows predefined by the CMD and in accordance with the terms provided elsewhere in the contract documents.

- iii. Contractor shall fill out the submittals completely. A failure to do so will result in automatic rejections and be deemed a “review” as provided elsewhere in the contract.

3. TECHNOLOGY

- a. Contractor shall have PDF and the Microsoft suite software as they are a requirement of Procore. Attachments to RFIs, Submittals, Meetings, etc. should be uploaded in PDF as required by Procore.

4. TRAINING AND SUPPORT

- a. The contractor shall designate a minimum of one primary and one backup staff person to administer the contractors’ Procore responsibilities of this project. Those personnel will be trained as defined below and shall not rely on the CMD staff for training.
- b. The Contractor shall ensure adequate training of all staff utilizing the Procore software. Selected staff must complete all the required training necessary to fully function in the system and on this project. Training is offered in the form of self-paced learning videos as well as interactive webinars. Training is free and can be found at:

<https://education.procore.com/page/procore-certification-general-contractor-client>

- c. The contractor shall host a kickoff meeting with the CMD and applicable team members at the beginning of the project to discuss how the software will be used, routing & naming protocols, etc. Project Subcontractors should not be part of the Procore platform unless otherwise directed by the Department.

5. PROCEDURES

- a. RFIs and Submittals
 - i. The Contractor will be responsible for submitting all RFIs and Submittals through the Procore software tools and assigning them to the appropriate parties using predetermined workflows. All data fields shall be filled out completely and routed as defined in the project kickoff/Job Start meeting.
 - ii. All project team members including Architects / Engineers / Consultants etc. are responsible for posting all responses to these items via the Procore software, including uploading all relevant attachments.
 - iii. The Contractor will, as directed by CMD, distribute responses to all affected subcontractors and confirm agreement with the response by “close and distribute” action on the item.

b. Construction Documentation

- i. The Contractor will construct pursuant to Drawings, Specifications and Documents in the software and ensure that the current version of all applicable construction documentation is available to the entire team within Procore software.
- ii. The Contractor will ensure that all RFIs which modify the current drawings are posted/linked to the drawings and available in the Procore software immediately upon response from the department.

6. COST

- a. The Contractor's bid proposal shall be inclusive of full utilization of the Procore software. The program is hosted by the CMD and no adjustment to the contract will be made for utilization.

SECTION 01 32 16.00 20

SMALL PROJECT CONSTRUCTION PROGRESS SCHEDULES

PART 1 GENERAL

1.1 SUBMITTALS

Government approval is required for all submittals. Submit the following in accordance with Section 01 33 00 Submittal Procedures:

- A. Preconstruction Submittals
- B. Baseline Construction Schedule
- C. Monthly Updates

1.2 PRE-CONSTRUCTION SCHEDULE REQUIREMENT

Prior to the start of work, prepare and submit to the Contract Manager a Baseline Design Schedule and Baseline Construction Schedule. The approval of a Baseline Construction Schedule is a condition precedent to:

- a. The Contractor starting demolition work or construction stage(s) of the contract.
- b. Processing Contractor's invoice(s) for construction activities/items of work.
- c. Review of any schedule updates.

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

1.3 SCHEDULE FORMAT

1.3.1 Project Schedule (NAS)

Use the critical path method (CPM) to schedule and control project activities. Prepare and maintain project schedules using Microsoft Project 2010. The scheduling software that will be utilized by the Government on this project is Microsoft Project 2020 by Microsoft, Inc. Notwithstanding any other provision in the contract, schedules submitted for this project must be prepared using Microsoft Project. Submission of data from another software system where data conversion techniques or software is used to import into Microsoft Projects scheduling software is not acceptable and will be cause for rejection of the submitted schedule. Importing data into the scheduling program using data conversion techniques or third-party software is cause for rejection of the submitted schedule.

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

1.3.1.1 Activity Requirements

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

- (1) Design and Construction time for major systems and components
- (2) Each activity assigned with its appropriate Responsibility Code
- (3) Each activity assigned with its appropriate Phase and Area Codes
- (4) Major submittals and submittal processing time
- (5) Major equipment lead time

b. Build the Schedule as follows:

- (1) Show design periods, submittals, Government review periods, material/equipment delivery, utility outages, on-site construction, inspection, testing, and closeout activities. Government and Contractor on-site work activities must be driven by calendars that reflect Saturdays, Sundays and all Federal Holidays as non-work days for 5-day work week calendars. 6-day work week calendars must reflect Sundays and all Federal Holidays as non-work days. 7-day work week calendars must reflect all Federal Holidays as non-work days unless otherwise agreed to by the Contract Manager. Total work hours/day for all defined calendars is set to 8 unless otherwise agreed upon.]
- (2) With the exception of the Contract Award and End Contract milestone activities, use of open-ended activities is not allowed; each activity must have predecessor and successor ties. No activity must have open start or open finish (dangling) logic. Minimize redundant logic ties. Once an activity exists on the schedule it must not be deleted or renamed to change the scope of the activity and must not be removed from the schedule logic without approval from the Contract Manager.

While an activity cannot be deleted, where said activity is no longer applicable to the schedule but must remain within the logic stream for historical record, it can be changed to a milestone. Document any such change in the milestone's "Notebook," including a date and explanation for the change. The ID number for a deleted activity must not be re-used for another activity.

- (3) Assign each activity its appropriate Responsibility Code and Area Code, indicating location and responsibility to accomplish the work indicated by the activity, Phase Code, and Work Location Code. Include anticipated tasks to be assigned Government responsibility.
- (4) Date/time constraints or lags, other than those required by the contract, are not allowed unless approved by the Contract Manager. Include as the last activity in the contract schedule, a milestone activity named "Contract Completion Date".

(5) Include the following Contract Milestones:

- (a) Include as the first activity on the schedule a start milestone titled "Contract Award", which must have a Mandatory Start constraint equal to the Contract Award Date.
- (b) Include Interim or Phased Completion Milestones required by the Contract or as approved by the Contract Manager.
- (c) Include Facility Turnover Planning Meeting Milestones.
- (d) Include an unconstrained finish milestone on the schedule titled "Substantial Completion". Substantial Completion is defined as the point in time the Government would consider the project ready for beneficial occupancy wherein by mutual agreement of the Government and Contractor. Government use of the facility is allowed while construction access continues in order to complete remaining items (e.g. punch list and other close out submittals).
- (e) Include an unconstrained finish milestone on the schedule titled "Projected Completion". Projected Completion is defined as the point in time the Government would consider the project complete. This milestone must have the Contract Completion Date (CCD) milestone as its only successor.
- (f) Include as the last activity on the schedule a finish milestone titled "Contract Completion (CCD)" with constraint type "Must Finish No Later Than". Calculation of schedule updates must be such that if the finish of the "Projected Completion" milestone falls after the contract completion date, then negative float will be calculated on the longest path and if the finish of the "Projected Completion" milestone falls before the contract completion date, the float calculation must reflect positive float on the longest path. This milestone must be set to 5:00 pm.

(6) Provide lead time for major equipment.

1.3.1.2 Anticipated Weather Lost Work Days

Use the National Oceanic and Atmospheric Administration's (NOAA) Summary of Monthly Normals report to obtain the historical average number of days each month with precipitation, using a nominal 30-year, greater than 2.5 mm 0.10 inch precipitation amount parameter, as indicated on the Station Report for the NOAA location closest to the project site as the basis for establishing a "Weather Calendar" showing the number of anticipated non-workdays for each month due to adverse weather, in addition to Saturdays, Sundays and all Federal Holidays as non-work days.

Use the following schedule of anticipated monthly non-work days due to adverse weather as the basis for establishing a "Weather Calendar" showing the number of anticipated non-workdays for each month due to adverse weather, in addition to Saturdays, Sundays and all Federal and State Holidays as non-work days.

MONTHLY ANTICIPATED ADVERSE WEATHER DELAYS											
JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
[2] [_]	[2] [_]	[2] [_]	[2] [_]	[2] [_]	[2] [_]	[2] [_]	[2] [_]	[2] [_]	[2] [_]	[2] [_]	[2] [_]

Assign the Weather Calendar to any activity that could be impacted by adverse weather. The Contract Manager will issue a modification in accordance with the contract clauses, giving the Contractor a time extension for the difference of days between the anticipated and actual adverse weather delay if the number of actual adverse weather delay days exceeds the number of days anticipated for the month in which the delay occurs and the adverse weather delayed activities are critical to contract completion.

A lost workday due to weather conditions is defined as a day in which the Contractor cannot work at least 50 percent of the day on the impacted activity.

1.3.1.3 Activity Identification

- Identify Government, Construction Quality Management (CQM), Construction activities planned for the project and other activities that could impact project completion if delayed.
- Identify administrative type activity/milestones including pre-construction submittal and permit requirements prior to demolition or construction stage.
- Create separate activities for each Phase, Area, Floor Level, and Location the activity is occurring.
- Do not use construction category activity to represent non-work type reference (Such as, Serial Letter or Request for Information) in NAS.
- Place non-work reference within P6 activity details notebook. Activity categories included in the schedule are specified below.

1.3.1.4 Responsibility Code

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

1.3.1.5 Microsoft Project 2020 Settings and Parameters

Use the following MS Project 2020 settings and parameters in preparing the Baseline Schedule:

- The Network must have a minimum of 30 construction activities.
- No on-site construction activity may have durations in excess of 20 working days.
- Critical is defined as having zero days of Total Slack. Within the Baseline Schedule no more than 20 percent of the activities shall be critical.

- d. Logic: include the following setting: File, Options, Schedule tab - Split in-progress tasks - must be selected.
- e. Status Date gridline is displayed in the Gantt Chart view.
- f. Task Type is set to Fixed Work for "boots-on-the-ground" construction activities.
- g. Task Type is set to Fixed Duration for design activities, submittals, Government reviews, procurement, material/equipment delivery, and utility outages.
- h. "Effort Driven" is turned ON for Fixed Duration tasks.
- i. Time Periods established for the project are set to 8 Hrs/Day, 40 Hrs/Week and 20 days/month.
- j. Week starts on Monday must be selected.
- k. Default start time is set to 8am (0800).
- l. Default end time is set to 5pm (1700).

1.3.1.7 Cost Loading Microsoft Project 2020 Schedules

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

1.3.1.7.1 Software Settings

- a. Resource Sheet
 - (1) Resource Name: Enter each code and resource for the project
 - (2) Type: Set to "Material"
 - (3) Material Label: Enter units of measurement for each resource
 - (4) Std. Rate: Enter unit cost for each resource
 - (5) Accrue at: Set to "Prorated"
- b. Assigning Resources to Each Activity
 - (1) Select each activity in Gantt Chart
 - (2) Assign resources, Resource Tab
 - (3) Select each resource and enter the quantity of the units; then, assign the resource(s) to the activity
- c. Baseline for Earned Value Calculation, File Tab, Options, Advanced, Default task Earned Value method: Set to "Physical % Complete" or as directed by the Contract Manager.

1.3.1.7.2 Tabular Reports

1.3.1.7.2.1 Tracking Gantt Schedule with Cost Table

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

1.3.1.7.2.2 Earned Value Over Time Report

- a. With each schedule submission, submit Earned Value Over Time Report S-Curves indicating Planned Value to the contract completion date based on projected early and late activity finish dates and Earned Value.
- b. Revise Earned Value Over Time Report S-Curves when the contract is modified, or as directed by the Contract Manager.

1.3.2 Bar Chart Schedule

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

1.3.3 Schedule Submittals and Procedures

Submit Schedules and updates in hard copy and on electronic media that is acceptable to the Contract Manager. 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 Design and Construction Schedule at monthly intervals or when the schedule has been revised. Keep the updated schedule current, reflecting actual activity progress and plan for completing the remaining work. Submit copies of purchase orders and confirmation of delivery dates as directed by the Contract Manager.

- a. Narrative Report: Identify and justify the following:
 - (1) Progress made in each area of the project.
 - (2) Longest Path: Include printed copy on 279 by 432 mm 11 by 17-inch paper, landscape setting.
 - (3) Date/time constraint(s), other than those required by the contract.
 - (4) Listing of changes made between the previous schedule and current updated schedule including: added or removed activities, original and remaining durations for activities that have not started, logic (sequence, constraint, lag/lead), milestones, planned sequence of operations, longest path, calendars or calendar assignments, and cost loading.

- (5) Any decrease in previously reported activity Earned Amount.
- (6) Pending items and status thereof, including permits, changes orders, and time extensions.
- (7) Status of Contract Completion Date and interim milestones.
- (8) Current and anticipated delays (describe cause of delay and corrective actions(s) and mitigation measures to minimize).
- (9) Description of current and future schedule problem areas.

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

1.5 CONTRACT MODIFICATION

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

- a. Each TIA must be in both narrative and schedule form. The narrative must define the scope and conditions of the change; provide start and finish dates of impact, successor and predecessor activity to impact period, responsible party, describe how it originated, and how it impacts the schedule. The schedule submission must consist of three native files:
 - (1) Fragnet used to define the scope of the changed condition
 - (2) Most recent accepted schedule update as of the time of the proposal or claim submission that has been updated to show all activity progress as of the time of the impact start date.
 - (3) The impacted schedule that has the fragnet inserted in the updated schedule and the schedule "run" so that the new completion date is determined.
- b. For claimed as-built project delay, the inserted fragnet TIA method must be modified to account for as-built events known to occur after the data date of schedule update used.
- c. TIAs must include any mitigation and must determine the apportionment of the overall delay assignable to each individual delay. Apportionment must provide identification of delay type and classification of delay by compensable and non-compensable events. The associated narrative must clearly describe analysis methodology used, and the findings in a chronological listing beginning with the earliest delay event.

- (1) Identify and classify types of delays as follows:
 - (a) Force majeure delay (e.g. weather delay): Any delay event caused by something or someone other than the Government (including its agents) or the Contractor, or the risk of which has not been assigned solely to the Government or the Contractor. If the force majeure delay is on the critical path, in absence of other types of concurrent delays, the Contractor is granted an extension of contract time, classified as a non-compensable event.
 - (b) A Contractor-delay: Any delay event caused by the Contractor, or the risk of which has been assigned solely to the Contractor. If the contractor-delay is on the critical path, in absence of other types of concurrent delays,
 - (c) Contractor is not granted extension of contract time and classified as a non-compensable event. Where absent other types of delays, and having impact to project completion, provide a Corrective Action Plan, identifying plan to mitigate delay, to the Contract Manager a Government-delay: Any delay event caused by the Government, or the risk of which has been assigned solely to the Government. If the Government-delay is on the longest path, in absence of other types of concurrent delays, the Contractor is granted an extension of contract time and classified as a compensable event.
- (2) Use functional theory to analyze concurrent delays, where: Separate delay issues delay project completion, do not necessarily occur at same time, rather occur within same monthly schedule update period at minimum, or within same as-built period under review. If a combination of functionally concurrent delay types occurs, it is considered Concurrent Delay, which is defined in the following combinations:
 - (a) Government-delay concurrent with Contractor-delay: Excusable time extension, classified non-compensable event.
 - (b) Government-delay concurrent with force majeure delay: Excusable time extension, classified non-compensable event.
 - (c) Contractor-delay concurrent with force majeure delay: Excusable time extension, classified non-compensable event.
- (3) A pacing delay, reacting to another delay (parent delay) equally or more critical than paced activity, must be identified prior to pacing. Contract Manager will notify Contractor prior to pacing. Contractor must notify Contract Manager prior to pacing. Notification must include identification of parent delay issue, estimated parent delay time period, paced activity(s) identity, and pacing reason(s). Pacing Concurrency is defined as follows:
 - (a) Government-delay concurrent with Contractor-pacing: Excusable time extension, classified compensable event.
 - (b) Contractor-delay concurrent with Government-pacing: Inexcusable time extension, classified non-compensable event.

1.6 3-WEEK LOOK AHEAD SCHEDULE

Prepare and issue a 3-Week Look Ahead schedule to provide a more detailed day-to-day plan of upcoming work identified on the Construction Schedule. Key the work plans to activity numbers when a NAS is required and update each week to show the planned work for the current and following two-week period. Additionally, include upcoming outages, closures, preparatory meetings, and initial meetings. Identify critical path activities on the Three-Week Look Ahead Schedule. The detail work plans are to be bar chart type schedules, maintained separately from the Construction Schedule on an electronic spreadsheet program and printed on 216 by 279 mm 8-1/2 by 11-inch sheets as directed by the Contract Manager. Activities must not exceed 5 working days in duration and have sufficient level of detail to assign crews, tools and equipment required to complete the work. Deliver three hard copies and one electronic file of the 3-Week Look Ahead Schedule to the Contract Manager no later than 8 a.m. each Monday, and review during the weekly CQC Coordination or Production Meeting.

1.7 CORRESPONDENCE AND TEST REPORTS:

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

1.8 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 requirements of this section.

PART 2 PRODUCTS

Not used.

PART 3 EXECUTION

Not used.

END OF SECTION

SECTION 01 33 00

SUBMITTAL PROCEDURES

PART 1 GENERAL

1.1 SUMMARY

1.1.1 Submittal Information

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

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

1.1.2 Project Type

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

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

1.1.3 Submission of Submittals

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

1.2 DEFINITIONS

1.2.1 Submittal Descriptions (SD)

SD-01 Preconstruction Submittals

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

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

Certificates of Insurance

Surety Bonds

List of Proposed Subcontractors

Submittal Register

Schedule of Values Report

SD-02 Shop Drawings

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

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

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

SD-03 Product Data

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

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

SD-04 Samples

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

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

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

SD-06 Test Reports

Report signed by authorized official of testing laboratory that a material, product or system identical to the material,

product or system to be provided has been tested in accord with specified requirements. Unless specified in another section, testing must have been within three years of date of contract award for the project.

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

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

Investigation reports Daily logs and checklists

Final acceptance test and operational test procedure

SD-07 Certificates

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

Document required of Contractor, or of a manufacturer, supplier, installer or Subcontractor through Contractor. The document purpose is to further promote the orderly progression of a portion of the work by documenting procedures, acceptability of methods, or personnel qualifications.

Confined space entry permits

Text of posted operating instructions SD-08

Manufacturer's Instructions

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

SD-08 Manufacturer's Field Reports

Documentation of the testing and verification actions taken by manufacturer's representative at the job site, in the vicinity of the job site, or on a sample taken from the job site, on a portion of the work, during or after installation, to confirm compliance with manufacturer's standards or instructions. The documentation must be signed by an authorized official of a testing laboratory or agency and state the test results; and indicate whether the material, product, or system has passed or failed the test.
Factory test reports.

SD-9 Operation and Maintenance Data

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

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

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

SD-10 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.

1.2.2 Approving Authority

Office or designated person authorized to approve the submittal.

1.2.3 Work

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

1.3 SUBMITTAL CLASSIFICATION

1.3.1 Government Approved (G)

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

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

1.4 FORWARDING SUBMITTALS REQUIRING GOVERNMENT APPROVAL

1.4.1 O&M Data

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 Project Manager may withhold from progress payments 50 percent of the price of the items to which such O&M data apply.

1.6 PREPARATION

1.6.1 Transmittal Form

Transmit each submittal, except sample installations and sample panels to the office of the approving authority using the transmittal form prescribed by the Project Manager. Include all information prescribed by the transmittal form and required in paragraph Identifying Submittals. Use the submittal transmittal forms to record actions regarding samples.

Use the transmittal form for submitting both Government-approved and information-only submittals. Submit in accordance with the instructions on the reverse side of the form. These forms will be furnished to the Contractor. Properly complete the form by filling out all the heading blank spaces and identifying each item submitted. Exercise special care to ensure proper listing of the specification paragraph and sheet number of the contract drawings pertinent to the data submitted for each item.

1.6.2 Identifying Submittals

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

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

- a. Project title and location
- b. Construction contract number
- c. Dates of the drawings and revisions
- d. Name, address, and telephone number of Subcontractor, supplier, manufacturer, and any other Subcontractor associated with the submittal.
- e. Section number of the specification by which submittal is required
- f. Submittal description (SD) number of each component of submittal
- g. For a resubmission, add alphabetic suffix on submittal description, for example, submittal 18 would become 18A, to indicate resubmission
- h. Product identification and location in project.

1.6.3 Submittal Format

1.6.3.1 Format for SD-02 Shop Drawings

Provide shop drawings not less than 8 1/2 by 11 inches nor more than 30 by 42 inches, except for full-size patterns or templates.

Prepare drawings to accurate size, with scale indicated, unless another form is required. Ensure drawings are suitable for reproduction and of a quality to produce clear, distinct lines and letters, with dark lines on a white background.

- a. Include the nameplate data, size, and capacity on drawings. Also include applicable federal, military, industry, and technical society publication references.
- b. Dimension drawings, except diagrams and schematic drawings. Prepare drawings demonstrating interface with other trades to scale. Use the same unit of measure for shop drawings as indicated on the contract drawings. Identify materials and products for work shown.

Present shop drawings sized 8 1/2 by 11 inches as part of the bound volume for submittals. Present larger drawings in sets. Submit an electronic copy of drawings in PDF format.

1.6.3.2.1 Drawing Identification

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

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

Reserve a blank space on the right-hand side of each sheet for the Government disposition stamp.

1.6.3.3 Format of SD-03 Product Data

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

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

1.6.3.3.1 Product Information

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

Provide product data in metric dimensions. Where product data are included in preprinted catalogs with English units only, submit metric dimensions on separate sheet.

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

1.6.3.3.2 Standards

Where equipment or materials are specified to conform to industry or technical-society reference standards of such organizations as the American National Standards Institute (ANSI), ASTM International (ASTM),

National Electrical Manufacturer's Association (NEMA), Underwriters Laboratories (UL), or Association of Edison Illuminating Companies (AEIC), submit proof of such compliance. The label or listing by the specified organization will be acceptable evidence of compliance.

In lieu of the label or listing, submit a certificate from an independent testing organization, competent to perform testing, and approved by the Project Manager. State on the certificate that the item has been tested in accordance with the specified organization's test methods and that the item complies with the specified organization's reference standard.

1.6.3.3.3 Data Submission

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

Submit the manufacturer's instructions before installation.

1.6.3.4 Format of SD-04 Samples

1.6.3.4.1 Sample Characteristics

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

- a. Sample of Equipment or Device: Full size.
- b. Sample of Materials Less Than 2 by 3 inches: Built up to 8 1/2 by 11 inches.
- c. Sample of Materials Exceeding 8 1/2 by 11 inches: Cut down to 8 1/2 by 11 inches and adequate to indicate color, texture, and material variations.
- d. Sample of Linear Devices or Materials: 10 inch length or length to be supplied, if less than 10 inches. Examples of linear devices or materials are conduit and handrails.
- e. Sample Volume of Nonsolid Materials: Pint. Examples of nonsolid materials are sand and paint.
- f. Color Selection Samples: 2 by 4 inches. Where samples are specified for selection of color, finish, pattern, or texture, submit the full set of available choices for the material or product specified. Sizes and quantities of samples are to represent their respective standard unit.
- g. Sample Panel: 4 by 4 feet.
- h. Sample Installation: 100 square feet.

1.6.3.4.2 Sample Incorporation

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

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

1.6.3.4.3 Comparison Sample

Samples Showing Range of Variation: Where variations in color, finish, pattern, or texture are unavoidable due to nature of the materials, submit sets of samples of not less than three units showing extremes and middle of range. Mark each unit to describe its relation to the range of the variation. When color, texture, or pattern is specified by naming a particular manufacturer and style, include one sample of that manufacturer and style, for comparison.

1.6.3.5 Format of SD-05 Design Data

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

1.6.3.6 Format of SD-06 Test Reports

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

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

1.6.3.7 Format of SD-07 Certificates

Provide design data and certificates on 210 by 297 mm 8 1/2 by 11 inch paper. Provide a bound volume for submittals containing numerous pages.

1.6.3.8 Format of SD-08 Manufacturer's Instructions

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

Submit the manufacturer's instructions before installation.

1.6.3.8.1 Standards

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

1.6.3.9 Format of SD-09 Manufacturer's Field Reports

Provide reports on 210 by 297 mm 8 1/2 by 11 inch paper in a complete bound volume.

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

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

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

1.6.3.11 Format of SD-11 Closeout Submittals

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

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

Provide all dimensions in administrative submittals in metric. Where data are included in preprinted material with English units only, submit metric dimensions on separate sheet.

1.6.4 Source Drawings for Shop Drawings

1.6.4.1 Source Drawings

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

1.6.4.2 Terms and Conditions

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

These electronic source drawing files are not construction documents. Differences may exist between the source drawing files and the corresponding construction documents. The Government makes no representation regarding the accuracy or completeness of the electronic source drawing files, nor does it make representation to the compatibility of these files with the Contractor hardware or software. The Contractor is responsible for determining if any conflict exists. In the event that a conflict arises between the signed and sealed construction documents prepared by the Government and the furnished source drawing files, the signed and sealed construction documents govern.

Use of these source drawing files does not relieve the Contractor of the duty to fully comply with the contract documents, including and without limitation the need to check, confirm and coordinate the work of all contractors for the project. If the Contractor uses, duplicates or modifies these electronic source drawing files for use in producing construction data related to this contract, remove all previous indication of ownership (seals, logos, signatures, initials and dates).

1.6.5 Electronic File Format

Provide submittals in electronic format, with the exception of material samples required for Samples items. In addition to the electronic submittal, provide 2 hard copies of the submittals.

Compile the submittal file as a single, complete document, to include the Transmittal Form described within. Name the electronic submittal file specifically according to its contents, and coordinate the file naming convention with the Project Manager. Electronic files must be of sufficient quality that all information is legible. Use PDF as the electronic format, unless otherwise specified or directed by the Project Manager. Generate PDF files from original documents with bookmarks so that the text included in the PDF file is searchable and can be copied. If documents are scanned, optical character resolution (OCR) routines are required. Index and bookmark files exceeding 30 pages to allow efficient navigation of the file. When required, the electronic file must include a valid electronic signature or a scan of a signature.

E-mail electronic submittal documents smaller than 10MB to an e-mail address as directed by the Project Manager. Provide electronic documents over 10 MB on an optical disc or through an electronic file sharing system such as the AMRDEC SAFE Web Application located at the following website: <https://safe.amrdec.army.mil/safe/>.

1.7 QUANTITY OF SUBMITTALS

1.7.1 Number of SD-01 Shop Drawing Copies

Submit 3 copies of submittals of shop drawings requiring review and approval by a QC organization. Submit 3 copies of shop drawings requiring review and approval by the Project Manager.

1.7.2 Number of SD-02 Product Data Copies

Submit in compliance with quantity requirements specified for shop drawings.

1.7.3 Number of SD-03 Test Report Copies

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

1.7.4 Number of SD-04 Certificate Copies

Submit in compliance with quantity requirements specified for shop drawings.

1.7.5 Number of SD-05 Manufacturer's Instructions Copies

Submit in compliance with quantity requirements specified for shop drawings.

1.7.6 Number of SD-06 Manufacturer's Field Report Copies

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

1.7.7 Number of SD-10 Operation and Maintenance Data Copies

Submit 3 copies of O&M data to the Project Manager for review and approval.

1.7.8 Number of SD-11 Closeout Submittals Copies

Unless otherwise specified, submit two sets of administrative submittals.

1.8 PROJECT SUBMITTAL REGISTER

A sample Project Submittal Register showing items of equipment and materials for when submittals are required by the specifications is provided as "Appendix A - Submittal Register."

1.8.1 Submittal Management

Prepare and maintain a submittal register, as the work progresses. Use an electronic submittal register program furnished by the Government. Do not change data that is output in columns (c), (d), (e), and (f) as delivered by Government; retain data that is output in columns (a), (g), (h), and as approved. As an attachment, provide a submittal register showing items of equipment and materials for which submittals are required by the specifications. This list may not be all-inclusive and additional submittals may be required. Maintain a submittal register for the project in accordance with Section 01 45 00.15 10.

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

1.10 VARIATIONS

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

1.10.1 Considering Variations

Discussion of variations with the Project Manager before submission will help ensure that functional and quality requirements are met and minimize rejections and resubmittals. When contemplating a variation that 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 variations may cause the Government to require rejection and removal of such work at no additional cost to the Government.

1.10.2 Proposing Variations

When proposing variation, deliver a written request to the Project Manager, with documentation of the nature and features of the variation and why the variation is desirable and beneficial to Government. Include 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.

1.10.3 Warranting that Variations are Compatible

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

1.10.4 Review Schedule Extension

In addition to the normal submittal review period, a period of 14 **working** days will be allowed for the Government to consider submittals with variations.

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

- a. Coordinate scheduling, sequencing, preparing, and processing of submittals with performance of work so that work will not be delayed by submittal processing. The Contractor is responsible for additional time required for Government reviews resulting from required resubmittals. The review period for each resubmittal is the same as for the initial submittal.
- b. Submittals required by the contract documents are listed on the submittal register. If a submittal is listed in the submittal register but does not pertain to the contract work, the Contractor is to include the submittal in the register and annotate it "N/A" with a brief explanation. Approval by the Project Manager does not relieve the Contractor of supplying submittals required by the contract documents but that have been omitted from the register or marked "N/A."
- c. Resubmit the submittal register and annotate it monthly with actual submission and approval dates. When all items on the register have been fully approved, no further resubmittal is required. Project Manager review will be completed within 14 working days after the date of submission.

1.11.1 Reviewing, Certifying, and Approving Authority

The QC Manager is responsible for reviewing all submittals and certifying that they are in compliance with contract requirements. The approving authority on submittals is the QC Manager unless otherwise specified. At each "Submittal" paragraph in individual specification sections, a notation "G" following a submittal item indicates that the Project Manager is the approving authority for that submittal item. Provide an additional copy of the submittal to the Government Approving authority

1.12 GOVERNMENT APPROVING AUTHORITY

When the approving authority is the Project Manager, the Government will:

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

Upon completion of review of submittals requiring Government approval, stamp and date submittals. 1 copy of the submittal will be retained by the Project Manager and 1 copy of the submittal will be returned to the Contractor.

1.12.1 Review Notations

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

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

1.13 DISAPPROVED SUBMITTALS

Make corrections required by the Project Manager. If the Contractor considers any correction or notation on the returned submittals to constitute a change to the contract drawings or specifications, give notice to the Project Manager as required in the contract.

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

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

1.14 APPROVED SUBMITTALS

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

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

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

1.15 APPROVED SAMPLES

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

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

Failure of any materials to pass the specified tests will be sufficient cause for refusal to consider, under this contract, any further samples of the same brand or make as that material.

The Government reserves the right to disapprove any material or equipment that has previously proved unsatisfactory in service.

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

1.16 WITHHOLDING OF PAYMENT

Payment for materials incorporated in the work will not be made if required approvals have not been obtained. No payment for materials incorporated in the work will be made unless all required DOR approvals or required Government approvals have been obtained.

No payment will be made for any materials incorporated into the work for any conformance review submittals or information-only submittals found to contain errors or deviations from the Solicitation or Accepted Proposal.

1.17 STAMPS

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

____NAME OF CONTRACTOR____

SIGNATURE OF CONTRACTOR

PART 2 PRODUCTS

Not Used

PART 3 EXECUTION

Not Used

End of Section

SECTION 01 35 29

SAFETY AND OCCUPATIONAL HEALTH REQUIREMENTS

PART 1 – GENERAL PRODUCTS

1.1 REFERENCES

- A. 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.
- B. AMERICAN NATIONAL STANDARDS INSTITUTE (ANSI)
 - 1. ANSI Z359.1 (2016) Safety Requirements for Personal Fall Arrest Systems, Subsystems and Components
- C. ASME INTERNATIONAL (ASME)
 - 1. ASME B30.5 (2018) Mobile and Locomotive Cranes
 - 2. ASME B30.22 (2016) Articulating Boom Cranes
- D. OCCUPATIONAL SAFETY AND HEALTH ADMINISTRATION (OSHA)
 - 1. 29 CFR 1910 Safety and Health Regulation in General Industry
 - 2. 29 CFR 1910.94 Ventilation
 - 3. 29 CFR 1910.120 Hazardous Waste Operations and Emergency Response
 - 4. 29 CFR 1910.146 Permit-required Confined Spaces
 - 5. 29 CFR 1915 Confined and Enclosed Spaces and Other Dangerous Atmospheres in Shipyard Employment
 - 6. 29 CFR 1926 Safety and Health Regulations for Construction
 - 7. 29 CFR 1926.65 Hazardous Waste Operations and Emergency Response

8. 29 CFR 1926.500 Fall Protection

E. NATIONAL FIRE PROTECTION ASSOCIATION (NFPA)

1. NFPA 10 (2018) Portable Fire Extinguishers
2. NFPA 70 (2017) National Electrical Code
3. NFPA 241 (2018) Safeguarding Construction, Alteration, and Demolition Operations

1.2 SUBMITTALS

- A. 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. The following shall be submitted in accordance with Section 013300 SUBMITTAL PROCEDURES:

1. SD-01 Preconstruction Submittals
 - a. Accident Prevention Plan (APP); G
 - b. Activity Hazard Analysis (AHA); G
 - c. Crane Critical Lift Plan; G
2. SD-06 Test Reports
 - a. Reports
 - b. Submit reports as their incidence occurs, in accordance with the requirements of the paragraph entitled, "Reports."
 - c. Accident Reports
 - d. Monthly Exposure Reports
 - e. Regulatory Citations and Violations
 - f. Crane Reports
 - g. Certificate of Compliance (Crane)

1.3 DEFINITIONS

- A. High Visibility Accident. Any mishap which may generate publicity and/or high visibility.
- B. Low-slope roof. A roof having a slope less than or equal to 4 in 12 (vertical to horizontal).

- 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 though provided by physician or registered personnel.
- D. Multi-Employer Work Site (MEWS). A multi-employer work site, as defined by OSHA, is one in which many employers occupy the same site. The Government considers the Prime Contractor to be the "controlling authority" for all work site safety and health of the subcontractors.
- E. Operating Envelope. The area surrounding any crane. Inside this "envelope" is the crane, the operator, riggers, rigging gear between the hook and the load, the load and the crane's supporting structure (ground, rail, etc.).
- F. Recordable Injuries or Illnesses. Any work-related injury or illness that results in:
 - 1. Death, regardless of the time between the injury and death, or the length of the illness.
 - 2. Days away from work.
 - 3. Restricted work.
 - 4. Transfer to another job.
 - 5. Medical treatment beyond first aid.
 - 6. Loss of consciousness; or
 - 7. A significant injury or illness diagnosed by a physician or other licensed health care professional, even if it did not result in (1) through (6) above.
- G. Site Safety and Health Officer (SSHO). The superintendent or other qualified or competent person who is responsible for the on-site safety and health required for the project. The Contractor quality control (QC) person can be the SSHO on this project.
- H. Steep roof. A roof having a slope greater than 4 in 12 (vertical to horizontal).
- I. Weight Handling Equipment (WHE) Accident. A WHE accident occurs when any one or more of the six elements in the operating envelope fails to perform correctly during operation, including operation during maintenance or testing resulting in personnel injury or death; material or equipment damage; dropped load; derailment; two-blocking; overload; and collision, including unplanned contact between the load, crane, and/or other objects. A dropped load, derailment, two-blocking, overload and collision are considered accidents even though no material damage or injury occurs. A component failure (e.g., motor burnout, gear tooth failure, bearing failure) is not considered an accident solely due to material or equipment damage unless the component failure results in damage to other components (e.g., dropped boom, dropped load, roll over, etc.).

1.4 REGULATORY REQUIREMENTS

- A. In addition to the detailed requirements included in the provisions of this contract, work performed shall comply with OSHA 29 CFR 1910, 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 shall apply.

1.5 DRUG PREVENTION PROGRAM

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

1.6 SITE QUALIFICATIONS, DUTIES AND MEETINGS

A. Personnel Qualifications

- 1. Site Safety and Health Officer (SSHO): Site Safety and Health Officer (SSHO) shall be provided at the work site at all times to perform safety and occupational health management, surveillance, inspections, and safety enforcement for the Contractor. The SSHO shall meet the following requirements:
 - a. Level 2:
 - 1) A minimum of 3 years safety work on similar project.
 - 2) 30-hour OSHA construction safety class or equivalent within last 3 years.
 - 3) Competent person training as needed.

B. Personnel Duties

- 1. Site Safety and Health Officer (SSHO)/Superintendent
 - a. Conduct daily safety and health inspections and maintain a written log which includes area/operation inspected, date of inspection, identified hazards, recommended corrective actions, estimated and actual dates of corrections. Safety inspection logs shall be attached to the Contractors' daily production report.

- b. Conduct mishap investigations and complete required reports. Maintain the OSHA Form 300 and Daily Production reports for prime and sub- contractors.
 - c. Maintain applicable safety reference material on the job site.
 - d. Attend the pre-construction conference, pre-work meetings including preparatory inspection meeting, and periodic in-progress meetings.
 - e. Implement and enforce accepted APPS and AHAs.
 - f. Maintain a safety and health deficiency tracking system that monitors outstanding deficiencies until resolution. A list of unresolved safety and health deficiencies shall be posted on the safety bulletin board.
 - g. Ensure sub-contractor compliance with safety and health requirements.
2. Failure to perform the above duties will result in dismissal of the superintendent and/or SSHO, and a project work stoppage. The project work stoppage will remain in effect pending approval of a suitable replacement.

C. Meetings

1. Preconstruction Conference

- a. The Contractor will be informed, in writing, of the date of the preconstruction conference. The purpose of the preconstruction conference is for the Contractor and the Contracting Officer's representatives to become acquainted and explain the functions and operating procedures of their respective organizations and to reach mutual understanding relative to the administration of the overall project's APP before the initiation of work.
- b. Contractor representatives who have a responsibility or significant role in accident prevention on the project shall attend the preconstruction conference. This includes the project superintendent, site safety and health officer, quality control supervisor, or any other assigned safety and health professionals who participated in the development of the APP (including the AHAs and special plans, program and procedures associated with it).
- c. The Contractor shall discuss the details of the submitted APP to include incorporated plans, programs, procedures and a listing of anticipated activity hazard analyses (AHAs) that will be developed and implemented during the performance of the contract. This list of proposed AHAs will be reviewed at the conference and an agreement will be reached between the Contractor and the Contracting Officer's representative as to which phases will require an analysis. In addition, a schedule for the preparation, submittal, review, and acceptance of AHAs shall be established to preclude project delays.
- d. Deficiencies in the submitted APP will be brought to the attention of the Contractor at the preconstruction conference, and the Contractor shall revise the plan to correct deficiencies and re-submit it for acceptance. Work shall not begin until there is an accepted APP.

2. Weekly Safety Meetings: Conduct weekly safety meetings at the project site for all employees. The Contracting Officer will be informed of the meeting in advance and be allowed attendance. Minutes showing contract title, signatures of attendees and a list of topics discussed shall be attached to the Contractors' daily production report.
3. Work Phase Meetings: The appropriate AHA shall be reviewed and attendance documented by the Contractor at the preparatory, initial, and follow-up phases of quality control inspection. The analysis should be used during daily inspections to ensure the implementation and effectiveness of safety and health controls.

1.7 TRAINING

- A. New Employee Indoctrination: New employees (prime and sub-contractor) will be informed of specific site hazards before they begin work. Documentation of this orientation shall be kept on file at the project site.
- B. Periodic Training: Provide Safety and Health Training in accordance with USACE EM 385-1-1 and the accepted APP. Ensure all required training has been accomplished for all onsite employees.
- C. Training on Activity Hazard Analysis (AHA): Prior to beginning a new phase, training will be provided to all affected employees to include a review of the AHA to be implemented.

1.8 ACCIDENT PREVENTION PLAN (APP)

- A. The Contractor shall use a qualified person to prepare the written site-specific APP. Prepare the APP in accordance with the format and requirements of 29 CFR 1910 and as supplemented herein.

Appendix A, "Minimum Basic Outline for Preparation of Accident Prevention Plan". Where a paragraph or subparagraph element is not applicable to the work to be performed indicate "Not Applicable" next to the heading. Specific requirements for some of the APP elements are described below at paragraph 1.8.1. The APP shall be job-specific and shall address any unusual or unique aspects of the project or activity for which it is written. The APP shall interface with the Contractor's overall safety and health program. Any portions of the Contractor's overall safety and health program referenced in the APP shall be included in the applicable APP element and made site-specific. The Government considers the Prime Contractor to be the "controlling authority" for all work site safety and health of the subcontractors. Contractors are responsible for informing their subcontractors of the safety provisions under the terms of the contract and the penalties for noncompliance, coordinating the work to prevent one craft from interfering with or creating hazardous working conditions for other crafts, and inspecting subcontractor operations to ensure that accident prevention responsibilities are being carried out.

The APP shall be signed by the person and firm (senior person) preparing the APP, the Contractor, the on-site superintendent, the designated site safety and health officer and any designated CSP and/or CIH.

- B. Submit the APP to the Contracting Officer 15 calendar days prior to the date of the preconstruction conference for acceptance. Work cannot proceed without an accepted APP. The Contracting Officer reviews and comments on the Contractor's submitted APP and accepts it when it meets the requirements of the contract provisions.
- C. 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.
- D. Once work begins, changes to the accepted APP shall be made with the knowledge and concurrence of the Contracting Officer, project superintendent, SSHO and quality control manager. Should any unforeseen hazard become evident during the performance of work, the project superintendent shall inform the Contracting Officer, both verbally and in writing, for resolution as soon as possible. In the interim, all necessary action shall be taken by the Contractor to restore and maintain safe working conditions in order to safeguard onsite personnel, visitors, the public, and the environment.
- E. Copies of the accepted plan will be maintained at the Contracting Officer's office and at the job site. The APP shall be continuously reviewed and amended, as necessary, throughout the life of the contract. Unusual or high-hazard activities not identified in the original APP shall be incorporated in the plan as they are discovered.

1.9 ACTIVITY HAZARD ANALYSIS (AHA)

- A. The Activity Hazard Analysis (AHA) format shall be in accordance with USACE EM 385-1-1. Submit the AHA for review at least 15 calendar days prior to the start of each phase. Format subsequent AHA as amendments to the APP. An AHA will be developed by the Contractor for every operation involving a type of work presenting hazards not experienced in previous project operations or where a new work crew or subcontractor is to perform work.
The analysis must identify and evaluate hazards and outline the proposed methods and techniques for the safe completion of each phase of work. At a minimum, define activity being performed, sequence of work, specific safety and health hazards anticipated, control measures (to include personal protective equipment) to eliminate or reduce each hazard to acceptable levels, equipment to be used, inspection requirements, training requirements for all involved, and the competent person in charge of that phase of work. For work with fall hazards, including fall hazards associated with scaffold erection and removal, identify the appropriate fall arrest systems. For work with materials handling

equipment, address safeguarding measures related to materials handling equipment. For work requiring excavations, include requirements for safeguarding excavations. An activity requiring an AHA shall not proceed until the AHA has been accepted by the Contracting Officer's representative and a meeting has been conducted by the Contractor to discuss its contents with everyone engaged in the activity, including on-site Government representatives. The Contractor shall document meeting attendance at the preparatory, initial, and follow-up phases of quality control inspection. The AHA shall be continuously reviewed and, when appropriate, modified to address changing site conditions or operations. The analysis should be used during daily inspections to ensure the implementation and effectiveness of the activity's safety and health controls.

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

1.10 DISPLAY OF SAFETY INFORMATION

- A. Within 15 calendar days after commencement of work, erect a safety bulletin board at the job site. The following information shall be displayed on the safety bulletin board in clear view of the on-site construction personnel, maintained current, and protected against the elements and unauthorized removal:
 - 1. Map denoting the route to the nearest emergency care facility.
 - 2. Emergency phone numbers.
 - 3. Copy of the most up-to-date APP.
 - 4. AHA(s).
 - 5. OSHA 300A Form.
 - 6. OSHA Safety and Health Protection-On-The-Job Poster.

1.11 SITE SAFETY REFERENCE MATERIALS

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

1.12 EMERGENCY MEDICAL TREATMENT

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

1.13 REPORTS

- A. Accident Reports: For recordable injuries and illnesses, and property damage accidents resulting in at least \$2,000 in damages, the Prime Contractor shall conduct an accident investigation to establish the root cause(s) of the accident, complete the USACE

Accident Report Form 3394 and provide the report to the Contracting Officer within 1 calendar day(s) of the accident. The Contracting Officer will provide copies of any required or special forms.

- B. Accident Notification: Notify the Contracting Officer as soon as practical, but not later than four hours, after any accident meeting the definition of Recordable Injuries or Illnesses or High Visibility Accidents, property damage equal to or greater than \$2,000, or any weight handling equipment accident involving a overturned crane, collapsed boom, or any other major damage to the crane or adjacent property. Information shall include contractor name; contract title; type of contract; name of activity, installation or location where accident occurred; date and time of accident; names of personnel injured; extent of property damage, if any; extent of injury, if known, and brief description of accident (to include type of construction equipment used, PPE used, etc.). Preserve the conditions and evidence on the accident site until the Government investigation team arrives on site and Government investigation is conducted.
- C. Monthly Exposure Reports: Monthly exposure reporting to the Contracting Officer is required to be attached to the monthly billing request. This report is a compilation of employee hours worked each month for all site workers, both prime and subcontractor. The Contracting Officer will provide copies of any special forms.
- D. Regulatory Citations and Violations: Contact the Contracting Officer immediately of any OSHA or other regulatory agency inspection or visit and provide the Contracting Officer with a copy of each citation, report, and contractor response. Correct violations and citations promptly and provide written corrective actions to the Contracting Officer.
- E. Certificate of Compliance: The Contractor shall provide a Certificate of Compliance for each crane entering into an activity under this contract (see Contracting Officer for a blank certificate). Certificate shall state that the crane and rigging gear meet applicable OSHA regulations (with the Contractor citing which OSHA regulations are applicable, e.g., cranes used in construction, demolition, or maintenance shall comply with 29 CFR 1926 and Appendix H. Certify on the Certificate of Compliance that the crane operator(s) is qualified and trained in the operation of the crane to be used. The Contractor shall also certify that all of its crane operators working on the project have been trained in the proper use of all safety devices (e.g., anti-two block devices). These certifications shall be posted on the crane.

1.14 HOT WORK

- A. The Contractor will provide at least two (2) twenty (20) pound 4A:20 BC rated extinguishers for normal "Hot Work". All extinguishers shall be current inspection tagged, approved safety pin and tamper resistant seal. It is also mandatory to have a designated FIRE WATCH for any "Hot Work" done.
 - 1. Oil painting materials (paint, brushes, empty paint cans, etc.), and all flammable liquids shall be removed from the facility at quitting time. All painting materials and flammable liquids shall be stored outside in a suitable metal locker or box and will require re- submittal with non-hazardous materials.

2. Accumulation of trays, paper, shavings, sawdust, boxes and other packing materials shall be removed from the facility at the close of each workday and such material disposed of in the proper containers located away from the facility.
3. The storage of combustible supplies shall be a safe distance from structures.
4. Area outside the facility undergoing work shall be cleaned of trash, paper, or other discarded combustibles at the close of each workday.
5. All portable electric devices (saws, sanders, compressors, extension chord, lights, etc.) shall be disconnected at the close of each workday. When possible, the main electric switch in the facility shall be deactivated.
6. When starting work in the facility, Contractors shall require their personnel to familiarize themselves with the location of the nearest fire alarm boxes and place in memory the emergency phone number.

PART 2 - PRODUCTS

2.1 FALL PROTECTION ANCHORAGE

- A. Fall protection anchorage, conforming to ANSI Z359.1, will be left in place and so identified for continued customer use.

2.2 CONFINED SPACE SIGNAGE

- A. The Contractor shall 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 25 mm(one inch) in height and constructed to be clearly legible with all paint removed

The signal word "DANGER" shall be red and readable from 1.52 m(5 feet).

PART 3 - EXECUTION

3.1 CONSTRUCTION AND/OR OTHER WORK

- A. The Contractor shall comply with NFPA 241, the APP, the AHA, and other related submittals and activity fire and safety regulations.
- B. Hazardous Material Use: Each hazardous material must receive approval prior to being brought onto the job site or prior to any other use in connection with this contract. Allow a minimum of 10 working days for processing of the request for use of a hazardous material. Any work or storage involving hazardous chemicals or materials must be done in a manner that will not expose Government or Contractor employees to any unsafe or unhealthful conditions. Adequate protective measures must be taken to prevent Government or Contractor employees from being exposed to any hazardous condition that could result from the work or storage. The Prime Contractor shall keep a complete inventory of hazardous materials brought onto the work-site. Approval by the Contracting Officer of protective measures and storage area is required prior to the start of the work.
- C. Hazardous Material Exclusions: Notwithstanding any other hazardous material used in this contract, radioactive materials or instruments capable of producing ionizing/non-ionizing radiation (with the exception of radioactive material and devices used in accordance with EM 385-1-1 such as nuclear density meters for compaction testing and laboratory equipment with radioactive sources) as well as materials which contain asbestos, mercury or polychlorinated biphenyls, di-isocynates, 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.
- D. Unforeseen Hazardous Material: The design should have identified materials such as PCB, lead paint, and friable and non-friable asbestos. If 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 the material is not hazardous or poses no danger, the Government will direct the Contractor to proceed without charge. If material is hazardous and handling of the material is necessary to accomplish the work, the Government will issue a modification.

3.2 PRE-OUTAGE COORDINATION MEETING

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

3.3 FALL HAZARD PROTECTION AND PREVENTION

- A. The Contractor shall establish a fall protection and prevention program, for the protection of all employees exposed to fall hazards. The program shall include company policy, identify responsibilities, education, and training requirements, fall hazard identification, prevention and control measures, inspection, storage, care and maintenance of fall protection equipment and rescue and escape procedures.
- B. Training: The Contractor shall institute a fall protection training program. As part of the Fall Hazard Protection and Prevention Program, the Contractor shall provide training for each employee who might be exposed to fall hazards.
- C. Fall Protection Equipment: The Contractor shall enforce use of the fall protection equipment designated for each specific work activity in the Fall Protection and Prevention Plan and/or AHA at all times when an employee is on a surface 1.8 m(6 feet) or more above lower levels. Fall protection systems such as guardrails, personnel fall arrest system, safety nets, etc., are required when working within 1.8m (6 feet) of any leading edge. In addition to the required fall protection systems, safety skiff, personal floatation devices, life rings etc., are required when working above or next to water in accordance with USACE EM 385-1-1, paragraphs 05.I. and 05.J. Personal fall arrest systems are required when working from an articulating or extendible boom, swing stages, or suspended platform. In addition, personal fall arrest systems may be required when operating other equipment such as scissor lifts if the work platform is capable of being positioned outside the wheelbase. Fall protection must comply with 29 CFR 1926.500, Subpart M and USACE EM 385-1-1.
 - 1. Personal Fall Arrest Equipment: Personal fall arrest equipment, systems, subsystems, and components shall meet ANSI Z359.1. Only a full-body harness with a shock- absorbing lanyard or self-retracting lanyard is an acceptable personal fall arrest device. Body belts may only be used as a positioning device system (for uses such as steel reinforcing assembly and in addition to an approved fall arrest system). Harnesses shall have a fall arrest attachment affixed to the body support (usually a Dorsal D-ring) and specifically designated for attachment to the rest of the system. Only locking snap hooks and carabiners shall be used. Webbing, straps, and ropes shall be made of synthetic fiber.

The maximum free fall distance when using fall arrest equipment shall not exceed 1.8 m (6 feet). The total fall distance shall always be taken into consideration when attaching a person to a fall arrest system.

- D. Fall Protection for Roofing Work: Fall protection controls shall be implemented based on the type of roof being constructed and work being performed. The roof area to be accessed shall be evaluated for its structural integrity including weight-bearing capabilities for the projected loading.
 - 1. Low Sloped Roofs:
 - a. For work within 1.8 m (6 feet) of an edge, on low-slope roofs, personnel shall be protected from falling by use of personal fall arrest systems, guardrails, or safety nets.
 - b. For work greater than 1.8 m (6 feet) from an edge, warning lines shall be erected and installed in accordance with 29 CFR 1926.500 and USACE EM 385-1-1.
- E. Safety Nets: If safety nets are used as the selected fall protection system on the project, they shall be provided at unguarded workplaces, over water, machinery, dangerous operations and leading-edge work. Safety nets shall be tested immediately after installation with a drop test of 181.4 kg (400 pounds) and every six months thereafter.
- F. Existing Anchorage: Existing anchorages, to be used for attachment of personal fall arrest equipment, shall be certified (or re-certified) by a qualified person in accordance with ANSI Z359.1.
- G. Horizontal Lifelines: Horizontal lifelines shall be designed, installed, certified, and used under the supervision of a qualified person as part of a complete fall arrest system (29 CFR 1926.500).

3.4 SCAFFOLDING

- A. Employees shall be provided with a safe means of access to the work area on the scaffold. Climbing of any scaffold braces or supports not specifically designed for access is prohibited. Access to scaffold platforms greater than 6 m (20 feet) in height shall be accessed by use of a scaffold stair system. Vertical ladders commonly provided by scaffold system manufacturers shall not be used for accessing scaffold platforms greater than 6 m (20 feet) in height. The use of an adequate gate is required. Contractor shall ensure that employees are qualified to perform scaffold erection and dismantling. Do not use scaffold without the capability of supporting at least four times the maximum intended load or without appropriate fall protection as delineated in the accepted fall protection and prevention plan. Stationary scaffolds must be attached to structural building components to safeguard against tipping forward or backward.

Special care shall be given to ensure scaffold systems are not overloaded. Side brackets used to extend scaffold platforms on self-supported scaffold systems for the storage of material is prohibited. The first tie-in shall be at the height equal to 4 times the width of the smallest dimension of the scaffold base. Work platforms shall be placed on mud sills. Scaffold or work platform erectors shall have fall protection during the erection and dismantling of scaffolding or work platforms that are more than six feet. Delineate fall protection requirements when working above six feet or above dangerous operations in the Fall Protection and Prevention (FP&P) Plan and Activity Hazard Analysis (AHA) for the phase of work.

3.5 EQUIPMENT

A. Material Handling Equipment

1. 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.
2. The use of hooks on equipment for lifting of material must be in accordance with manufacturer's printed instructions.
3. Operators of forklifts or power industrial trucks shall be licensed in accordance with OSHA.

B. Weight Handling Equipment

1. Cranes must be equipped with:
 - a. Load indicating devices (LIDs) and a boom angle or radius indicator,
 - b. or load moment indicating devices (LMIs).
 - c. Anti-two block prevention devices.
 - d. Boom hoist hydraulic relief valve, disconnect, or shutoff (stops hoist when boom reaches a predetermined high angle).
 - e. Boom length indicator (for telescoping booms).
 - f. Device to prevent uncontrolled lowering of a telescoping hydraulic boom.
 - g. Device to prevent uncontrolled retraction of a telescoping hydraulic boom.
2. The Contractor shall notify the Contracting Officer 15 days in advance of any cranes entering the activity so that necessary quality assurance spot checks can be coordinated. Contractor's operator shall remain with the crane during the spot check.
3. The Contractor shall comply with the crane manufacturer's specifications and limitations for erection and operation of cranes and hoists used in support of the work. Erection shall be performed under the supervision of a designated person (as defined in ASME B30.5). All testing shall be performed in accordance with the manufacturer's recommended procedures.
4. The Contractor shall comply with ASME B30.5 for mobile and locomotive cranes, ASME B30.22 for articulating boom cranes and ASME B30.8 for floating cranes and floating derricks.

5. The presence of Government personnel does not relieve the Contractor of an obligation to comply with all applicable safety regulations. The Government will investigate all complaints of unsafe or unhealthful working conditions received in writing from contractor employees, federal civilian employees, or military personnel.
6. Each load shall be rigged/attached independently to the hook/master-link in such a fashion that the load cannot slide or otherwise become detached. Christmas- tree lifting (multiple rigged materials) is not allowed.
7. Under no circumstance shall a Contractor make a lift at or above 90% of the cranes rated capacity in any configuration.
8. When operating in the vicinity of overhead transmission lines, operators and riggers shall be alert to this special hazard and shall follow the requirements of USACE EM 385-1-1 section 11 and ASME B30.5 or ASME B30.22 as applicable.
9. Crane suspended personnel work platforms (baskets) shall not be used unless the Contractor proves that using any other access to the work location would provide a greater hazard to the workers or is impossible. Personnel shall not be lifted with a line hoist or friction crane.
10. A fire extinguisher having a minimum rating of 10BC and a minimum nominal capacity of 5lb of extinguishing agent shall be available at all operator stations or crane cabs. Portable fire extinguishers shall be inspected, maintained, and recharged as specified in NFPA 10, Standard for Portable Fire Extinguishers.
11. All employees shall be kept clear of loads about to be lifted and of suspended loads.
12. A weight handling equipment operator shall not leave his position at the controls while a load is suspended.
13. Only Contractor crane operators who have met the requirements of 29 CFR 1910.94, 29 CFR 1910.120, 29 CFR 1926.65, 29 CFR 1926.500, USACE EM 385-1-1, ASME B30.5, and ASME B30.22 and other local and state requirements shall be authorized to operate the crane.
14. The Contractor shall use cribbing when performing lifts on outriggers.
15. The crane hook/block must be positioned directly over the load. Side loading of the crane is prohibited.
16. A physical barricade must be positioned to prevent personnel from entering the counterweight swing (tail swing) area of the crane.
17. A substantial and durable rating chart containing legible letters and figures shall be provided with each crane and securely mounted onto the crane cab in a location allowing easy reading by the operator while seated in the control station.
18. 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.
19. 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.
20. The Contractor shall certify that all crane operators have been trained in proper use of all safety devices (e.g. anti-two block devices).

C. Equipment and Mechanized Equipment

1. Equipment shall be operated by designated qualified operators. Proof of qualifications shall be kept on the project site for review.
2. Manufacture specifications or owner's manual for the equipment shall be on site and reviewed for additional safety precautions or requirements that are sometimes not identified by OSHA or USACE EM 385-1-1. Such additional safety precautions or requirements shall be incorporated into the AHAs.
3. Equipment and mechanized equipment shall be inspected in accordance with the manufacturer's recommendations for safe operation by a competent person prior to being placed into use.
4. Daily checks or tests shall be conducted and documented on equipment and mechanized equipment by designated competent persons.

3.6 EXCAVATIONS

- A. The competent person for excavations performed as a result of contract work shall be on-site when excavation work is being performed, and shall inspect, and document the excavations daily prior to entry by workers. The competent person must evaluate all hazards, including atmospheric, that may be associated with the work, and shall have the resources necessary to correct hazards promptly.
- B. Utility Locations: All underground utilities in the work area must be positively identified by a private utility locating service. Any markings made during the utility investigation must be maintained throughout the contract.
- C. Utility Location Verification: The Contractor must physically verify underground utility locations by hand digging using wood or fiberglass handled tools when any adjacent construction work is expected to come within three feet of the underground system. Digging within .061 m (2 feet) of a known utility must not be performed by means of mechanical equipment; hand digging shall be used. If construction is parallel to an existing utility the utility shall be exposed by hand digging every 30.5 m (100 feet) if parallel within 1.5 m (5 feet) of the excavation.
- D. Shoring Systems: Trench and shoring systems must be identified in the accepted safety plan and AHA. Manufacture tabulated data and specifications or registered engineer tabulated data for shoring or benching systems shall be readily available on site for review. Job-made shoring or shielding shall have the registered professional engineer stamp, specifications, and tabulated data. Extreme care must be used when excavating near direct burial electric underground cables.
- E. Trenching Machinery: Trenching machines with digging chain drives shall be operated only when the spotters/laborers are in plain view of the operator. Operator and spotters/laborers shall be provided training on the hazards of the digging chain drives with emphasis on the distance that needs to be maintained when the digging chain is operating.

Documentation of the training shall be kept on file at the project site.

3.7 ELECTRICAL

- A. Conduct of Electrical Work: Underground electrical spaces must be certified safe for entry before entering to conduct work. Cables that will be cut must be positively identified and de- energized prior to performing each cut. Positive cable identification must be made prior to submitting any outage request for electrical systems. Arrangements are to be coordinated with the Contracting Officer and Station Utilities for identification. The Contracting Officer will not accept an outage request until the Contractor satisfactorily documents that the circuits have been clearly identified. Perform all high voltage cable cutting remotely using hydraulic cutting tool. When racking in or live switching of circuit breakers, no additional person other than the switch operator will be allowed in the space during the actual operation. Plan so that work near energized parts is minimized to the fullest extent possible. Use of electrical outages clear of any energized electrical sources is the preferred method. When working in energized substations, only qualified electrical workers shall be permitted to enter. When work requires Contractor to work near energized circuits as defined by the NFPA 70, high voltage personnel must use personal protective equipment that includes, as a minimum, electrical hard hat, safety shoes, insulating gloves with leather protective sleeves, fire retarding shirts, coveralls, face shields, and safety glasses. Insulating blankets, hearing protection, and switching suits may be required, depending on the specific job and as delineated in the Contractor's AHA.
- B. Portable Extension Cords: Portable extension cords shall be sized in accordance with manufacturer ratings for the tool to be powered and protected from damage. All damaged extension cords shall be immediately removed from service. Portable extension cords shall meet the requirements of NFPA 70.

3.8 WORK IN CONFINED SPACES

- A. The Contractor shall comply with the requirements in OSHA 29 CFR 1910.146. Any potential for a hazard in the confined space requires a permit system to be used.
 - 1. Entry Procedures. Prohibit entry into a confined space by personnel for any purpose, including hot work, until the qualified person has conducted appropriate tests to ensure the confined or enclosed space is safe for the work intended and that all potential hazards are controlled or eliminated and documented. All hazards pertaining to the space shall be reviewed with each employee during review of the AHA.

2. 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.
3. Ensure the use of rescue and retrieval devices in confined spaces greater than 1.5 m (5 feet) in depth.
4. Sewer wet wells require continuous atmosphere monitoring with audible alarm for toxic gas detection.
5. Include training information for employees who will be involved as entrants and attendants for the work.
6. Daily Entry Permit. Post the permit in a conspicuous place close to the confined space entrance.

3.9 CRYSTALLINE SILICA

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

3.10 HOUSEKEEPING

- A. Clean-Up: All debris in work areas shall be cleaned up daily or more frequently if necessary. Construction debris may be temporarily located in an approved location, however garbage accumulation must be removed each day.
- B. Dust control: In addition to the dust control measures required elsewhere in the contract documents, dry cutting of brick or masonry shall be prohibited. The Contracting Officer, upon written request by the Contractor, may consider exceptions to this prohibition on a case-by-case basis. Wet cutting must address control of water runoff.

END OF SECTION

SECTION 01 35 43

ENVIRONMENTAL PROCEDURES

1. GENERAL

1.1. SUMMARY

1.1.1. Section Includes

- 1.1.1.1. Potential Pollutants.
- 1.1.1.2. Storm water pollution protection plans.
- 1.1.1.3. Spill prevention and control.
- 1.1.1.4. Temporary containment removal.
- 1.1.1.5. Non-storm water management.
- 1.1.1.6. Cultural Resources

1.1.2. Related Sections

- 1.1.2.1. Section 01 30 00 – Administrative Requirements.
- 1.1.2.2. Section 01 74 19 - Construction Waste Management and Disposal.
- 1.1.2.3. Other Sections: Equipment and materials that may contain potential site pollutants.

1.2. POTENTIAL POLLUTANTS

- 1.2.1. Identify potential pollutants that are used in the Work.
- 1.2.2. Certain potential pollutants are identified in Attachment A, immediately following this Section.

1.3. SUBMITTALS

- 1.3.1. Submit under provisions of Section 01 33 00.
- 1.3.2. Hazardous Material Clean Up and Solid Waste Management Data: List the employees trained in emergency spill cleanup procedures and indicate the training procedures for employees and subcontractors in spill prevention and cleanup and solid waste management.
- 1.3.3. Concrete Waste Management Data: Indicate concrete washout areas and the procedures to train employees and subcontractors in proper concrete waste management.

1.4. PRECONSTRUCTION CONFERENCE

- 1.4.1. In accordance with Section 01 30 00 Administrative Requirements.
- 1.4.2. Review delivery routes, storage areas, spill prevention and clean up procedures, and training procedures.

1.5. DELIVERY, STORAGE, AND HANDLING

- 1.5.1. Keep an accurate, current inventory of materials containing potential pollutants, delivered and stored onsite.
- 1.5.2. Use personnel trained in spill prevention and emergency spill clean up procedures to unload and store materials containing potential pollutants.
- 1.5.3. Store construction raw materials containing potential pollutants off the ground in designated areas in secondary containment structures or surrounded by earth berms away from storm drain inlets, waterways, and drainage paths. Store chemicals in their original labelled containers. Cover the materials with plastic tarps when not in use.
 - 1.5.3.1. Store hazardous waste and materials in sealed containers; protect from vandalism. Place in areas that will be paved and surround the areas with earth berms.
 - 1.5.3.2. Store reactive, ignitable, or flammable liquids in accordance with fire codes.
 - 1.5.3.3. Store materials in a covered area during wet weather.
 - 1.5.3.4. Small amounts of material may be secondarily contained in “bus boy” trays or concrete mixing trays.
- 1.5.4. Remove and dispose of residual materials and contaminated soil after construction is complete.

2. PRODUCTS - NOT USED

3. EXECUTION

3.1. STORM WATER POLLUTION PROTECTION PLAN (SWPPP)

- 3.1.1. It is incumbent upon the Contractor to prepare a Storm Water Pollution Protection Plan to implement for the project and comply with the National Pollutant Discharge Elimination System (NPDES) General Permit.
- 3.1.2. The Contractor and its subcontractors shall perform all necessary pollution prevention work to comply with the SWPP and the Permits for any Work performed on the Project Site. Any person or group who violates any condition of the Permits may be subject to substantial penalties in accordance with State and Federal law. The Contractor is encouraged to advise each of its employees and subcontractors working on this Project of the requirements of the Permits and SWPPP. A copy of the Permits and SWPPP will be available for review during the bidding period and the Facility Representative's site office during construction.

3.2. SPILL PREVENTION AND CONTROL

- 3.2.1. Use secondary containment devices such as drain pans or drop cloths at all areas when fueling, removing, or changing fluids.
- 3.2.2. Place a stockpile of spill cleanup materials where it will be readily accessible.
- 3.2.3. Use personnel trained in emergency spill clean up procedures.

3.2.4. Clean up leaks and spills immediately, in accordance with waste management regulations.

3.2.5. Clean up spills on paved surfaces with minimal water usage. Clean small spills with cloths and larger spills with absorbent material. Immediately send used hazardous cleanup cloth material to a certified laundry or remove and dispose as hazardous waste, in accordance with waste management regulations.

3.2.6. Do not hose down or bury dry material spills.

3.3. TEMPORARY CONTAINMENT REMOVAL

3.3.1. Remove all temporary containment structures, devices and equipment when directed by Facility Representative. Clean and repair damage caused by installation and use of temporary work.

3.4. NON-STORM WATER MANAGEMENT

3.4.1. Minimize the use of water sprayed for dust control and irrigation, to avoid causing runoff and erosion.

3.4.2. Remove sediment from dewatering operations using sediment basins. Filter sediment from sediment basins with a sump pit and perforated standpipe, wrapped in filter fabric, or a floating suction hose.

3.5. DISCHARGE WATER, USED FOR FLUSHING AND DISINFECTION, INTO ONSITE DETENTION BASINS OR TEMPORARY EARTHEN BASINS. INADVERTENT DISCOVERY OF CULTURAL OR ARCHAEOLOGICAL OR HUMAN REMAINS

3.5.1. In accordance with Standard Operating Procedures (SOP) 4 and 11 of the CAARNG Integrated Cultural Resources Management Plan, workers/soldiers shall monitor their ground disturbing activities (all activities that alter the existing state of the ground surface) for the unearthing of previously unknown items of archaeological, historic, or cultural interest (e.g. human remains, artifacts, fossils, etc.). If any such items are unearthed or exhumed, all ground disturbing activities shall cease and the Environmental Office contacted immediately (Camp Roberts: 805-238-8332, Camp San Luis Obispo: 805-594-6537, all other sites 916-854-1474). No further ground disturbance shall proceed without prior authorization from the Environmental Office that the CAARNG has complied with all regulatory requirements pertaining to the resources discovered. (National Historic Preservation Act (NHPA), Native American Graves Protection and Repatriation Act (NAGPRA), California Health and Safety Code Section 7050.5[b]).

3.5.2. If any such items are discovered at other CMD locations, all ground disturbing activities shall cease. Notify the Facility Representative immediately. No further ground disturbance shall proceed without prior authorization from the Facility Representative when it is determined that the CAARNG has complied with all regulatory requirements pertaining to the discovered resources.

END OF SECTION

SECTION 01 35 43 - ATTACHMENT A

PARTIAL LIST OF POTENTIAL POLLUTANTS

- 1.1 Contractor shall identify the pollutants present during construction and take the necessary measures to restrict their entry into the natural drainage system, based on the National Pollutant Discharge Elimination System (NPDES) applicable laws, codes and regulations.
- 1.2 Potential pollutants that may be used at the site and that have the potential to enter the storm water drainage system are included in the list below. This is not intended to be a complete list of categories, products and pollutants.
- 1.3 CONSTRUCTION SITE POTENTIAL POLLUTANTS

CATEGORY	PRODUCT, ACTIVITY	POLLUTANTS
Adhesives	Adhesives, Glues Resins, Epoxy Synthetics Calks, Sealers, Putty, Sealing Agents Coal Tars (Naptha, Pitch)	Phenolics, Formaldehydes Phenolics, Formaldehydes Asbestos, Phenolics, Formaldehydes Benzene, Phenols, Naphthalene
Cleaners	Polishes, (Metal, Ceramic, Tile) Etching Agents Cleaners, Ammonia, Lye, Caustic Sodas Bleaching Agents Chromate Salts	Metals Metals Acidity/Alkalinity Acidity/Alkalinity Chromium
Plumbing	Solder (Lead, Tin), Flux (Zinc Chloride) Pipe Fitting (Cut Shavings) Galvanized Metals	Lead, Copper, Zinc, Tin Copper Zinc
Electrical	Wiring	Copper, Lead
Painting	Paint Thinner, Acetone, MEK, Stripper Paints, Lacquers, Varnish, Enamels Turpentine, Gum Spirit, Solvents Sanding, Stripping Paints (Pigments), Dyes	VOC's Metals, Phenolics, Mineral Spirits VOC's Metals Metals
Woods	Sawdust Particle Board Dusts Treated Woods	BOD Formaldehyde Copper, Creosote
Floors & Walls	Flashing Drywall Tile Cutting (Ceramic Dusts)	Copper, Aluminum Dusts Minerals
Remodeling & Demolition	Insulation Venting Systems	Asbestos Aluminum, Zinc

CATEGORY	PRODUCT, ACTIVITY	POLLUTANTS
Air Conditioning & Heating	Insulation Coolant Reservoirs	Asbestos Freon
Yard O&M	Vehicle and Machinery Maintenance Gasoline, Oils, Additives Marking Paints (Sprays) Grading, Earth Moving Portable Toilets Fire Hazard Control (Herbicides) Wash Waters	Oils and grease, Coolants Benzene & Derivatives, Oils & Grease Vinyl Chloride, Metals Erosion (Sediments) BOD, Disinfectants (Spills) Sodium Arsenite, Dinitro Rodenticides, Insecticides, Herbicides, Concrete, Oils, Greases
Landscaping & Earthmoving	Planting, Plant Maintenance Excavation, Tilling Solid Wastes (Trees, Shrubs) Exposing Natural Lime or Other Mineral Deposits Soils Additives Revegetation of Graded Areas	Pesticides, Herbicides, Nutrients Erosion (Sediments) BOD Acidity/Alkalinity, Metals Aluminum Sulfate, Sulfur Fertilizers
Materials Storage	Waste Storage (Used Oils, Solvents, Etc.) Hazardous Waste Containment Raw Material Piles	Spills, Leaks Spills, Leaks Dusts, Sediments

Note: VOC = Volatile Organic Compounds.

BOD = Biochemical Oxygen Demand due to the use of oxygen by decomposing materials.

END OF SECTION 01 35 43 - ATTACHMENT A

SECTION 01 41 00
REGULATORY REQUIREMENTS

PART 1 GENERAL

1.1 SUMMARY

- A. Section Includes
 - 1. Submittals.
 - 2. Quality assurance.
 - 3. Regulatory requirements.
 - 4. Field quality control.
- B. Related Sections
 - 1. Section 01 33 00 – Submittal Requirements.

1.2 SUBMITTALS

- A. Submit under provisions of Section 01 33 00.
- B. Submit certification of inspection confirming approval by authority having jurisdiction when required by individual Section.
- C. Submit the following directly to enforcing authorities when required by individual Section:
 - 1. Product data.
 - 2. Design data.
 - 3. Test reports.
 - 4. Certificates.
 - 5. Manufacturer's Instructions.
 - 6. Manufacturer's Field Reports.
 - 7. Operation and Maintenance Data.
 - 8. Guarantee.
 - 9. Other items indicated.

1.3 QUALITY ASSURANCE

- A. Perform work in accordance with specific standards indicated. Maintain one copy of each document on site.

1.4 REGULATORY REQUIREMENTS

- A. Conform to applicable codes, except conform to more stringent requirements of the Drawings and Specifications.

B. Applicable codes include, but are not limited to:

1. The California Building Standards Code, also known as the California Code of Regulations (CCR), Title 24.
 - a. CBC - 2022 California Building Code: California Code of Regulations (CCR), Title 24, Part 2. CBC was adopted in 2023, and is based on the 2021 International Building Code (IBC) with California Amendments.
 - b. CMC - 2022 California Mechanical Code: California Code of Regulations (CCR), Title 24, Part 2. CBC was adopted in 2023, and is based on the 2021 International Building Code (IBC) with California Amendments.
 - c. CPC - 2022 California Plumbing Code: California Code of Regulations (CCR), Title 24, Part 2. CBC was adopted in 2023, and is based on the 2021 International Building Code (IBC) with California Amendments.
 - d. CEC - 2022 California Electrical Code: California Code of Regulations (CCR), Title 24, Part 3. CEC was adopted in 2023, and is based on 2021 National Electrical Code (NEC) with California Amendments.
 - e. For copies of the California Building Standards Code or the California Amendments only, contact Building News Inc. (BNI) at (310) 202-7775, or International Code Council (ICC) at (800) 786-4452 or (888) 422-7233.
2. ANSI/ASHRAE/IES Standard Regulations 90.1 2016.
3. Unified Facilities Code 04 -010-01 DOD Minimum Antiterrorism Standards for Buildings December 12, 2018.

PART 2 PRODUCTS

Not Used

PART 3 EXECUTION

3.1 FIELD QUALITY CONTROL

- A. When required by the individual Section, arrange for enforcing authority to witness indicated Observations, Testing and Inspections.

END OF SECTION

SECTION 01 45 00.10 20

QUALITY CONTROL FOR MINOR CONSTRUCTION

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.

OCCUPATIONAL SAFETY & HEALTH ADMINISTRATION

29 CFR 1910	Safety and Health Regulation in General Industry
29 CFR 1910	Safety and Health Regulation for Construction

Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are for Contractor Quality Control approval. Ensure all submittals conform to the requirements in Section 01 33 00 Submittal procedures and Submittal Log.

1.2 INFORMATION FOR THE CONTRACT MANAGER

Prior to commencing work on construction, the Contractor can obtain a single copy set of the current report forms from the CM. 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 CM:

- a. CQC Report: Original and one copy, by 10:00 AM the next working week after each day that work is performed.
- b. Preparatory Phase Checklist: Original attached to the original CQC Report and one copy attached to each copy.
- c. Initial Phase Checklist: Original attached to the original CQC Report and one copy attached to each copy.
- d. Field Test Reports: One copy, within the week after the test is performed, attached to the CQC Report.
- e. QC Meeting Minutes: One copy, within the week after the meeting; and
- f. QC Certifications: As required by the paragraph entitled "QC Certifications."

1.3 QC PROGRAM REQUIREMENTS

Establish and maintain a QC program as described in this section. The QC program consists of a QC Manager, a QC plan, a Coordination and Mutual Understanding Meeting, QC meetings, three phases of control, submittal review and approval, testing, 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 work or testing may be performed unless the QC Manager is on the work site.

1.4.1 Preliminary Work Authorized Prior to Acceptance

The only 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.

1.4.2 Acceptance

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

1.4.3 Notification of Changes

Notify the CM, in writing, of any proposed change, including changes in the QC organization personnel, a minimum of seven calendar days prior to a proposed change. The proposed changes shall be subject to the acceptance by the CM.

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 QC Manager shall be a stand-alone position and have no other duties.

Exception: Building Official (BO) may allow the QC Manager to share duties with the Superintendent or safety officer on projects with a contract value under one million dollars or on single trade, non-complex projects of any value. However, at no time will one person hold more than two duties. This option is at the discretion of the BO. Contractors may request this option during pre-bid RFI's for bidding purposes.

The QC Manager is required to attend the Coordination and Mutual Understanding Meeting, conduct the QC meetings, perform the three phases of control, 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 others.

1.5.1.2 Qualifications

An individual with a minimum of 5 years combined experience as a superintendent, inspector, QC Manager, project manager, or construction manager on similar size and type construction contracts which included the major trades that are part of this contract. The individual must be familiar with the requirements OSHA 29 CFR 1910 & 1926.

1.5.1.3 Construction Quality Management Training

In addition to the above experience and education requirements, the QC Manager shall have completed the course Construction Quality Management for Contractors and will have a current certificate.

1.5.2 Alternate QC Manager Duties and Qualifications

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

1.6 QC PLAN

1.6.1 Requirements

Provide, for acceptance by the CM, a QC plan submitted in a three-ring binder that covers both on-site and off-site work and includes the following with a table of contents listing the major sections identified with tabs.

- I. QC ORGANIZATION: A chart showing the QC organizational structure and its relationship to the production side of the organization.
- II. NAMES AND QUALIFICATIONS: In resume format, for each person in the QC organization. Include the CQM for Contractors course certification required by the paragraph entitled "Construction Quality Management Training".
- III. DUTIES, RESPONSIBILITY AND AUTHORITY OF QC PERSONAL: Of each person in the QC organization.
- IV. 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.
- V. 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 managing and implementing the QC program as described in this contract. Include in this letter the QC Manager's authority to direct the removal and replacement of non-conforming work.
- VI. 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.

- VII. TESTING LABORATORY INFORMATION: Testing laboratory information required by the paragraphs "Accredited Laboratories" or "Testing Laboratory Requirements", as applicable.
- VIII. 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.
- IX. PROCEDURES TO COMPLETE REWORK ITEMS: Procedures to identify, record, track and complete rework items.
- X. DOCUMENTATION PROCEDURES: Use Government formats.
- XI. LIST OF DEFINABLE FEATURES: A Definable Feature of Work (DFOW) is a task, which is separate and distinct from other tasks, has the same control requirements and work crews. The list shall be cross-referenced to the Contractor's Construction Schedule and the specification sections. For projects requiring a Progress Chart, the list of definable features of work shall include but not be limited to all items of work on the schedule. For projects requiring a Network Analysis Schedule, the list of definable features of work shall include but not be limited to all critical path activities.
- XII. PROCEDURES FOR PERFORMING THREE PHASES OF CONTROL: For each DFOW provide Preparatory and Initial Phase Checklists. Each list shall include a breakdown of quality checks that will be used when performing the quality control functions, inspections, and tests required by the contract documents. The preparatory and initial phases shall be conducted with a view towards obtaining quality construction by planning ahead and identifying potential problems.
- XIII. PERSONNEL MATRIX: Not Applicable.
- XIV. PROCEDURES FOR COMPLETION INSPECTION: See the paragraph entitled "COMPLETION INSPECTIONS".
- XV. TRAINING PROCEDURES AND TRAINING LOG: Not Applicable.

1.7 COORDINATION AND MUTUAL UNDERSTANDING MEETING

During the Pre-Construction conference and prior to the start of construction, discuss the QC program required by this contract. 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, and the coordination of the Contractor's management, production and the QC personnel. At the meeting, the Contractor will be required to explain how three phases of control will be implemented for each DFOW. Contractor's personnel required to attend shall include the QC Manager, project manager, and superintendent. Minutes of the meeting will be prepared by the QC Manager and signed by both the Contractor and the COR. The Contractor shall provide a copy of the signed minutes to all attendees. Repeat the coordination and mutual understanding meeting when a new QC Manager is appointed.

1.8 QC MEETINGS

After the start of construction, the QC Manager shall conduct QC meetings once every [one] [two] weeks at the work site with the superintendent and the foreman responsible for the ongoing and upcoming work. The QC Manager shall prepare the minutes of the meeting and provide a copy to the CM within two working days after the meeting. As a minimum, the following shall be accomplished at each meeting:

- a. Review the minutes of the previous meeting; Review the schedule and the status of work and rework.
- b. Review the status of submittals.
- c. Review the work to be accomplished in the next two weeks and documentation required.
- d. Resolve QC and production problems (RFIs, etc.);
- e. Address items that may require revising the QC plan; and
- f. Review Accident Prevention Plan (APP).

1.9 THREE PHASES OF CONTROL

The three phases of control shall adequately cover both on-site and off-site work and shall include the following for each DFOV.

1.9.1 Preparatory Phase

Notify the COR at least two work days in advance of each preparatory phase. Conduct the preparatory phase with the superintendent and the foreman responsible for the definable feature of work. Document the results of the preparatory phase actions in the daily CQC Report and in the QC checklist. Perform the following prior to beginning work on each definable feature of work:

- a. Review each paragraph of the applicable specification sections.
- b. Review the contract drawings.
- c. Verify that appropriate shop drawings and submittals for materials and equipment have been submitted and approved. Verify receipt of approved factory test results, when required.
- d. Review the testing plan and ensure that provisions have been made to provide the required QC testing.
- e. Examine the work area to ensure that the required preliminary work has been completed.
- f. Examine the required materials, equipment and sample work to ensure that they are on hand and conform to the approved shop drawings and submitted data.

- g. Review the APP and appropriate Activity Hazard Analysis (AHA) to ensure that applicable safety requirements are met, and that required Safety Data Sheets (SDS) are submitted; and
- h. Discuss specific controls used and the construction methods and the approach that will be used to provide quality construction by planning ahead and identifying potential problems for each DFOW.

1.9.2 Initial Phase

Notify the CM/PM at least two work days in advance of each initial phase. Conduct the Initial Phase with the foreman responsible for that DFOW.. Observe the initial segment of the work to ensure that it complies with contract requirements. Document the results of the Initial Phase in the daily CQC Report and in the QC checklist. 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; and
- d. Check work procedures for compliance with the APP and the appropriate AHA to ensure that applicable safety requirements are met.

1.9.3 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 and in the QC checklist:

- 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; and
- e. Assure manufacturer's representatives have performed necessary inspections, if required.

1.9.4 Additional Preparatory and Initial Phases

Additional preparatory and initial phases shall be conducted 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.

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

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

1.10 SUBMITTAL REVIEW AND APPROVAL

Procedures for submission, review, and approval of submittals are described in the submittal section of the specification.

1.11 TESTING

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

1.11.1 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 (i.e.; 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."

1.11.2 Laboratory Accreditation Authorities

Laboratory Accreditation Authorities include the National Voluntary Laboratory Accreditation Program (NVLAP) administered by the National Institute of Standards and Technology, the American Association of State Highway and Transportation Officials (AASHTO), International Accreditation Services, Inc. (IAS), U. S. Army Corps of Engineers Materials Testing Center (MTC), the American Association for Laboratory Accreditation (A2LA), the Washington Association of Building Officials (WABO) (Approval authority for WABO is limited to projects within Washington State), and the Washington Area Council of Engineering Laboratories (WACEL) (Approval authority by WACEL is limited to projects within the NAVFAC WASH and Public Works Center Washington geographical area).

1.11.3 Capability Check

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

1.11.4 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 CM/PM 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 shall be signed by a testing laboratory representative authorized to sign certified test reports. Furnish the signed reports, certifications, and other documentation to the CM/PM.

1.12 QC CERTIFICATIONS

1.12.1 Contractor Quality Control Report Certification

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

1.12.2 Invoice Certification

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

1.12.3 Completion Certification

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

1.13 COMPLETION INSPECTIONS

1.13.1 Punch-Out Inspection

Near the completion of all work or any increment thereof established by a completion time stated in the Contract clause "Commencement, Prosecution, and Completion of Work," or stated elsewhere in the specifications, the QC Manager shall conduct an inspection of the work and develop a punch list of items which do not conform to the approved drawings and specifications. Include in the punch list any remaining items of the "Rework Items List", which were not corrected prior to the Punch-Out inspection. The punch list shall include the estimated date by which the deficiencies will be corrected. A copy of the punch list shall be provided to the CM/PM. The QC Manager or staff shall make follow-on inspections to ascertain that all deficiencies have been corrected. Once this is accomplished, the Contractor shall notify the Government that the facility is ready for the Government "Pre-Final Inspection".

1.13.2 Pre-Final Inspection

The Government and QC manager will perform this inspection to verify that the facility is complete and ready to be occupied. A Government pre-final punch list may be developed as a result of this inspection. The QC Manager shall ensure that all items on this list are corrected prior to notifying the Government that a "Final" inspection with the customer can be scheduled. Any items noted on the "Pre-Final" inspection shall be corrected in a timely manner and shall 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.

1.13.3 Final Acceptance Inspection

The QC Manager, the superintendent, or other Contractor management personnel and the CM/PM will be in attendance at this inspection. Additional Government personnel may be in attendance.

The final acceptance inspection will be formally scheduled by the CM/PM based upon results of the "Pre-Final Inspection". Notice shall be given to the COR at least 14 days prior to the final inspection. The notice shall state that all specific items previously identified to the Contractor as being unacceptable will be complete by the date scheduled for the final acceptance inspection. Failure of the Contractor to have all contract work acceptably complete for this inspection will be cause for the COR to bill the Contractor for the Government's additional inspection cost in accordance with the contract clause "Inspection of Construction".

1.14 DOCUMENTATION

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 CONTRACT MANAGER (CM)" shall 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 superintendent and the QC Manager must prepare and sign the Contractor Production and CQC Reports, respectively. The reporting of work shall be identified by terminology consistent with the construction schedule. In the "remarks" section in this report will contain pertinent information including directions received, problems encountered during construction, work progress and delays, conflicts or errors in the drawings or specifications, field changes, safety hazards encountered, instructions given and corrective actions taken, delays encountered and a record of visitors to the work site. For each remark given, identify the Schedule Activity No. that is associated with the remark.

1.14.1 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 shall be readily available to the Government's Quality Assurance Team during all business hours.

- a. All completed Preparatory and Initial Phase Checklists, arranged by specification section.
- b. All milestone inspections, arranged by Activity/Event Number.
- c. A current up-to-date copy of the Testing and Plan 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. A current up-to-date copy of the Rework Items List.
- f. Maintain up-to-date copies of all punch lists issued by the QC Staff on the Contractor and Sub-Contractors and all punch lists issued by the Government.

1.14.2 As-Built Drawings

The QC Manager is required to review 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 number, modification number, RFI number, etc. The QC Manager shall initial each deviation or revision. Upon completion of work, the QC Manager shall submit a certificate attesting to the accuracy of the as-built drawings prior to submission to the CM.

1.15 NOTIFICATION ON NON-COMPLIANCE

The CM/PM will notify the Contractor of any detected non-compliance with the foregoing requirements. The Contractor shall take immediate corrective action. If the contractor fails or refuses to correct the non-compliant work, the COR will issue a noncompliance 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 CM may issue an order stopping all or part of the work until satisfactory corrective action has been taken. The Contractor shall make no part of the time lost due to such stop orders the subject of claim for extension of time, for excess costs, or damages.

PART 2 PRODUCTS

Not Used

PART 3 EXECUTION

Not Used

End of Section

SECTION 01 50 00

TEMPORARY CONSTRUCTION FACILITIES AND CONTROLS

PART 1 GENERAL

1.1 REFERENCES

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

AMERICAN WATER WORKS ASSOCIATION (AWWA)

AWWA C511 (2017) Reduced-Pressure Principle Backflow
Prevention Assembly

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

U.S. ARMY CORPS OF ENGINEERS (USACE)

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

U.S. FEDERAL AVIATION ADMINISTRATION (FAA)

FAA AC 70/7460-1 (2015; Rev L) Obstruction Marking and
Lighting

1.2 SUBMITTALS

Government approval is required for all 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:

1.3 CONSTRUCTION SITE PLAN

Prior to the start of work, submit a site plan showing the locations and dimensions of temporary facilities (including layouts and details, equipment and material storage area (onsite and offsite), and access and haul routes, avenues of ingress/egress to the fenced area and details of the fence installation.

Identify any areas which may have to be graveled to prevent the tracking of mud. Indicate if the use of a supplemental or other staging area is desired. Show locations of safety and construction fences, site trailers, construction entrances, trash dumpsters, temporary sanitary facilities, and worker parking areas.

PART 2 PRODUCTS

2.1 TEMPORARY SIGNAGE

2.1.1 Warning Signs

Post temporary signs, tags, and labels to give workers and the public adequate warning and caution of construction hazards according to the 29 CFR 1910 Section 04. Attach signs to the perimeter fencing every 150 feet warning the public of the presence of construction hazards. Signs must require unauthorized persons to keep out of the construction site. Correct the data required by safety signs daily.

2.2 TEMPORARY TRAFFIC CONTROL

2.2.1 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.

2.2.2 Polyethylene Mesh Safety Fencing

Temporary safety fencing must be a high visibility orange colored, high density polyethylene grid, a minimum of 48 inches high and maximum mesh size of 2 inches. Fencing must extend from the grade to a minimum of 48 inches above the grade and be tightly secured to T-posts spaced as necessary to maintain a rigid and taut fence. Fencing must remain rigid and taut with a minimum of 200 pounds of force exerted on it from any direction with less than 4 inches of deflection.

2.2.3 Chain Link Panel Fencing

Temporary panel fencing must be galvanized steel chain link panels [6] [8] feet high. Multiple fencing panels may be linked together at the bases to form long spans as needed. Each panel base must be weighted down using sand bags or other suitable materials in order for the fencing to withstand anticipated winds while remaining upright. Fencing must remain rigid and taut with a minimum of 200 pounds of force exerted on it from any direction with less than 4 inches of deflection.

2.2.4 Post-Driven Chain Link Fencing

Temporary post-driven fencing must be galvanized chain link fencing 6 feet high supported by a tightly secured to galvanized steel posts driven below grade. Fence posts must be located on minimum 10-foot centers. Posts may be set in various surfaces such as sand, soil, asphalt or concrete as necessary.

Chain link fencing must remain rigid and taut with a minimum of 200 pounds of force exerted on it from any direction with less than 4 inches of deflection.

Fencing and posts must be completely removed at the completion of construction and any surfaces disturbed or damaged must be restored to its original condition. Underground utilities must be located and identified prior to setting fence posts. Fence must be equipped with a lockable gate. Gate must remain locked when construction personnel are not present.

3.1 EMPLOYEE PARKING

Construction contract 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. Employee parking must not interfere with existing and established parking requirements of the government installation.

3.2 TEMPORARY BULLETIN BOARD

Locate the bulletin board at the project site in a conspicuous place easily accessible to all employees, as approved by the Contracting Officer.

3.3 AVAILABILITY AND USE OF UTILITY SERVICES

3.3.1 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. Coordinate with Project Manager to see in the Facility has available power.

3.3.11 Water

Make connections to existing facilities to provide water for construction purposes. Water used maybe be furnished by the Government coordinate with Project Manager.

3.3.12 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 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. Include provisions for pest control and elimination of odors. Government toilet facilities will not be available to Contractor's personnel.
- b. Provide toilet/sanitation and temporary sewer facilities in accordance with Occupational Safety and Health Administration standard 1926.51. Ventilate the units to control odors and fumes and empty and clean them at least once a week or more often if required by the Contracting Officer. Provide self-closing doors. The exterior of the unit shall match the base standard color. Locate the facility behind the construction fence or out of the public view.

3.3.13 Telephone

Make arrangements and pay all costs for telephone facilities desired.

3.4 TRAFFIC PROVISIONS

3.4.1 Maintenance of Traffic

- a. Conduct operations in a manner that will not interfere in any way with traffic on site except with written permission of the Contract.
- b. Conduct work so as to minimize obstruction of 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.

3.5 CONTRACTOR'S TEMPORARY FACILITIES

3.5.1 Safety Systems

Protect the integrity of any installed safety systems or personnel safety devices. Obtain prior approval from Contracting Officer if entrance into systems serving safety devices is required. 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.

3.5.2 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.

3.5.3 Storage Area

Construct a temporary **6-foot-high** chain link fence around trailers and materials. 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.

3.5.4 Supplemental Storage Area

Upon request, and pending availability, the Contracting Officer will designate another or supplemental area for the 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.

The area will be maintained in a clean and orderly fashion and secured if needed to protect supplies and equipment. Utilities will not be provided to this area by the Government.

3.5.5 Appearance of Trailers

Trailers which are rusted, have peeling paint or are otherwise in need of repair will not be allowed on Installation property. Trailers must present a clean and neat exterior appearance and be in a state of good repair.

3.5.6 Trailers or Storage Buildings

Trailers or storage buildings will be permitted, where space is available, subject to the approval of the Contracting Officer. The trailers or buildings shall be in good condition, free from visible damage rust and deterioration, and meet all applicable safety requirements. Trailers shall be roadworthy and comply with all appropriate state and local vehicle requirements. Failure to maintain storage trailers or buildings to these standards may result in the removal of non-complying units at the Contractor's expense. A sign not smaller than 600 by 600 mm 24 by 24 inches shall be conspicuously placed on the trailer depicting the company name, business phone number, and emergency phone number. Trailers must be anchored to resist high winds and must meet applicable state or local standards for anchoring mobile trailers. Coordinate anchoring with EM 385-1-1 Section 04.

3.5.7 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, and will be traversed with construction equipment or other vehicles, 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. 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.
- b. Cut grass (or annual weeds) within the construction and storage sites to a maximum 4 inch height at least once a week during the growing season, whether or not area is visible to the public to assist in rodent control. Trim the grass around fences at time of grass cutting. Maintain grass or weeds on stockpiled earth as described above.

3.5.8 Security Provisions

Provide adequate outside security lighting at the temporary facilities. The Contractor will be responsible for the security of its own equipment.

3.5.11 Storage Size and Location

The open site available for storage must be confined to the indicated operations area within 1,000 feet of the operations area or as indicated.

3.5.13 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.

3.5.13.1 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.

3.6 PLANT COMMUNICATIONS

Whenever the individual elements of the plant are located so that operation by normal voice between these elements is not satisfactory, install a satisfactory means of communication, such as telephone or other suitable devices and make available for use by Government personnel.

3.7 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, remove from the work site.

3.8 DUMPSTERS

Equip dumpsters with a secure cover and paint the standard installation color. Keep dumpster closed, 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 installation color to collect debris in the construction site area. For large demolitions, large dumpsters without lids are acceptable, but must not have debris higher than the sides before emptying.

3.9 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.

3.10 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. Restore areas used during the performance of the contract to the original or better condition. Remove gravel used to traverse grassed areas and restore the area to its original condition, including top soil and seeding as necessary.

End of Section

SECTION 01 55 00

FINAL FACILITY CLEANING

1. PART 1 GENERAL

1.1. SUMMARY

- 1.1.1. Section Includes: Contract closeout requirements including:
 - 1.1.1.1. Final cleaning.

1.2. FINAL CLEANING

- 1.2.1. Perform final cleaning prior to inspections for final acceptance.
- 1.2.2. Use cleaning materials which are recommended by manufacturers of surfaces to be cleaned.
- 1.2.3. Prevent scratching or otherwise damaging surfaces being cleaned.
- 1.2.4. Broom clean exterior paved surfaces and rake clean other surfaces of site work.
 - 1.2.4.1. Armory yards and grounds to clean be kept clean and weeds abated.
- 1.2.5. Clean grease, mastic, adhesives, dust, dirt, stains, fingerprints, paint, blemishes, sealants, plaster, concrete, and other foreign materials from sight-exposed surfaces, and fixtures and equipment.
- 1.2.6. Remove non-permanent protection and labels.

1.3. WASTE DISPOSAL

- 1.3.1. Arrange for and dispose of surplus materials, waste products, and debris off-site.
 - 1.3.1.1. Prior to making disposal on private property, obtain written permission from Facility Representative of such property.
- 1.3.2. Do not create unsightly or unsanitary nuisances during disposal operations.
- 1.3.3. Maintain disposal site in safe condition and good appearance.
- 1.3.4. Complete leveling and cleanup prior to final acceptance of the Work.

1.4. TOUCH-UP AND REPAIR

- 1.4.1. Touch-up or repair finished surfaces on equipment, fixtures, and installations that have been damaged prior to inspection for final acceptance.

2. PART 2 PRODUCTS

Not Used.

3. PART 3 EXECUTION

Not Used.

4. END OF SECTION

SECTION 01 60 00

PRODUCT REQUIREMENTS

PART 1 GENERAL

.1 SECTION INCLUDES

- A. Products.
- B. Transportation and handling.
- C. Storage and protection.
- D. Product options.
- E. Substitutions.

.2 RELATED SECTIONS

- A. Document - Instructions to Bidders: Product options and substitution procedures.
- B. Section 01 11 00 - Summary.
- C. Section 01 33 00 - Submittals.
- D. Section 01 65 00 – Product Delivery Requirements for Substitution Provisions.

.3 PRODUCTS

- A. Products: Means new material, machinery, components, equipment, fixtures, and systems forming the Work. Products do not include machinery and equipment used for preparation, fabrication, conveying and erection of the Work. Products may also include existing materials or components required for reuse.
- B. Do not use materials and equipment removed from existing premises, except as specifically permitted by the Contract Documents.
- C. Provide interchangeable components of the same manufacturer for similar components or details.
- D. All products shall comply with the Buy America Act. Federal Acquisition Regulation Title 48 Section 52-225-11.
- E. All products and materials shall be delivered to job-site in new, dry, unopened containers, clearly showing catalog number, product description, where and by whom manufactured, in quantities sufficient to ensure continuous work.

.4 TRANSPORTATION AND HANDLING

- A. Transport and handle products in accordance with the manufacturer's instructions.
- B. Promptly inspect shipments to ensure that products comply with requirements, quantities are correct, and products are undamaged.
- C. Provide equipment and personnel to handle products by methods to prevent soiling, disfigurement, or damage.

.5 STORAGE AND PROTECTION

- A. Store and protect products in accordance with manufacturer's instructions, with seals and labels intact and legible. Store sensitive products in weather-tight, climate-controlled enclosures.
- B. Assure that materials are kept clean, and away from excessive heat and cold; do not remove labels or tear off protective covering until ready for application; store in an enclosed area where temperature is above 50 degrees and below 90 degrees Fahrenheit, securely tied with rope. Material shall not be stored directly on the ground.
- C. For exterior storage of fabricated products, place on sloped supports, above ground.
- D. Provide off-site storage and protection when the site does not permit on-site storage or protection.
- E. Cover products subject to deterioration with impervious sheet covering. Provide ventilation to avoid condensation.
- F. Provide equipment and personnel to store products by methods to prevent soiling, disfigurement, or damage.
- G. Arrange storage of products to permit access for inspection. Periodically inspect to ensure products are undamaged and are maintained under specified conditions.
- H. Maintain aisle space between stacks to facilitate fire suppression if necessary.

I.6 PRODUCT OPTIONS

- A. Products Specified by Reference Standards or by Description Only: Any product meeting those standards or description.
- B. Products Specified by Naming One or More Manufacturers: Products of manufacturers named and meeting specifications, no options or substitutions allowed.

I.7 SUBSTITUTIONS

- A. Instructions to Bidders specify time restrictions for submitting requests for Substitutions during the bidding period.
- B. Contract Manager will consider requests for Substitutions only within 15 days after date of Contract Agreement.
- C. Substitutions may be considered when a product becomes unavailable through no fault of the Contractor.
- D. Document each request with complete data substantiating compliance of proposed Substitution with Contract Documents.
- E. A request constitutes a representation that the Contractor:
 - 1. Has investigated the proposed product and determined that it meets or exceeds the quality level of the specified product.
 - 2. Will provide the same warranty for the Substitution as for the specified product.
 - 3. Will coordinate installation and make changes to other Work which may be required for the Work to be complete with no additional cost to the Government.
 - 4. Waives claims for additional costs or time extension which may subsequently become apparent.
- F. Substitutions will not be considered when they are indicated or implied on shop drawing or product data submittals, without separate written request, or when acceptance will require revision to the Contract Documents.
- G. Substitution Submittal Procedure:
 - 1. Submit three copies of request for Substitution for consideration. Refer to 01 65 00 for substitution procedures.

PART 2 PRODUCTS

Not Used

PART 3 EXECUTION

Not Used

END OF SECTION

01 60 00 -3

SECTION 01 65 00

PRODUCT DELIVERY REQUIREMENTS

1. GENERAL

1.1. SUMMARY

1.1.1. A.Section Includes

- 1.1.1.1. Products.
- 1.1.1.2. Transportation and Handling.
- 1.1.1.3. Product Options.
- 1.1.1.4. Substitutions.

1.1.2. Related Sections

- 1.1.2.1. Section 01 11 00 - Summary of Work.
- 1.1.2.2. Section 01 33 00 - Submittals

1.2. PRODUCTS

- 1.2.1. Products: For the purpose of this Section, products mean new material, machinery, components, equipment, fixtures, and systems forming the Work. It does not include machinery and equipment used for preparation, fabrication, conveying and erection of the Work. Products may also include existing materials or components required for reuse.

1.3. TRANSPORTATION AND HANDLING

- 1.3.1. Transport and handle products in accordance with manufacturer's instructions; provide equipment and personnel to handle products by methods to preserve quality, appearance, and suitability for the project.

1.4. PRODUCT OPTIONS

- 1.4.1. Products Specified by Reference Standards or by Description Only: Any product meeting those standards or description.
- 1.4.2. Products Specified by Naming One or More Manufacturers: Products of manufacturers named and meeting specifications or accepted substitutes. Provide a minimum of three selections.

1.5. SUBSTITUTIONS

- 1.5.1. Submit in writing, within the time limit set forth in General Conditions, on form provided as 01 65 00 - Attachment A, Notice of Request for Substitution. Notice of Request for Substitution shall include complete data substantiating compliance of proposed substitution with Contract.

1.5.2. A request constitutes a representation that the Contractor:

- 1.5.2.1. Has investigated proposed substitution and determined that it meets or exceeds the quality level required to achieve operating efficiency and effectiveness of the specified material, product, thing, or service.
- 1.5.2.2. Will provide the same warranty for the substitution as for the specified material, product, thing, or service.
- 1.5.2.3. Will coordinate installation and make changes to other Work which may be required for the Work to be complete with no additional cost to State.
- 1.5.2.4. Waives claims for additional costs or time extension which may subsequently become apparent.
- 1.5.2.5. Will reimburse State for review or redesign services associated with proposed substitutions.

1.5.3. Substitution Submittal Procedure:

- 1.5.3.1. Limit each request to one proposed substitution.
- 1.5.3.2. Submit shop drawings, product data, and certified test results attesting to the proposed equivalence.
- 1.5.3.3. Facility Representative will notify Contractor, in writing, of decision to approve or reject request.

1.5.4. After approval of Notice of Request for Substitution, submit required submittals under provisions of Sections 01 33 00.

2. PRODUCTS - NOT USED

3. EXECUTION - NOT USED

END OF SECTION

SECTION 01 65 00 - ATTACHMENT A

NOTICE OF REQUEST FOR SUBSTITUTION

Substitution Request: _____

In accordance with the Conditions of the Contract and the provisions of Section 01 65 00, we hereby submit for consideration, this Notice of Request for Substitution for the following material, product, thing, or service:

Section	Paragraph	Specified Item
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Proposed Substitution: _____

The following supporting information is attached:

- ☐ Product Data including model numbers and descriptions.
- ☐ Certified test results attesting to equivalence.
- ☐ Product/material samples.
- ☐ Other:

Reason for proposed substitution:

- ☐ Specified or indicated item is unavailable.
- ☐ Significant cost reduction. Amount to be credited to the Department: \$ _____
- ☐ Significant quality difference without cost change.
- ☐ Other: _____

Submitted and Certified By:

CONTRACTOR:

Signature	Date
-----------	------

Name (Print)	Title
--------------	-------

Firm Name

Address	Phone
---------	-------

City, State, Zip	FAX
------------------	-----

Received: _____
Date _____ CMD Representative _____

☐ Approved: _____
☐ Rejected: _____ Date _____ CMD Representative _____

END OF SECTION 01 65 00 - ATTACHMENT A

01 65 00 Attachment A

SECTION 01 70 00
CONTRACT CLOSEOUT

PART 1 GENERAL

1 SECTION INCLUDES

- A. Closeout procedures.
- B. Final cleaning.
- C. Adjusting.
- D. Project record documents.

2 CLOSEOUT PROCEDURES

- A. Submit written certification that Contract Documents have been reviewed, Work has been inspected and accepted, and that Work is complete in accordance with Contract Documents and ready for inspection.
- B. Comply with requirements of specification sections 01 11 00 and 01 33 00.
- C. Provide warranty certificates to Contract Manager.
- D. Submit final Application for Payment to the Contract Manager identifying total adjusted Contract Sum, previous payments, and sum remaining due.
- E. The Contract Manager and/or their representatives shall conduct a final inspection within 14 days of receipt of a written request from the Contractor for final inspection.
- F. A corrective notice (i.e. punch list) will be developed during the final inspection. All items noted on the corrective must be complete prior to the job being accepted by the project manager.

3 ADJUSTING

Adjust operating Products and equipment to ensure smooth, proper operation.

4 PROJECT RECORD DOCUMENTS

- A. Maintain on site, one set of the following record documents; record actual revisions to the Work:
 - 1. Project Drawings.
 - 2. Specifications.
 - 3. Change Orders and other Modifications to the Contract.
 - 4. Reviewed shop drawings, product data, and samples.

5. Manufacturer's Warranty Certificate(s).
- B. Store Record Documents separate from documents used for construction.
 - C. Record information concurrent with construction progress.
 - D. Specifications: Legibly mark and record at each Product section description of actual Products installed, including the following:
 1. Manufacturer's name and product model and number.
 2. Product substitutions or alternates utilized.
 3. Changes made by Addenda and Modifications.
 - E. Record Documents and Shop Drawings: Legibly mark each item to record actual construction including:
 1. Field changes of dimension and detail.
 2. Details not on original Contract Drawings.
 3. Submit prior to final inspection, one (1) set bound in 8-1/2 x 11-inch text pages, 3-D side ring binder and one (1) set of identical documentation in electronic (.pdf) format.
 4. Internally subdivide the binder contents with page dividers, logically organized, and tabbed to identify contents of binder.
 5. Part 1: Directory, listing names, addresses, and telephone numbers of Contractor, and Subcontractors.
 6. Part 2: Project documents and certificates, including the following:
 7. Part 3: Requests for Information (RFI) log and copies of all signed RFIs
 8. Part 4: Submittal log and copies all approved submittals.
 9. Warranty certificates.
 - F. Submit one hard copy and one electronic copy of completed volume in final form seven (7) days prior to final inspection. Revise as required prior to final contract close out per CM directions.
 - G. Submit final revised hardcopy and electronic volumes within ten (10) days after final inspection and prior to release of final payment.

PART 2 PRODUCTS

Not Used

PART 3 EXECUTION

Not Used

END OF SECTION

SECTION 01 74 19

CONSTRUCTION WASTE MANAGEMENT AND DISPOSAL

GENERAL

1.1 SUMMARY

- A. Section includes
 - 1. Administrative and procedural requirements for the following:
 - a. Salvaging nonhazardous demolition and construction waste.
 - b. Recycling nonhazardous demolition and construction waste.
 - c. Disposing of nonhazardous demolition and construction waste.
- B. Related Sections
 - 1. Section 01 30 00 – Administrative Requirements.
 - 2. Section 02 41 00 - Demolition.

1.2 REFERENCES

- A. ASTM E1609- 2010 - Standard Guide for Development and Implementation of a Pollution Prevention Program.

1.3 DEFINITIONS

- A. Class III Landfill: A landfill that accepts non-hazardous waste such as household, commercial, and industrial waste, including construction, remodeling, repair, and demolition operations.
- B. Chemical Waste: Includes petroleum products, bituminous materials, salts, acids, alkalis, herbicides, pesticides, organic chemicals and inorganic wastes, and other similar materials.
- C. Clean: Untreated and unpainted; not contaminated with oils, solvents, caulk, or similar.
- D. Construction Waste: Building and site improvement materials and other solid waste resulting from construction, remodeling, renovation, or repair operations. Construction waste includes packaging.
- E. Debris: Includes both combustible and noncombustible wastes, such as leaves and tree trimmings that result from construction or maintenance and repair work, and other similar materials.
- F. Deconstruction: The process of removing existing building materials from renovation and demolition projects for the purposes of reuse and recycling in as an efficient and safe manner as possible.
- G. Demolition Waste: Building and site improvement materials resulting from demolition or selective demolition operations.
- H. Disposal: Removal off-site of demolition and construction waste and subsequent sale, recycling, reuse, or deposit in landfill or incinerator acceptable to authorities having jurisdiction.
- I. Divert: Using material for any purpose other than disposal in a landfill.
- J. Inert Fill: A permitted facility that accepts inert waste such as asphalt and concrete exclusively.
- K. Recycle: Recovery of demolition or construction waste for subsequent processing in preparation for reuse.
- L. Rubbish: Includes both combustible and noncombustible wastes, such as paper, boxes, glass, crockery, metal and lumber scrap, tin cans, bones, and other similar materials.

- M. Salvage: Recovery of demolition or construction waste and subsequent sale or reuse in another facility.
- N. Salvage and Reuse: Recovery of demolition or construction waste and subsequent incorporation into the Work.
- O. Sanitary Wastes
 - 1. Garbage: Refuse and scraps resulting from preparation, cooking, distribution, or consumption of food, or other similar materials.
 - 2. Sewage: Domestic sanitary sewage.

1.4 PERFORMANCE REQUIREMENTS

General: Achieve end-of-Project rates for salvage/recycling of a minimum of 75 percent by weight of total non-hazardous solid waste generated by the Work. Practice efficient waste management in the use of materials in the course of the Work. Use all reasonable means to divert construction and demolition waste from landfills and incinerators. Facilitate recycling and salvage of materials. Materials, including the following:

Demolition Waste

- a. Wood studs.
 - b. Wood joists.
 - c. Plywood and oriented strand board.
 - d. Wood trim.
 - e. Structural and miscellaneous steel.
 - f. Rough hardware.
 - g. Roofing.
 - h. Insulation (including fiberglass, rigid polystyrene but excluding polyisocyanurate).
 - i. Metal studs.
 - j. Gypsum board.
 - k. Acoustical tile and panels.
2. Construction Waste
- a. Untreated lumber.
 - b. Wood sheet materials (plywood, oriented strand board, and medium density fiberboard).
 - c. Wood trim.
 - d. Metals.
 - e. Roofing.
 - f. Insulation (including fiberglass, rigid polystyrene but excluding polyisocyanurate).
 - g. Packaging: Regardless of salvage/recycle goal indicated above, salvage or recycle 100 percent of the following uncontaminated packaging materials:
 - 1) Paper.
 - 2) Cardboard.
 - 3) Boxes.
 - 4) Plastic sheet and film.
 - 5) Polystyrene packaging.
 - 6) Wood crates and pallets.
 - 7) Plastic pails.
 - 8) Beverage containers.

1.5 ACTION SUBMITTALS

- A. Construction Waste Management Plan (CWMP): Submit 1 copy of plan within 30 calendar days of date of the Notice to Proceed and prior to any waste removal.

1.6 INFORMATIONAL SUBMITTALS

Records of Donations: Indicate receipt and acceptance of salvageable waste donated to individuals and organizations. Indicate whether organization is tax exempt.

- B. Records of Sales: Indicate receipt and acceptance of salvageable waste sold to individuals and organizations. Indicate whether organization is tax exempt.
- C. Recycling and Processing Facility Records: Indicate receipt and acceptance of recyclable waste by recycling and processing facilities licensed to accept them. Include manifests, weight tickets, receipts, and invoices.
- D. Landfill and Incinerator Disposal Records: Indicate receipt and acceptance of waste by landfills and incinerator facilities licensed to accept them. Include manifests, weight tickets, receipts, and invoices.

Qualification Data: For waste management coordinator.

1.7 QUALITY ASSURANCE

Facility representative will act as a waste coordinator.

- B. Regulatory Requirements: Comply with hauling and disposal regulations of authorities having jurisdiction.

Waste Management Review: Conduct review at Project Site in accordance with Section 01 30 00". Review methods and procedures related to waste management including, but not limited to, the following:

Review and discuss CWMP including responsibilities of waste management coordinator.

- 2. Review requirements for documenting quantities of each type of waste and its disposition.
- 3. Review and finalize procedures for materials separation and verify availability of containers and bins needed to avoid delays.
- 4. Review procedures for periodic waste collection and transportation to recycling and disposal facilities.
- 5. Review waste management requirements for each trade.

1.8 CONSTRUCTION WASTE MANAGEMENT PLAN (CWMP)

General: Develop a CWMP according to ASTM E1609 and requirements of this Section. Plan shall consist of waste identification, and waste reduction work plan. Distinguish between demolition and construction waste.

- B. Waste Identification: Indicate anticipated types and quantities of demolition construction waste generated by the Work. Use Include estimated quantities and assumptions for estimates.
- C. Waste Reduction Work Plan: List each type of waste and whether it will be salvaged, recycled, or disposed of in landfill or incinerator. Include points of waste generation, total quantity of each type of waste, quantity for each means of recovery, and handling and transportation procedures.

1. Salvaged Materials for Reuse: For materials that will be salvaged and reused in this Project, describe methods for preparing salvaged materials before incorporation into the Work.
 2. Salvaged Materials for Sale: For materials that will be sold to individuals and organizations, include list of their names, addresses, and telephone numbers.
- Salvaged Materials for Donation: For materials that will be donated to individuals and organizations, include list of their names, addresses, and telephone numbers.
4. Recycled Materials: Include list of local receivers and processors and type of recycled materials each will accept. Include names, addresses, and telephone numbers.
 5. Disposed Materials: Indicate how and where materials will be disposed of. Include name, address, telephone number, and a copy of the permit or license of each landfill and incinerator facility. The permit or license shall indicate the type or class of waste accepted.
 6. Handling and Transportation Procedures: Include method that will be used for separating recyclable waste including sizes of containers, container labeling, and designated location on Project Site where materials separation will be located.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION

3.1 PLAN IMPLEMENTATION

- A. General: Implement the approved CWMP. Provide handling, containers, storage, signage, transportation, and other items as required to implement the CWMP during the entire duration of the Contract.
 1. Comply with Section 01 50 00 "for operation, termination, and removal requirements.
- Waste Management Coordinator: Engage a waste management coordinator to be responsible for implementing, monitoring, and reporting status of the CWMP.
- C. Training: Train workers, subcontractors, and suppliers on proper waste management procedures as appropriate for the Work occurring at Project site.
 1. Distribute the CWMP to Project Manager within 10 working days of submittal return.
 2. Distribute the CWMP to entities when they first begin work on site. Review the CWMP procedures and locations established for salvage, recycling, and disposal.
 3. Provide information and training updates throughout the construction process as needed to facilitate understanding and participation.
 - D. Site Access and Temporary Controls: Conduct waste management operations to ensure minimum interference with roads, streets, walks, walkways, and other adjacent occupied and used facilities.
 1. Designate and label specific areas on Project Site necessary for separating materials that are to be salvaged, recycled, reused, donated, and sold.
 2. Comply with Section 01 50 00 "for controlling dust and dirt, environmental protection, and noise control.

3.2 SALVAGING DEMOLITION WASTE

- A. Salvaged Items for Reuse in the Work: Salvage items for reuse and handle as follows:
 1. Clean salvaged items.
 2. Pack or crate items after cleaning. Identify contents of containers.
 3. Store items in a secure area until installation.
 4. Protect items from damage during transport and storage.

5. Install salvaged items to comply with installation requirements for new materials and equipment. Provide connections, supports, and miscellaneous materials necessary to make items functional for use indicated.
- B. Salvaged Items for Sale and Donation: Not permitted on Project Site.
- C. Salvaged Items for Facility's Use:
 1. Clean salvaged items.
 2. Pack or crate items after cleaning. Identify contents of containers.
 3. Store items in a secure area until delivery to Facility.
 4. Transport items to Facility's storage area on-site designated by Facility Representative.
 5. Protect items from damage during transport and storage.

RECYCLING DEMOLITION AND CONSTRUCTION WASTE, GENERAL

A. General: Recycle paper and beverage containers used by on-site workers.
 Recycling Incentives: Revenues, savings, rebates, tax credits, and other incentives received for recycling waste materials shall accrue to Contractor.

- C. Preparation of Waste: Prepare and maintain recyclable waste materials according to recycling or reuse facility requirements. Maintain materials free of dirt, adhesives, solvents, petroleum contamination, and other substances deleterious to the recycling process.

Procedures: Separate recyclable waste from other waste materials, trash, and debris. Locate containers and/or bins in areas designated in the CWMP. Separate recyclable waste by type at Project site to the maximum extent practical according to the approved CWMP.

1. Provide appropriately marked containers or bins for controlling recyclable waste until they are removed from Project Site. Include list of acceptable and unacceptable materials at each container and bin.
 - a. Inspect containers and bins for contamination and remove contaminated materials if found.
2. Stockpile processed materials on-site without intermixing with other materials. Place, grade, and shape stockpiles to drain surface water. Cover to prevent windblown dust.
3. Stockpile materials away from construction area. Do not store within drip line of remaining trees.
4. Store components off the ground and protect from the weather.
5. Remove recyclable waste off Facility property and transport to recycling receiver or processor.

3.4 RECYCLING DEMOLITION WASTE

Wood Materials: Sort and stack members according to type. Separate lumber, engineered wood products, panel products, and treated wood materials.

- B. Metals: Separate metals by type.
 1. Structural Steel: Stack members according to size, type of member, and length.
 2. Remove and dispose of bolts, nuts, washers, and other rough hardware.
- C. Roofing: Separate organic and glass-fiber asphalt shingles and felts. Remove and dispose of nails, staples, and accessories.

- D. Acoustical Ceiling Panels and Tile: Stack large clean pieces on wood pallets and store in a dry location if quantity warrants it.

3.5 RECYCLING CONSTRUCTION WASTE

Packaging

1. Cardboard and Boxes: Break down packaging into flat sheets. Bundle and store in a dry location.
 2. Polystyrene Packaging: Separate and bag materials.
 3. Pallets: As much as possible, require deliveries using pallets to remove pallets from Project site. For pallets that remain on-site, break down pallets into component wood pieces and comply with requirements for recycling wood.
 4. Crates: Break down crates into component wood pieces and comply with requirements for recycling wood.
- B. Wood Materials
1. Clean Cut-Offs of Lumber: Stack by size.
 2. Clean Sawdust: Bag sawdust that does not contain painted or treated wood.

DISPOSAL OF WASTE

General: Except for items or materials to be salvaged, recycled, or otherwise reused, remove waste materials from Project Site and legally dispose of them in a landfill or incinerator acceptable to authorities having jurisdiction.

1. Except as otherwise specified, do not allow waste materials that are to be disposed of accumulate on-site.
 2. Remove and transport debris in a manner that will prevent spillage on adjacent surfaces and areas.
- B. Burning: Do not burn waste materials.

Disposal: Transport waste materials off Facility property and legally dispose of them.

END OF SECTION

SECTION 01 78 00

CLOSE-OUT SUBMITTALS

GENERAL

1.1 SUMMARY

- A. Section includes
 - 1. Close-out submittals, including as-builts; record drawings, specifications, and product data; and warranties.
- B. Related Sections
 - 1. 01 33 00 - Submittals
 - 2. Divisions 2 through 44 Sections for specific requirements of the Work in those Sections.

1.2 ITEMS SUBMITTED TO ARCHITECT FOR REVIEW PRIOR TO DISTRIBUTION TO FACILITY REPRESENTATIVE:

- A. Marked-up copies of Contract Drawings.
- B. Newly prepared Drawings.
- C. Marked-up copies of Specifications, addenda and Change Orders.
- D. Record information on Work that is recorded only schematically, when part of record documents.
- E. Complete set of RFI's.

1.3 ITEMS DELIVERED DIRECTLY TO CONTRACT MANAGER:

- A. Orders (Construction Change Directives).
- B. Marked-up copies of Shop Drawings.
- C. Marked-up Product Data submittals.
- D. Record Samples.
- E. Field records for variable and concealed conditions.
- F. Copies of change orders, submittal, substitutions, warranties and other forms that are part of this Project.

1.4 SUBMITTALS

- A. Record Drawings: Comply with the following:
 - 1. Review required content with CA Military Dept. prior to submittal.
 - 2. Completed Submittal: Submit one set of marked-up Record Prints

- B. Record Specifications: Submit one copy of Project's Specifications, including addenda and contract modifications.
- C. Record Product Data: Submit one copy of each Product Data submittal. Where Record Product Data is required as part of operation and maintenance manuals, submit marked-up Product Data as an insert in manual instead of submittal as Record Product Data.

1.5 WARRANTIES

- A. Submittal Time: Submit written warranties on request of Architect for designated portions of the Work where commencement of warranties other than date of Substantial Completion is indicated.
- B. Partial Occupancy: Submit properly executed warranties within [15] days of completion of designated portions of the Work that are completed and occupied or used by CA Military Dept. during construction period by separate agreement with Contractor.
- C. Organize warranty documents into an orderly sequence based on the table of contents of the project manual.
 - 1. Bind warranties and bonds in heavy-duty, 3-ring, vinyl-covered, loose-leaf binders, thickness as necessary to accommodate contents, and sized to receive 8-1/2 x 11-inch documents.
 - 2. Provide heavy paper dividers with plastic-covered tabs for each separate warranty. Mark tab to identify the product or installation. Provide a typed description of the product or installation, including the name of the product and the name, address, and telephone number of Installer.
 - 3. Identify each binder on the front and spine with the type or printed title "WARRANTIES", Project name, and name of Contractor.

PART 2 PRODUCTS

2.1 RECORD DRAWINGS

- A. Record Prints: Maintain one set of blue- or black-line white prints of the Contract Drawings and Shop Drawings.
 - 1. Preparation: Mark Record Prints to show the actual installation where installation varies from that shown originally. Require individual or entity who obtained record data, whether individual or entity is Installer, subcontractor, or similar entity, to prepare the marked-up Record Prints.
 - a. Give particular attention to information on concealed elements that would be difficult to identify or measure and record later.
 - b. Accurately record information in an understandable drawing technique.
 - c. Record data as soon as possible after obtaining it. Record and check the markup before enclosing concealed installations.
 - 2. Content: Types of items requiring marking include, but are not limited to, the following:
 - a. Dimensional changes to Drawings.
 - b. Revisions to details shown on Drawings.
 - c. Changes made by Change Order or Construction Change Directive.
 - d. Changes made following Architect's written orders.

- e. Details not on the original Contract Drawings.
 - f. Field records for variable and concealed conditions.
 - g. Record information on the Work that is shown only schematically.
 - 3. Mark the Contract Drawings or Shop Drawings, whichever is most capable of showing actual physical conditions, completely and accurately. If Shop Drawings are marked, show cross-reference on the Contract Drawings.
 - 4. Mark record sets with erasable, red-colored pencil. Use other colors to distinguish between changes for different categories of the Work at same location.
 - 5. Mark important additional information that was either shown schematically or omitted from original Drawings.
 - 6. Note Construction Change Directive numbers, alternate numbers, Change Order numbers, and similar identification, where applicable.
 - 7. Accompany submittal with certification that each document submitted is complete and accurate.
- B. Record Prints: Provide one set of Drawings.
- C. Newly Prepared Record Drawings: Prepare new Drawings instead of preparing Record Drawings where A/E determines that neither the original Contract Drawings nor Shop Drawings are suitable to show actual installation.
- 1. New Drawings may be required when a Change Order is issued as a result of accepting an alternate, substitution, or other modification.
 - 2. Consult A/E for proper scale and scope of detailing and notations required to record the actual physical installation and its relation to other construction. Integrate newly prepared Record Drawings into Record Drawing sets; comply with procedures for formatting, organizing, copying, binding, and submitting.
- D. Format: Identify and date each Record Drawing; include the designation "PROJECT RECORD DRAWING" in a prominent location.
- 1. Record Prints: Organize Record Prints and newly prepared Record Drawings into manageable sets. Bind each set with durable paper cover sheets. Include identification on cover sheets.
 - 2. Identification: As follows:
 - a. Project name.
 - b. Date.
 - c. Designation "PROJECT RECORD DRAWINGS."
 - d. Name of Architect and Construction Manager.
 - e. Name of Contractor.

2.2 RECORD SPECIFICATIONS

- A. Preparation: Mark specifications to indicate the actual product installation where installation varies from that indicated in Specifications, addenda, and contract modifications. Information shall be sufficient for Owner's personnel to maintain facility.
- 1. Give particular attention to information on concealed products and installations that cannot be readily identified and recorded later.
 - 2. Mark copy with the proprietary name and model number of products, materials, and equipment furnished, including substitutions and product options selected.
 - 3. Record the name of manufacturer, supplier, Installer, and other information necessary to provide a record of selections made.
 - 4. For each principal product, indicate whether Record Product Data has been submitted in operation and maintenance manuals instead of submitted as Record Product Data.

5. Note related Change Orders, Record Product Data, and Record Drawings where applicable.

2.3 RECORD PRODUCT DATA

- A. Preparation: Mark Product Data to indicate the actual product installation where installation varies substantially from that indicated in Product Data submittal.
 1. Give particular attention to information on concealed products and installations that cannot be readily identified and recorded later.
 2. Include significant changes in the product delivered to Project site and changes in manufacturer's written instructions for installation.
 3. Note related Change Orders, Record Specifications, and Record Drawings where applicable.

2.4 MISCELLANEOUS RECORD SUBMITTALS

- A. Assemble miscellaneous records required by other Specification Sections for miscellaneous record keeping and submittal in connection with actual performance of the Work. Bind or file miscellaneous records and identify each, ready for continued use and reference.

PART 3 EXECUTION

3.1 RECORDING AND MAINTENANCE

- A. Recording: Maintain one copy of each submittal during the construction period for Project Record Document purposes. Post changes and modifications to Project Record Documents as they occur; do not wait until the end of Project.
- B. Maintenance of Record Documents and Samples: Store Record Documents and Samples in the field office apart from the Contract Documents used for construction. Do not use Project Record Documents for construction purposes. Maintain Record Documents in good order and in a clean, dry, legible condition, protected from deterioration and loss. Provide access to Project Record Documents for Architect's and Construction Project Manager's reference during normal working hours.

END OF SECTION

SECTION 02 41 00

DEMOLITION

PART 1 GENERAL

1.1 REFERENCES

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

AIR-CONDITIONING, HEATING AND REFRIGERATION INSTITUTE (AHRI)

AHRI Guideline K

(2009) Guideline for Containers for Recovered Non-Flammable Fluorocarbon Refrigerants

AMERICAN SOCIETY OF SAFETY PROFESSIONALS (ASSP)

ASSP A10.6

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

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

40 CFR 61

National Emission Standards for Hazardous Air Pollutants

40 CFR 82

Protection of Stratospheric Ozone

49 CFR 173.301

Shipment of Compressed Gases in Cylinders and Spherical Pressure Vessels

SAFETY AND OCCUPATIONAL HEALTH REQUIREMENTS

29 CFR 1910

Safety and Health Regulation in General Industry

29 CFR 1926

Safety and Health Regulations for Construction

1.2 PROJECT DESCRIPTION

1.2.1 Definitions

1.2.1.1 Demolition

Demolition is the process of wrecking or taking out any load-supporting structural member of a facility together with any related handling and disposal operations.

1.2.1.2 Deconstruction

Deconstruction is the process of taking apart a facility with the primary goal of preserving the value of all useful building materials.

1.2.1.3 Demolition Plan

Demolition Plan is the planned steps and processes for managing demolition activities and identifying the required sequencing activities and disposal mechanisms.

1.2.1.4 Deconstruction Plan

Deconstruction Plan is the planned steps and processes for dismantling all or portions of a structure or assembly, to include managing sequencing activities, storage, re-installation activities, salvage, and disposal mechanisms.

1.2.2 Demolition/Deconstruction Plan

Prepare a salvage and removal procedures plan for approval before work is started. Include in the plan procedures for careful removal and disposition of materials specified to be salvaged. A disconnection schedule of building power. 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 in accordance with Section 01 74 19 construction waste management and disposal. Include statements affirming Contractor inspection of the existing roof deck and its suitability to perform as a safe working platform or if inspection reveals a safety hazard to workers, state provisions for securing the safety of the workers throughout the performance of the work. Plan shall be approved by Project Manager prior to work beginning.

1.2.3 General Requirements

Do not begin demolition or deconstruction until authorization is received from the Project Manager. 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 the building or on airfield pavements. The work includes demolition and salvage of identified items and materials, and removal of resulting rubbish and debris. Remove rubbish and debris from Government property daily, unless otherwise directed. Store materials that cannot be removed daily in areas specified by the Project Manager. In the interest of occupational safety and health, perform the work in accordance with OSHA requirements.

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 Project Manager. Coordinate the work of this section with all other work indicated. Construct and maintain shoring, bracing, and supports as required. Ensure that structural elements are not overloaded. Increase structural supports or add new supports as may be required as a result of any cutting, removal, deconstruction, or demolition work performed under this contract. Do not overload [structural elements] [pavements to remain]. Provide new supports and reinforcement for existing construction weakened by demolition, deconstruction, or removal work. Repairs, reinforcement, or structural replacement require approval by the Project Manager prior to performing such work.

1.3.1 Existing Construction Limits and Protection

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

1.3.2 Weather Protection

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

1.3.3 Trees

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

1.3.4 Utility Service

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

1.3.5 Facilities

Protect electrical and mechanical services and utilities. Where removal of existing utilities and pavement is specified or indicated, provide approved barricades, temporary covering of exposed areas, and temporary services or connections for electrical and mechanical utilities. Floors, roofs, walls, columns, pilasters, and other structural components that are designed and constructed to stand without lateral support or shoring, and are determined to be in stable condition, must remain standing without additional bracing, shoring, or lateral support until demolished or deconstructed, unless directed otherwise by the Project Manager.

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 SUBMITTALS

Government approval is required for all submittals with a "G" designation. 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-01 Preconstruction Submittals

Salvage and removal procedures; G

Closeout Submittals

Receipts

1.5 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 Project Manager in writing 10 working days prior to the commencement of work in accordance with 40 CFR 61, Subpart M. Comply with federal, state, and local hauling and disposal regulations. In addition to the requirements of the "Contract Clauses," conform to the safety requirements contained in ASSP A10.6.

1.5.1 Dust and Debris Control

Prevent the spread of dust and debris to occupied portions of the building and on airfield pavements and avoid the creation of a nuisance or hazard in the surrounding area. Do not use water if it results in hazardous or objectionable conditions such as, but not limited to, ice, flooding, or pollution. Vacuum and dust the work area daily. Sweep pavements as often as necessary to control the spread of debris that may result in foreign object damage potential to aircraft.

1.8 PROTECTION

1.8.1 Traffic Control Signs

- a. Where pedestrian and driver 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 Project Manager prior to beginning such work.

1.8.2 Protection of Personnel

Before, during and after the demolition work continuously evaluate the condition of the objects being demolished and take immediate action to protect all personnel working in and around the project site. No area, section, or component of floors, roofs, walls, columns, pilasters, or other structural element will be allowed to be left standing without sufficient bracing, shoring, or lateral support to prevent collapse or failure while workmen remove debris or perform other work in the immediate area.

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1.9 FOREIGN OBJECT DAMAGE (FOD) - Not Applicable

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 Project Manager 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.

1.10 RELOCATIONS

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

1.11 EXISTING CONDITIONS

Before beginning any demolition or deconstruction work, survey the site and examine the drawings and specifications to determine the extent of the work. Record existing conditions in the presence of the Project Manager 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.

PART 2 PRODUCTS - Not used

PART 3 EXECUTION

3.1 EXISTING FACILITIES TO BE REMOVED

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

3.1.1 Structures

- a. Demolish objects in a systematic manner from the top of the structure to the ground. Complete demolition work above each tier or floor before the supporting members on the lower level are disturbed. Demolish concrete and masonry walls in small sections. Remove structural framing members and lower to ground by means of derricks, platforms hoists, or other suitable methods as approved by the Project Manager.
- b. Locate demolition and deconstruction equipment throughout the structure and remove materials so as to not impose excessive loads to supporting walls, floors, or framing.

3.1.2 Utilities and Related Equipment

3.1.2.1 General Requirements

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

3.1.2.2 Disconnecting Existing Utilities

Remove existing utilities, as indicated and terminate in a manner conforming to the nationally recognized code covering the specific utility and approved by the Project Manager. When utility lines are encountered but are not indicated on the drawings, notify the Project Manager prior to further work in that area. Remove meters and related equipment and deliver to a location [on the station] in accordance with instructions of the Project Manager.

3.1.3 Roofing

Remove existing roof system and associated components in their entirety down to existing roof deck. Remove SBS roofing to effect the connections with new flashing or roofing. Cut membrane and insulation along straight lines. Remove roofing system and insulation without damaging the roof deck. Sequence work to minimize building exposure between demolition or deconstruction and new roof materials installation.

3.1.3.1 Temporary Roofing

Install temporary roofing and flashing as necessary to maintain a watertight condition throughout the course of the work. Remove temporary work prior to installation of permanent roof system materials unless approved otherwise by the Project Manager. If the existing deck and support structure is deteriorated, such that ability to support foot traffic and construction loads is unknown. Make provisions for worker safety during demolition and installation of new materials as described in paragraphs entitled "Statements" and "Regulatory and Safety Requirements."

3.1.3.2 Reroofing

When removing the existing roofing system from the roof deck, remove only as much roofing as can be recovered by the end of the work day, unless approved otherwise by the Project Manager. Do not attempt to open the roof covering system in threatening weather. Reseal all openings prior to suspension of work the same day.

3.1.6 Masonry

Sawcut and remove masonry so as to prevent damage to surfaces to remain, to removed materials being salvaged and to facilitate the installation of new work. Where new masonry adjoins existing, the new work shall abut or tie into the existing construction as specified for the new work. Provide square, straight edges and corners where existing masonry adjoins new work and other locations. Masonry removed in whole blocks shall be salvaged and stored for reuse.

3.1.7 Miscellaneous Metal

Salvage shop-fabricated items such as access doors and frames, steel gratings, metal ladders, wire mesh partitions, metal railings, metal windows and similar items as whole units. Salvage light-gage and cold-formed metal framing, such as steel studs, steel trusses, metal gutters, roofing and siding, metal toilet partitions, toilet accessories and similar items. [Scrap metal shall become the Contractor's property.] Recycle scrap metal as part of demolition and deconstruction operations. Provide separate containers to collect scrap metal and transport to a scrap metal collection or recycling facility, in accordance with the Waste Management Plan.

3.1.8 Carpentry

Salvage for recycle lumber, millwork items, and finished boards, and sort by type and size. Salvage [Remove] windows, doors, frames, and cabinets, and similar items as whole units, complete with trim and accessories. Do not remove hardware attached to units, except for door closers. Salvage hardware attached to units for reuse. Brace the open end of door frames to prevent damage.

3.1.9 Patching

Where removals leave holes and damaged surfaces exposed in the finished work, patch and repair these holes and damaged surfaces to match adjacent finished surfaces, using on-site materials when available. Where new work is to be applied to existing surfaces, perform removals and patching in a manner to produce surfaces suitable for receiving new work. Finished surfaces of patched area shall be flush with the adjacent existing surface and shall match the existing adjacent surface as closely as possible as to texture and finish. Patching shall be as specified and indicated, and shall include:

- a. Concrete and Masonry: Completely fill holes and depressions, [caused by previous physical damage or] left as a result of removals in existing masonry walls to remain, with an approved masonry patching material, applied in accordance with the manufacturer's printed instructions.
- b. Where existing partitions have been removed leaving damaged or missing resilient tile flooring, patch to match the existing floor tile.
- c. Patch acoustic lay-in ceiling where partitions have been removed. The transition between the different ceiling heights shall be effected by continuing the higher ceiling level over to the first runner on the lower ceiling and closing the vertical opening with a painted sheet metal strip.

3.1.10 Air Conditioning Equipment

Remove air conditioning, refrigeration, and other equipment containing refrigerants without releasing chlorofluorocarbon refrigerants to the atmosphere in accordance with the Clean Air Act Amendment of 1990. Recover all refrigerants prior to removing air conditioning, refrigeration, and other equipment containing refrigerants and dispose of in accordance with the paragraph entitled "Disposal of Ozone Depleting Substance (ODS)." Turn in salvaged Class I ODS refrigerants as specified in paragraph, "Salvaged Materials and Equipment."

3.1.11 Mechanical Equipment and Fixtures

Disconnect mechanical hardware at the nearest connection to existing services to remain, unless otherwise noted. Disconnect mechanical equipment and fixtures at fittings. Remove

service valves attached to the unit. Salvage each item of equipment and fixtures as a whole unit; listed, indexed, tagged, and stored. Salvage each unit with its normal operating auxiliary equipment. Transport salvaged equipment and fixtures, including motors and machines, to a designated [on station] storage area as directed by the Project Manager. Do not remove equipment until approved.

Remove water, dirt, dust, and foreign matter from units; tanks, piping and fixtures shall be drained; interiors, if previously used to store flammable, explosive, or other dangerous liquids, shall be steam cleaned. Seal openings with caps, plates, or plugs. Secure motors attached by flexible connections to the unit. Change lubricating systems with the proper oil or grease.

3.1.18.1 Piping

Disconnect piping at unions, flanges and valves, and fittings as required to reduce the pipe into straight lengths for practical storage. Store salvaged piping according to size and type. If the piping that remains can become pressurized due to upstream valve failure, end caps, blind flanges, or other types of plugs or fittings with a pressure gage and bleed valve shall be attached to the open end of the pipe to ensure positive leak control. Carefully dismantle piping that previously contained gas, gasoline, oil, or other dangerous fluids, with precautions taken to prevent injury to persons and property. Store piping outdoors until all fumes and residues are removed. Box prefabricated supports, hangers, plates, valves, and specialty items according to size and type. Wrap sprinkler heads individually in plastic bags before boxing. Classify piping not designated for salvage, or not reusable, as scrap metal.

3.1.18.2 Ducts

Classify removed duct work as scrap metal.

3.1.18.3 Fixtures, Motors and Machines

Remove and salvage fixtures, motors and machines associated with plumbing, heating, air conditioning, refrigeration, and other mechanical system installations. Salvage, box and store auxiliary units and accessories with the main motor and machines. Tag salvaged items for identification, storage, and protection from damage. Classify non-porcelain broken, damaged, or otherwise unserviceable units and not caused to be broken, damaged, or otherwise unserviceable as debris to be disposed of by the Contractor.

3.1.19 Electrical Equipment and Fixtures

Salvage motors, motor controllers, and operating and control equipment that are attached to the driven equipment. Salvage wiring systems and components. Box loose items and tag for identification. Disconnect primary, secondary, control, communication, and signal circuits at the point of attachment to their distribution system.

3.1.19.1 Fixtures

Remove and salvage electrical fixtures as indicated on the drawings. Salvage unprotected glassware from the fixture and salvage separately. Salvage incandescent, mercury-vapor, and fluorescent lamps and fluorescent ballasts manufactured prior to 1978, boxed and tagged for identification, and protected from breakage.

3.1.19.2 Electrical Devices

Remove and salvage switches, switchgear, transformers, conductors including wire and nonmetallic sheathed and flexible armored cable, regulators, meters, instruments, plates, circuit breakers, panelboards, outlet boxes, and similar items. Box and tag these items for identification according to type and size. Remove as indicated on the drawings

3.1.19.3 Wiring Ducts or Troughs

Remove and salvage wiring ducts or troughs. Dismantle plug-in ducts and wiring troughs into unit lengths. Remove plug-in or disconnecting devices from the busway and store separately. Remove as indicated on the drawings.

3.1.19.4 Conduit and Miscellaneous Items

Salvage conduit except where embedded in concrete or masonry. Consider corroded, bent, or damaged conduit as scrap metal. Sort straight and undamaged lengths of conduit according to size and type. Classify supports, knobs, tubes, cleats, and straps as debris to be removed and disposed.

3.2 DISPOSITION OF MATERIAL

3.2.1 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 Project Manager of the Contractor's demolition, deconstruction, and removal procedures, and authorization by the Project Manager 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.

3.2.2 Reuse of Materials and Equipment

Remove and store materials and equipment as indicated to be reused or relocated to prevent damage, and reinstall as the work progresses. Coordinate the re-use of materials and equipment with the re-use requirements in accordance with Section 01 74 19 construction waste management and disposal. Capture re-use of materials in the diversion calculations for the project.

3.2.3 Salvaged Materials and Equipment

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

- a. Salvage items and material to the maximum extent possible.
- b. Store all materials salvaged for the Contractor as approved by the Project Manager and remove from Government property before completion of the contract.

- c. Remove salvaged items to remain the property of the Government in a manner to prevent damage, and packed or crated to protect the items from damage while in storage or during shipment. Items damaged during removal or storage must be repaired or replaced to match existing items. Properly identify the contents of containers.
- d. Remove and capture all Class I ODS refrigerants in accordance with the Clean Air Act Amendment of 1990, and turn in as directed by the Project Manager.

3.2.4 Disposal of Ozone Depleting Substance (ODS)

Class I and Class II ODS are defined in Section, 602(a) and (b), of The Clean Air Act. Prevent discharge of Class I and Class II ODS to the atmosphere. Place recovered ODS in cylinders meeting AHRI Guideline K suitable for the type ODS (filled to no more than 80 percent capacity) and provide appropriate labeling.

Recovered ODS shall be put back into the existing equipment. Products, equipment and appliances containing ODS in a sealed, self-contained system (e.g. residential refrigerators and window air conditioners) shall be disposed of in accordance with 40 CFR 82. Submit Receipts or bills of lading, as specified.

3.3.5.1 Special Instructions

No more than one type of ODS is permitted in each container. A warning/hazardous label shall be applied to the containers in accordance with Department of Transportation regulations. All cylinders including but not limited to fire extinguishers, spheres, or canisters containing an ODS shall have a tag with the following information:

- a. Activity name and unit identification code
- b. Activity point of contact and phone number
- c. Type of ODS and pounds of ODS contained
- d. Date of shipment
- e. National stock number (for information, call (804) 279-4525).

3.3.6 Unsalvageable and Non-Recyclable Material

Dispose of unsalvageable and non-recyclable noncombustible material in the disposal area. Dispose of unsalvageable and non-recyclable combustible material in the sanitary fill area located in and near Fresno.

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.

3.5.2 Removal to Spoil Areas on Government Property

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

3.5.3 Removal from Government Property

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

3.6 REUSE OF SALVAGED ITEMS

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

End of Section

SECTION 03 10 00

CONCRETE FORMWORK

PART 1 GENERAL

1.1 SUMMARY

- A. Section Includes
 - 1. Formwork for cast-in-place concrete, with shoring, bracing, and anchorage.
 - 2. Openings for other work.
 - 3. Form accessories.
 - 4. Form stripping.
- B. Related Documents and Sections
 - 1. Section 03 20 00 - Concrete Reinforcement.
 - 2. Section 03 15 00 – Concrete Accessories
 - 3. Section 03 30 00 - Cast-In-Place Concrete.

1.2 QUALITY ASSURANCE

- A. Formwork shall be in conformance with ACI 347, unless otherwise specified.

1.3 DELIVERY, STORAGE AND HANDLING

- A. Store products subject to damage by dirt and moisture in a clean, dry location, off the ground and suitably protected.

1.4 COORDINATION

- A. Coordinate the design, construction and installation of concrete formwork with the requirements for openings, sleeves, chases, reglets, pipes, recesses, nailers, anchors, ties, inserts and other embedded items.

PART 2 PRODUCTS

2.1 MATERIALS

- A. Form materials shall be new and undamaged at start of work.
- B. Use flexible spring___steel forms or laminated boards to form radius bends.
- C. Form Lumber: Douglas Fir, Construction Grade, No. 2 or better, S1S2E.
- D. Plywood [for Unlined Forms]: Five___ply, 3/4 inch thick, APA B___B Plyform, Class I, Exterior Type with mill___oiling treatment omitted.
- E. [Plywood for Lined Forms: High Density Overlay, Plyform, Class I, EXT___DFPLA, minimum 3/4 inch thick, joint pattern as detailed.

- F. Form Liner
 - 1. Manufacturer
 - a. Fitzgerald Construction Sales, Inc. No. 304 Vinylok Interlocking Trapezoidal PVC Form liners.
 - 2. Provide in continuous lengths.

2.2 EARTH FORMS

- A. Where approved, vertical excavated surfaces may be used for forms for slabs on grade and grade beams, provided that the earth will stand without caving and that suitable provisions are taken to prevent raveling of top edges or sloughing of loose materials from the walls of the excavation.
- B. Where earth forms are permitted, clear dimensions as indicated shall be maintained and any over__excavation shall be filled monolithically with concrete.
- C. Construct wood edge strips at top sides of excavations.

2.3 FORM ACCESSORIES

- A. Accessories which will be wholly or partially embedded in concrete, such as ties and hangers, shall be a commercially manufactured type, of metal; wire will not be acceptable.
- B. The portion remaining in the concrete shall leave no metal within one inch of concrete face and no fractures, spalls, depressions, or other surface disfigurements greater than 3/4 inch in diameter.
- C. Spreader cones on ties shall not exceed one__inch in diameter.

2.4 FORM SEALER

- A. Manufacturers
 - 1. Sonneborn Building Products, Inc., "Form Saver".
 - 2. Grace Construction Materials "Form Fill".
 - 3. Burke "Form Sealer" (also known as "Kwik Coat Form Coating").
- B. Type: Shall eliminate grain raise as a result of moisture and shall not interfere with color, bond, or subsequent treatment of concrete surface.

2.5 FORM RELEASE AGENTS

- A. For Exposed Concrete to Receive Paint or Other Coatings: Chemically active type producing water-insoluble soaps. Release agents shall contain no petroleum solvents such as creosote, paraffin, wax or diesel oils.
- B. For Unexposed Concrete: Any type that will not interfere with bond of applied finishes.

PART 3 EXECUTION

3.1 FORMWORK

- A. All concrete placement shall be contained by constructed forms or stable earth forms.
- B. Design, construct, and brace formwork and temporary falsework to safely support concrete and safely hold personnel during construction operations.
- C. Construct forms of sufficient strength and rigidity to produce finished concrete of the precise size, shape, and location indicated, within the specified tolerances. Form assembly shall permit removal in proper sequence without damage to concrete.
- D. Arrange forms to permit single placement of exposed areas and panels without joints between adjacent forming materials in the same plane.
- E. Construct forms for architectural concrete full height and width between construction joints in concrete surface.
- F. Construct forms no higher than 12 inches above the top of a placement or construction joint.
- G. Construction Joints
 - 1. Form in accordance with requirements of Section 03 30 00.
 - 2. Provide a surfaced strip where construction joints intersect exposed surfaces; faces to provide straight lines at joints. Prior to subsequent placement, remove strip and tighten forms.
 - 3. Construction joints shall show no overlapping or offsetting of concrete surfaces and shall, as closely as possible, present the same appearance as butted plywood joints.
 - 4. Joints in a continuous line shall be straight and true.
- H. Provide cleanouts as required to permit inspection and thorough cleaning of loose dirt, debris, and waste material. Cleanouts shall not be apparent on concrete surfaces exposed to view in the finished Work.
- I. Chamfered Corners
 - 1. Chamfer exposed corners unless otherwise indicated.
 - 2. Obtain chamfers by placing 3/4__inch x 3/4__inch non__staining moldings in forms. Provide pieces in longest lengths possible and miter joints.
- J. Whenever concrete bases or foundations are to be provided for equipment furnished as part of the Work of other Sections, verify dimensions for the equipment to be furnished before concrete is placed.
- K. Form surfaces for concrete exposed to view in the finished Work shall be constructed of plywood.
- L. For surfaces not exposed to view in the finished Work, forms shall be lumber, form plywood, or any other suitable material.
- M. Form Liner: Install in forms with nails or staples in accordance with form liner manufacturer's recommendations.
- N. Formwork shall be clean and free of debris when concrete is placed.

- O. Forms shall be sufficiently tight to prevent leakage of water and mortar.
- P. Provide top forms for inclined surfaces where slope is too steep to place concrete with bottom forms only.
- Q. Locate temporary openings on forms at inconspicuous locations.
- R. Provide openings in formwork to accommodate work of other Sections. Accurately place and securely support items built into forms.

3.2 TOLERANCES

- A. Construct formwork to tolerances specified in ACI 347, except that anchor bolt setting tolerances shall be in conformance with AISC Code of Standard Practice, Section 7.5.
- B. Where tighter tolerances are required to accommodate detention equipment or other items specified in other sections, construct formwork to the most restrictive tolerance.

3.3 PREPARATION OF FORMS

- A. Treat contact surface of plywood and lumber forms with a form sealer in accordance with the manufacturer's printed instructions.
- B. Clean surfaces and reseal before each use to ensure undamaged concrete.
- C. Do not use form oil.

3.4 STRIPPING OF FORMS

- A. Strip forms using methods which will not damage concrete.
- B. Do not remove forms until concrete has attained sufficient strength to support its own weight and construction live loads to be placed thereon without damage to the structure, but not before minimum time as follows:
 - 1. Walls: 2 days.
 - 2. Footings, Curbs, Walks, and Paving: Side forms may be removed 24 hours after concrete is placed.
 - 3. Columns: 7 days.
 - 4. Soffits and Side Forms of Beams and Slabs: 10 days.
 - 5. Shoring: 21 days.

3.5 RESHORING

- A. Submit reshoring plan to Facility Representative if forms are to be stripped earlier than specified above.

3.6 RE-USE OF FORMS

- A. Re-use of forming materials shall be subject to the approval of the Facility Representative, provided the material is structurally sound, free of defects and blemishes. Split, frayed, delaminated, or otherwise damaged form facing material will not be acceptable for exposed surfaces. In no case shall forming materials be used more than 4 times.
- B. Clean and repair surfaces of forms to be re-used in the work. Apply new form coating compound as specified for new formwork.

- C. When forms are extended for successive concrete placement, thoroughly clean surfaces, remove fins and laitance, and tighten forms to close joints. Align and secure joint to avoid offsets. Do not use "patched" forms for exposed concrete surfaces.

END OF SECTION

SECTION 03 15 00

CONCRETE ACCESSORIES

PART 1 GENERAL

1.1 SUMMARY

- A. Section Includes
 - 1. Locating and furnishing construction joints.
- B. Related Sections
 - 1. Section 03 10 00 - Concrete Forming.
 - 2. Section 03 30 00 - Cast-in-Place Concrete.

1.2 REFERENCES

- A. ACI 318-[2019] - Building Code Requirements for Reinforced Concrete.
- B. CE CRD-C572-[2018] - Corps of Engineers Specification for Polyvinylchloride Waterstops.
- C. CE CRD-C513 - Corps of Engineers Specification for Rubber Waterstops.

1.3 SUBMITTALS

- A. Submit in accordance with Section 01 33 00.
- B. Shop Drawings
 - 1. Water Stops: Indicate details of construction joint types; support used in concrete pours to demonstrate water stop will remain secure until complete encasement.
 - 2. Construction and Control Joints: Indicate layout and location; joint types and details.
- C. Product data
 - 1. Product data for products and materials indicated.
 - 2. Manufacturer's technical bulletins and instructions for shipment, storage, handling, installation, and repair.
- D. Sample: Submit sample for each size, shape, and fitting of water stop(s) proposed. Include splice, joint, and fabricated cross.
- E. Certificates: Submit certification of acceptance of pourable joint filler for potable water structures by federal EPA or state health agencies.

1.4 DELIVERY, STORAGE, AND HANDLING

- A. Packing and Shipping: Prepare and protect materials for shipment in accordance with manufacturer's recommendations.
- B. Storage
 - 1. Store products in accordance with manufacturer's recommendations.
 - 2. Store products subject to damage by dirt and moisture in a clean, dry location, off the ground, and suitably protected.

PART 2 PRODUCTS

2.1 MATERIALS

- A. Rubber Waterstops
 - 1. Performance Requirements: CE CRD-C513.
 - 2. Manufacturers
 - a. Dayton Surperior; Vinylex Kwik-tie Waterstop.
 - b. Greenstreak; Styrene Butadiene Rubber Waterstop.

2.2 ACCESSORIES

- A. Bond Breaker: In accordance with Section 03 30 00.
- B. Nonshrink Grout: In accordance with Section 03 30 00. Compatible with joint sealant.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify that field conditions are acceptable and are ready to receive the Work. Notify the Facility Representative, in writing, of any conditions requiring corrective action.
- B. Verify conformance of water stops with dimensions shown and with aproved product data; prior to embedding water stops in concrete.
- C. If unsatisfactory conditions exist, do not commence the installation until such conditions have been corrected. Beginning of installation means acceptance of existing conditions.

3.2 PREPARATION

- A. Construction Joints
 - 1. Prior to placement of abutting concrete, clean contact surface.
 - 2. Remove laitance and spillage from reinforcing steel and dowels.
 - 3. Roughen surface to a minimum of 1/4-inch amplitude
 - a. Sandblast after the concrete has fully cured.
 - b. Water blast after the concrete has partially cured.
 - c. Green cut fresh concrete with high pressure water and hand tools.
 - 4. Perform cleaning so as to not to damage water stop, if one is present.
- B. Expansion and Contraction Joints
 - 1. All expansion and contraction joint materials in concrete floors shall terminate a minimum of 1/2 inch below the surface. After set, joints shall be trimmed and filled with joint filler.
 - 2. Expansion and contraction joints shall be no wider than 3/4 inch.
- C. Control Joint
 - 1. Coat concrete surfaces above and below plastic water stop with bond breaker.
 - 2. Avoid damage to water stop.
 - 3. Verify proper type and size of reinforcing and dowels.

3.3 INSTALLATION

- A. Construct straight joints; make vertical or horizontal, except where walls intersect sloping floors.
- B. Time Between Concrete Pours
 - 1. At least two hours must elapse after depositing concrete in long or high columns and/or heavy walls before depositing concrete in beams, girders, or slabs supported thereon.
 - 2. For short columns and low height walls, 10 feet or less, wait at least 45 minutes prior to depositing concrete in beams, girders, brackets, column capitals, or slabs supported thereon.
 - 3. Consider beams, girders, brackets, column capitals, and haunches as part of the floor or roof system and place monolithically with the floor or roof system.
 - 4. Should concrete placement sequence result in cold joint located below finished water surface, install water stop in joint prior to additional concrete placement.
- C. General
 - 1. Join water stops at intersections to provide continuous seal.
 - 2. Center water stop on joint.
 - 3. Secure water stop in correct position to avoid displacement during concrete placement.
 - 4. Repair or replace damaged water stop.
 - 5. Vibrate concrete to obtain impervious concrete in the vicinity of all joints.
- D. Joints in Footings and Slabs
 - 1. Ensure that space beneath water stop is completely filled with concrete.
 - 2. Concrete placement
 - a. Make a visual inspection of the entire water stop area as shown.
 - b. Limit to elevation of water stop in first pass.
 - c. Vibrate the concrete under the water stop.
 - d. Lift the water stop to confirm full consolidation without voids.
 - e. Place remaining concrete to full height of slab as shown.
- E. Galvanized Steel Water Stops
 - 1. Install in construction joints unless otherwise shown.
 - 2. Place water stops in wall construction joints by tamping into place immediately after the pour is completed and before concrete has begun to set. Puddle each side to level the concrete and assure that the water stop is properly embedded.
 - 3. Place water stop in other joints and secure in forms prior to placing concrete.
 - 4. Where metal water stops are spliced, lap at least 12 inches and secure together with sheet metal screws.
 - 5. After the concrete has set to the point where the surface can be cut with a broom or a stream of water, or by any other means specified, cut off the surface to a rough finish, minimum roughness of 1/4-inch amplitude, with all laitance removed and the concrete left clean.
- F. Rubber Water Stops

3.4 TESTING AND INSPECTION

- A. The Facility Representative will inspect the installation of the Work

3.5 DEFECTIVE WORK

- A. Work not conforming to required lines, details, dimensions, tolerances, or other specified requirements shall be considered defective. Notify the Facility Representative upon discovery of these conditions.
- B. Required repair or replacement of defective Work will be determined by the Facility Representative.
- C. Do not patch, fill, touch-up, repair, or replace Work except upon express direction of the Facility Representative for each individual area.
- D. Defective Work shall be repaired or replaced as recommended by the Facility Representative at no additional expense to the Facility.

3.6 PROTECTION

- A. Protect the Work from damage from subsequent construction operations.
- B. Provide protection in accordance with manufacturer's instructions.

END OF SECTION

SECTION 03 20 00

CONCRETE REINFORCEMENT

PART 1 GENERAL

1.1 SUMMARY

- A. Section Includes
 - 1. Reinforcing steel bars, wire fabric and accessories for concrete and unit masonry.
- B. Related Sections
 - 1. Section 03 10 00 - Concrete Formwork.
 - 2. Section 03 15 00 – Concrete Accessories
 - 3. Section 03 30 00 – Cast-in-Place Concrete.

1.2 REFERENCES

- A. CBC California Building Code, 2022 Edition.
- B. ACI American Concrete Institute

1.3 QUALITY ASSURANCE

- A. Perform Work in accordance with ACI 301.
- B. Facility Representative will inspect reinforcement.

1.4 DELIVERY, STORAGE, AND HANDLING

- A. Reinforcing steel shall be delivered from the mill in securely tied bundles, each bundle limited to one size and grade of material. Plastic or metal tags in an exposed position on each bundle shall identify the mill, the melt or heat number, and the grade and size of material. Identification of steel shall be maintained after bundles are broken.
- B. After fabrication, reinforcing steel shall be bundled and tagged for identification at the site. Tags shall identify the steel by the reinforcement item marking indicated on the reviewed Shop Drawings and the quantity of such item contained in the bundle.
- C. Segregate to maintain identification after bundles are broken.
- D. Store off the ground, protected from the elements and contaminants which could adversely affect bond.

1.5 COORDINATION

- A. Coordinate reinforcement with placement of formwork, anchor bolt locations, anchors, inserts, conduit, sleeves, and other items required to be cast in concrete. Ensure reinforcement will not interfere with the placement of such items, formed openings and other Work.

PART 2 PRODUCTS

2.1 REINFORCEMENT

- A. Reinforcing Bars
 - 1. Welded Bars: ASTM A706, Grade 60 deformed low alloy steel bars, plain finish.
 - 2. All Other: ASTM A615, Grade 60 deformed billet steel bars, plain finish, unless otherwise indicated.
- B. Welded Wire Fabric: ASTM A185 Plain Type, [and ASTM A82]. Provide in flat mats, rolls are not acceptable.

2.2 ACCESSORY MATERIALS

- A. Wire for Ties, Stirrups, and Spiral Reinforcement: ASTM A82, minimum 16 gage.
- B. Splice Sleeves:
 - 1. Acceptable Manufacturers:
 - a. Splice Sleeve North America; NMB Splice Sleeve.
 - b. Erico Products, Inc.; Lenton Interlock Rebar Splicing System.
 - c. Dayton/Richmond; US/MC - SAE Coupler Splice System.
 - 2. Description: Steel splice sleeves conforming to requirements of ACI 318 and CBC, Chapter 19A for mechanically spliced reinforcing. Each splice sleeve shall be identified with the size, type, and manufacturer's identification imprinted on the sleeve.
- C. Chairs, Bolsters, Spacers, Bar Supports, and Other Accessories
 - 1. Conform to requirements of ACI 315; size and shape for strength and support of reinforcement during concrete placement conditions.
 - 2. Where portion of accessories will be within 1/2 inch of concrete surfaces exposed to the weather in the finished Work, such accessories shall be made of stainless steel.
 - 3. Use wire bar type support complying with CRSI recommendations, unless otherwise indicated.
 - 4. For slabs on grade, use supports with sand plates or horizontal runners where wetted base materials will not support chair legs.
 - 5. For exposed__to__view concrete surfaces, where legs of supports are in contact with forms, provide supports with legs which are hot__dip galvanized, or plastic or stainless steel protected.
 - 6. Over vapor barriers or waterproof membranes, use load-bearing bottom pads or precast concrete chairs to prevent penetration of the membrane.

2.3 FABRICATION

- A. Reinforcing steel shall be bent cold and shall not be straightened or rebent in a manner that will damage the material.
- B. Fabricate concrete reinforcing in accordance with ACI 318 and CBC 2022.
- C. Locate reinforcing splices not indicated on Drawings, at point of minimum stress as approved.

PART 3 EXECUTION

3.1 PLACEMENT

- A. At time of concrete placement, reinforcement shall be free of coatings that could adversely affect the bond with concrete.
- B. Reinforcement shall be supported and fastened together to prevent displacement by construction loads or by the placement of concrete, beyond the tolerances specified in ACI 301.
- C. Furnish reinforcing bars full length, to the extent practicable. Splices will be permitted only where indicated on the Drawings, Shop Drawings or as otherwise permitted by the Facility Representative.
- D. Lap welded wire fabric reinforcement 12 inches at edges, unless otherwise indicated, and wire together.
- E. Sleeved Splices: Install splice sleeves in accordance with manufacturer's instructions; permitted only where indicated.
- F. Other Splices in Reinforcement: Lapped ends of bars may be placed in contact and securely wired or may be separated sufficiently to permit the embedment of the entire surface of each bar in concrete.
 - 1. Stagger splices in adjacent bars.
 - 2. Lap bars as indicated, but no less than 24 inches.
- G. Obstructions: Should conduit, pipes, inserts, sleeves, or other items interfere with the placement of reinforcement, notify the FACILITY Representative and obtain approval of procedure before placement of concrete is started.
- H. Concrete Cover: Indicated on Drawings.
- I. Welding
 - 1. Conform to the requirements of AWS D1.4; welding by AWS-qualified welders.
 - 2. Perform field test on minimum one weld within each 25 welds.
- J. Place, support and secure reinforcement against displacement. Do not deviate from required position.
- K. Misplaced Reinforcing
 - 1. If reinforcing bars are found to be misplaced after concrete has been placed, immediately notify the Facility Representative and make no correction and cutting without Facility Representative review and recommendations.
 - 2. Misplaced bars shall not be bent.
 - 3. Perform redesign alterations, corrections, or replacement of concrete or reinforcing required because of misplaced bars.
- L. Accommodate placement of formed openings.
- M. Dowels shall be tied securely in place before concrete is deposited. Bending of dowels subsequent to concrete placement is not permitted.

3.2 MAINTENANCE OF REINFORCING

- A. Continuously inspect and maintain reinforcement in proper position during concrete operations.

END OF SECTION

SECTION 03 30 00

CAST-IN-PLACE CONCRETE

PART 1 GENERAL

1.1 SUMMARY

- A. Section Includes
 - 1. Expansion and contraction joint devices associated with concrete work.
- B. Related Sections
 - 1. Section 03 10 00 - Concrete Formwork
 - 2. Section 03 15 00 – Concrete Accessories
 - 3. Section 03 20 00 - Concrete Reinforcement.

1.2 REFERENCES

- A. ACI 302 - Guide for Slab Construction.
- B. ACI 304 - Recommended Practice for Measuring, Mixing, Transporting and Placing Concrete.
- C. ACI 305R - Hot Weather Concreting.
- D. ACI 306R – 2016 Cold Weather Concreting.
- E. ACI 308R – 2016 Standard Practice for Curing Concrete.
- F. ACI 318 - 2019 Building Code Requirements for Reinforced Concrete.
- G. ANSI/ASTM D994 - Preformed Expansion Joint Filler for Concrete (Bituminous Type).
- H. ANSI/ASTM D1190 - Concrete Joint Sealer
- I. ANSI/ASTM D1752 - Preformed Sponge Rubber and Cork Expansion Joint Fillers for Concrete Paving and Structural Construction.
- J. ASTM C94 – Ready-Mixed Concrete.
- K. CBC - California Building Code 2022.

1.3 DEFINITIONS

- A. Defective Concrete: Concrete not conforming to required lines, details, dimensions, tolerances or specified requirements.

1.4 SUBMITTALS

- A. Submit under provisions of Division 1.

1.5 QUALITY ASSURANCE

- A. Conform to IBC, International Building Code.
- B. Allowable Tolerances: Deviation from plumb or level shall not exceed 1/8 inch within 10 feet in any direction, as determined with a 10 foot straight edge.

1.6 PRODUCT DELIVERY, STORAGE, AND HANDLING

- A. Deliver, store and handle packaged materials in the manufacturer's original, sealed containers, each clearly identified with the manufacturer's name, and name and type of product.
- B. Store materials subject to damage by dirt and moisture in a clean, dry location, off the ground and suitably protected.

1.7 JOB CONDITIONS

- A. Environmental Requirements for Placing Concrete
 - 1. Hot Weather: ACI 305.
 - 2. Cold Weather: ACI 306.
 - 3. Do not place concrete during precipitation, unless adequate protection is provided.

1.8 COORDINATION

- A. When required by Facility Representative, provide a Concrete Placement Checklist in form approved by Facility Representative. Checklist to indicate items of work and must be signed by Contractor and Facility Representative prior to placement of concrete.
- B. Coordinate work under provisions of Division 1.
- C. Coordinate the placement of joint devices with erection of concrete formwork and placement of form accessories.
- D. Concrete which is to receive application of other Work shall be water-cured only, and maintained free from other formwork and curing materials, unless otherwise accepted by the Facility Representative.

PART 2 PRODUCTS

2.1 MATERIALS

- A. Concrete: Ready-mixed, ASTM C94.
- B. Cement: ASTM C150. Type I, Type II, or Type V may be used if type is not indicated on Drawings.
- C. Aggregate: ASTM C33, except as modified by CCR Title 24, Section 2___2603.
- D. Water: Potable, clean, not detrimental to concrete, containing less than 500 ppm of chlorides.

2.2 ACCESSORIES

- A. Curing Compound: Liquid membrane, ASTM C309, type I; conforming to volatile organic compound (VOC) limits established by Local Air Quality Control Board (LAQCB) District Regulations.
- B. Sheet Curing Material: ASTM C171.
- C. Patching Mortar: Epoxy type, 100 percent solids, suitable for use on damp or dry surfaces.
 - 1. Manufacturer
 - a. Euclid Chemical Company; Euco 456 Mortar.
 - b. Sika Chemical Corporation; Sikadur 43 Patch-Pak.
 - c. The Burke Company; Burkepoxy Mortar.
- D. Patching Compound: Free flowing, polymer modified, cementitious topping.
 - 1. Manufacturers
 - a. Vertical or Overhead Applications
 - 1. Euclid Chemical Company; Verticoat.
 - 2. Dayton-Superior; Poly-Fast.
 - 3. Euclid Chemical Company; Euco Thin Coat.
 - 4. Sika Chemical Corporation; Sikatop 121.

2.3 JOINT DEVICES AND FILLER MATERIALS

- A. Joint Filler Type A: ASTM D1751; Asphalt impregnated fiberboard or felt, 1/4 inch thick; tongue and groove profile.
- B. Joint Filler Type B: ASTM D1752; Closed cell polyvinyl chloride foam, resiliency recovery of 90 percent if not compressed more than 50 percent of original thickness.
- C. Joint Filler Type C: ASTM D1752; Premolded sponge rubber, fully compressible with recovery rate of minimum 95 percent.
- D. Construction Joint Devices: Integral galvanized steel formed to tongue and groove profile, with removable top strip exposing sealant trough where indicated.

2.4 MIXES

- A. General Requirements
 - 1. Design mixes shall be in accordance with CBC 1905 A.3.1, Method B.
 - 2. Instruct Testing Agency to base mix designs on use of materials tested and approved.
 - 3. Concrete mixes shall be designed to meet strengths specified and be of uniform density without segregation when placed.
 - 4. Fly Ash:
 - a. Fly ash may be used only in concrete mixes with Portland cement Type II and IIA and shall not be used with high early strength Portland cement Type III.
 - b. Reduction of Portland cement, by weight, is acceptable with addition of an equal weight of fly ash provided the cement reduction shall not exceed 12 percent when comparing the mix design without fly ash to the mix design with fly ash.

5. Water Reducers
 - a. Use water-reducing admixtures in all concrete without superplasticizers.
 - b. Use water-reducing admixtures in all concrete with superplasticizers to allow proper mixing prior to adding superplasticizer.
 - c. Meet design strengths, slumps, water-cement ratio, and other requirements as specified at slump required for placement.
 - d. Use water reducers in combination with superplasticizers as required for mixing.
 6. Mix designs are subject to review. Final acceptance of materials will depend upon strength testing after placement.
 7. Specifically Prohibited Admixtures:
 - a. Admixtures containing hydrogen chloride, calcium chloride, or thiocyanates.
 - b. Admixtures containing more than 0.05 percent chloride ions.
 8. Unspecified admixtures will not be permitted, unless accepted by the Facility Representative, and under condition that the Testing Agency modifies mix design as necessary, and each such modification is approved by the Structural Engineer.
 9. Concrete may be designed for either pump or conventional placement. If pumping will be used, the mix shall be specifically designed for pumping and shall be so designated.
- B. Nonshrink Grout: Mix in accordance with the manufacturer's printed instructions, using potable water from a domestic source.
- C. Dry Pack: Mix, in proportions by volume, one part cement to two-and-one-half parts fine aggregate, screening out materials retained on a No. 4 sieve. Mix with water to a consistency such that, when a ball of mixture is compressed in the hand, it will maintain its shape, showing finger marks, but not showing any surface water.
- D. Patching Mortar: Mix in proportions, by volume, of one part cement to two parts fine aggregate.

2.5 MIXING

- A. Batch Plant Conditions
1. Equipment and plant shall be capable of weighing, proper segregation and efficient handling, and shall be subject to approval. Equipment and plant processes not approved shall not be used in the Work.
 2. Use approved automatic metering capable of determining moisture content of sand.
- B. General Requirements
1. Concrete mixing shall comply with CBC.
 2. Mix cement, fine and coarse aggregates, and water to exact proportions.
 3. Measure fine and coarse aggregates separately according to approved method which provides accurate control and easy checking.
 4. Adjust grading to improve workability; do not add water, unless otherwise recommended by the F Representative.
 5. Maintain proportions, values, and factors or prove mixes throughout Work.
- C. Admixtures: Use automatic metering dispenser to introduce admixture into mix.

2.6 CONCRETE CLASSES

- A. See schedule at the end of this Section.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify that conditions are satisfactory for the installation of cast-in-place concrete.
- B. Verify requirements for concrete cover over reinforcement.
- C. Verify that anchors, seats, plates, reinforcement and other items to be cast into concrete are accurately placed, positioned securely, and will not cause hardship in placing concrete.
- D. If unsatisfactory conditions exist, do not commence the installation until such conditions have been corrected. Beginning installation means acceptance of existing conditions.

3.2 PREPARATION

- A. Prepare previously placed concrete by cleaning with steel brush and applying bonding agent in accordance with manufacturer's instructions.
- B. In locations where new concrete is dowelled to existing work, drill holes in existing concrete, insert steel dowels and pack solid with non-shrink grout.
- C. Remove loose dirt and foreign matter from excavations and forms; remove standing water and saturated soil from excavations and from cavities. Placing concrete in standing water shall not be permitted. Hardened concrete and foreign materials shall be removed from the inner surfaces of conveying equipment.
- D. Thoroughly clean reinforcement and other embedded items free from loose rust and other objectionable matter.
- E. Thoroughly wet wood forms, except coated plywood, and adjacent concrete at least one hour in advance of placing concrete; securely close cleanout end inspection ports; repeat wetting as necessary to keep forms damp.
- F. Moisten subgrade or sand associated with under-slab vapor barrier system one day prior to placing concrete; maintain moisture until concrete placement.
- G. Maintain equipment clean and of sufficient quantity and capacity to efficiently execute the Work.
- H. Verify subgrade and forms have been checked for line and grade, and work areas have been observed and approved by the F Representative.

- I. Before depositing new concrete on or against hardened concrete, retighten forms and prepare surface of hardened concrete as follows:
 1. Concrete which has been placed longer than 6-1/2 hours: Sandblast to roughen surfaces. Thoroughly clean of foreign matter and laitance, and moisten with water.
 2. Concrete which has been placed longer than 3-1/2 hours but less than 6-1/2 hours: Remove all laitance from concrete by wire brushing.

3.3 PLACEMENT

- A. Do not place concrete until reinforcing has been inspected and approved by Facility Representative.
- B. Notify the Facility Representative 48 hours before each concrete placement.
- C. Transporting
 1. Concrete shall be handled from the mixer to the place of final deposit as rapidly as practicable by methods which prevent the separation or loss of the ingredients.
 2. Concrete shall not be dropped freely where reinforcing bars will cause segregation, nor shall it be dropped more than four feet.
 3. Spouts, elephant trunks, or other approved means shall be used to prevent segregation.
 4. Concrete may be pumped from the transit mixer to places of deposit, provided that information on mix-design adjustments, equipment data, procedures, and the entire operation are submitted for the Facility Representative's prior review.
 - a. Pumps shall be suitable for the mix, aggregate size, and slump required.
 - b. Pump operators shall be experienced in the operation of the equipment to be used.
 5. Use of aluminum equipment to transport concrete is not permitted.
- D. Depositing
 1. Place concrete in accordance with ACI 318-14 Section 26.5.2(f).
 2. Maintain during placement or until the completion of the section, a plastic surface approximately horizontal.
 3. Prevent displacement of reinforcement, anchor bolts, welding plates, and other items required to be embedded in concrete.
 4. Before concrete sets, completely remove concrete spilled on forms or reinforcing steel in portions of structure not to be immediately concreted.
 5. Place concrete continuously between predetermined expansion, control, and construction joints. An interruption in placing of more than 60 minutes will be cause for shutting down concrete placement operations and the wasting of remaining mixed concrete, concrete in hoppers, and concrete in mixers. In case such interruption occurs, provide construction joints where and as directed, and cut concrete back to such line, cleaning forms and reinforcing as specified herein.
 6. Keep a record of the time and data of placing the concrete in each portion of the structure. Keep reports until the completion of the structure, and keep reports open to the review of the Facility Representative.
- E. Consolidation
 1. Thoroughly consolidate concrete by puddling with suitable tools during placement and thoroughly working around reinforcement, embedded fixtures, and into the corners of forms.

2. In addition to manual spading and tamping, internally vibrate concrete with high-speed mechanical vibrators of sufficient amplitude for adequate consolidation.
3. Vertically insert and remove hand-held vibrators at points 18 inches to 30 inches apart.
4. Do not use vibrators to transport concrete in forms.
5. Vibrate concrete minimum amount required for consolidation.
6. Do not vibrate concrete placed for slab on grade except at slab edges adjacent to edge forms and at items embedded in the slab.

F. Construction Joints

1. Verify location and conformance with typical details; provide only where designated or accepted by the Facility Representative.
2. Horizontal construction joint shall conform to ACI 318-14 Section 26.5.6.
3. Surface of construction joints shall be cleaned and roughened by removing the entire surface and exposing clean aggregate solidly embedded in mortar matrix in accordance with the following procedure:
4. Contact surface shall be thoroughly cleaned by sandblasting or chipping the entire surface not earlier than five days after the initial placement or by an accepted method that will assure equal bond such as a thorough hose washing of surface not less than two or more than four hours after concrete is placed, wash water and chalk-like material being entirely cleaned from the surface. Vertical construction joints in suspended slabs shall be sandblasted.
5. Prevent formation of shoulders and ledges.
6. Control joints shall be located between construction joints.
 - a. Cut joints after concrete finishing, using Soff-Cut Systems or approved equivalent. Take necessary measures to prevent cracking.

3.4 FINISHING - GENERAL

A. Remove fins, projections, and loose material.

B. Patch honeycomb, aggregate pockets, voids, and holes as follows:

1. Chip out until sound concrete is exposed to minimum depth of one inch.
2. Prepare patching mortar with approximately two parts normal Portland cement, one part white cement, and nine parts fine aggregate; vary proportions of cement as necessary to match color of adjacent concrete.
3. Saturate surfaces with water and fill cavities with patching mortar.
4. Fill holes left by form ties with patching mortar.
5. Cure patches as specified for concrete.

3.5 UNFORMED SURFACE FINISHES

A. Broom Finish

1. For exterior flatwork and where indicated.
2. Draw a soft-bristled push broom over an initially trowel-finished surface.
3. When coarser surfaces are desired, use a stiffer-bristled broom.
4. Broom finish shall provide a non-slip surface, even if exposed to rain.

3.6 PROTECTION

A. Maintain concrete temperature above 50 deg F during curing.

B. Protect concrete from sun and rain.

- C. Do not subject concrete to any loads until it is completely cured and has attained its minimum 28 day strength.
- D. Protect concrete during and after curing from damage from subsequent construction operations.
- E. Cover traffic areas with plywood sheets; maintain paper and plywood in place and in good repair for as long as necessary to protect against damage from construction operations.
- F. Keep finished areas free from traffic for a minimum of four days or as necessary until surfaces have set sufficiently to prevent damage.

3.9 CURING

- A. Curing shall immediately follow finishing and shall be accomplished for each portion of the Work as follows:
- B. Flatwork Surfaces
 - 1. Water cure all concrete work.
 - 2. Membrane cure exterior pavement and slab surfaces.
 - 3. Where hardener is applied, cure in accordance with hardener manufacturer's printed instructions.
 - 4. Do not use liquid membrane curing compounds on surfaces to receive other finishes.

3.10 DEFECTIVE CONCRETE

- A. Repair or replacement of defective concrete will be determined by the Facility Representative
- B. Do not patch, fill, touch-up, repair, or replace exposed concrete except upon express direction of F Representative for each individual area.
- C. Defective concrete shall be repaired or replaced as recommended by the Facility Representative at no additional expense to the facility. Repair materials shall include cements, admixtures, epoxy, and aggregates as required by the nature of the defects.
- D. With the prior acceptance of the Facility Representative, some minor defective Work may be repaired by use of cement mortar; however, if the defects are serious or affect the strength of the structure or its appearance, the Facility Representative may require the removal and replacement of that portion of the structure affected.
- E. Immediately after removing forms, concrete surfaces shall be inspected, and pour joints, voids, rock pockets, tie holes, and similar defects shall be patched at once, but not until the surfaces have first been examined by the Facility Representative. Submit information on patching mixture and method proposed for use to the Facility Representative for review prior to commencing.

3.11 PATCHING

- A. Allow Facility Representative to inspect concrete surfaces immediately upon removal of forms.
- B. Excessive honeycomb or embedded debris in concrete is not acceptable. Notify Facility Representative upon discovery.
- C. Patch imperfections as directed.
- D. Patching Tie Holes
 1. Cut nails and tie wires for form ties flush with the face of the concrete, and leave surfaces smooth and clean.
 2. Remove metal spreader ties on exposed concrete Work, or snap off inside the wall surface.
 3. Patch resulting cone pockets on exposed surfaces, and solidly pack with cement grout.

3.12 DRY PACKING

- A. Provide for setting steel plates or bolts on concrete.
- B. Completely fill voids; thoroughly compact in place.
- C. Bolts or inserts which have been dry packed or grouted in place shall not be tensioned sooner than seven days after packing.

3.13 SCHEDULE

- A. Where not otherwise indicated on the Drawings or in other Sections, provide concrete in accordance with the following Table:

CLASS***	STRENGTH	SLUMP (MAX)*	AGGREGATE (MAX)**	MINIMUM CEMENT POUNDS PER C.Y.
Retaining Walls	4500	4"	1"	610
Concrete Fill (Pipe columns and guards)	3000	4"	1-1/2"	470
Fence Footings	4000	3-1/2"	3/4"	550
Flatwork, gutters	4000	4"	1-1/2"	550

END OF SECTION

SECTION 31 20 00

EARTH MOVING

PART 1 GENERAL

1.1 SUMMARY

- A. Section Includes
 - 1. Site Grading.
 - 2. Excavation, filling, and compacting.
 - 3. Scarifying and recompaction.
- B. Related Documents and Sections
 - 1. Section 31 23 33 - Trenching and Backfill.
 - 2. Section 31 25 00 - Erosion and Sedimentation Control.

1.2 REFERENCES

- A. ASTM References:
 - 1. ASTM D422-[Latest Edition] - Test Method for Particle-Size Analysis of Soils.
 - 2. ASTM D1556-[Latest Edition] - Test Method for Density and Unit Weight of Soil in Place by the Sand-Cone Method.
 - 3. ASTM D1557-[Latest Edition] - Test Methods for Laboratory Compaction Characteristics of Soil Using Modified Effort (56,000 ft-lbf/ft³ (2,700 kN-m/m³)).
 - 4. ASTM D2216-[Latest Edition] - Test Method for Laboratory Determination of Water (Moisture) Content of Soil and Rock by Mass.
 - 5. ASTM D2488-[Latest Edition] - Standard Practice for Description and Identification of Soils (Visual-Manual Procedure).
 - 6. ASTM D6938-[Latest Edition] - Test Method for In-Place Density and Water Content of Soil and Soil-Aggregate by Nuclear Methods (Shallow Depth).
 - 7. ASTM D2974-[Latest Edition] - Test Methods for Moisture, Ash, and Organic Matter of Peat and Other Organic Soils.
- B. Caltrans Testing Methods:
 - 1. #206 - Specific Gravity and Absorption of Coarse Aggregate.
 - 2. #229 - Durability Index.
 - 3. #301 - Test for Resistance "R" Value.
- C. Caltrans Standard Specifications, [Latest Edition].

1.3 DEFINITIONS

- A. Nonstructural Areas - Graded areas for landscaping, including concrete walkways less than four feet wide, berms, and all other areas not defined as a structural fill or as storm water detention basin.

- B. Influence Area - Area within planes sloped downward and outward at an angle of 45 degrees from the horizontal from (a) One foot outside the outermost edge of structural fill; or (b) One foot outside the outermost edge at the surface of roadways or shoulder; or (c) one foot outside the exterior edge at the spring line of pipes and culverts. [Verify influence angle with the Geotechnical Engineer; if none is given, use 45 shown.]
- C. Unclassified Excavation - Nature of materials to be encountered is not identified or described.
- D. Free from organic material - no visible wood or roots larger than two inches in diameter and all representative samples one cubic foot or larger shall contain no more than five percent by weight organic material when tested in accordance with ASTM D2974.

1.4 DESCRIPTION

- A. Provide materials, services and equipment required for rough and finish grading of the site; construction of berms and embankments; preparing building, structure and road earthen foundation pads to include excavating and recompact or replacing existing soils to requirements shown on the Contract Documents; densification and stabilization of site soils; rock crushing; and dewatering.
 - 1. Verify shrinkage characteristics of imported soils and existing soils to be reused.
 - 2. Government will not be responsible for additional costs associated with variations in shrinkage factors and related earthwork quantities.
 - 3. Government makes no guarantee regarding the balance of cut and fill earthwork on the site. The Contractor is responsible for the calculation of cut and fill required and available, for the cost of obtaining fill required, and for the cost of disposal of surplus.
- B. Excavations, filling, and fill and backfill material shall have the approval of the COR/PM. Work shall be performed only under the general observation and, where required, the detailed inspection and testing by the Specialty Inspector under the supervision of the COR/PM.

1.5 QUALITY ASSURANCE

- A. Facility will employ and pay for the services of an independent testing laboratory to perform specified testing per CCR Title 24, and any other testing specifically indicated in the Contract Documents to verify compliance with the Contract Documents.
- B. Relative compaction, moisture, and permeability tests will be made at locations determined by the COR/PM. When tests indicate that the specified requirements have not been achieved, that portion of the Work shall be reworked until the required density, moisture, and permeability has been attained. Re-testing to show compliance shall be at the Contractor's expense.
- C. Daily testing of materials and the work of the Contractor will be made during construction.
- D. Where soil material is required to be compacted to a percentage of maximum density, the maximum density at optimum moisture content will be determined in accordance with ASTM D 1557. Where cohesionless, free draining soil material is required to be densified to a percentage of relative density the calculation of relative density will be determined in accordance with ASTM D 4253 and D 4254. Field density in-place tests will be performed in accordance with ASTM D 2922, or by such other means acceptable to the COR/PM.

1.6 STORAGE AND HANDLING

- A. Cover and protect earth materials stockpiled for use from erosion and contamination.

1.7 ENVIRONMENTAL CONDITIONS

- A. Weather: Protect bearing surfaces under foundations. Should bearing surfaces become softened, excavate to solid bearing and fill with concrete, mix and strength as approved by the COR/PM, to elevations indicated.
- B. No fill material shall be placed, spread, or rolled if weather conditions increase the moisture content above permissible limits. When work is interrupted by rain, the earthwork operations shall stop and not be resumed until directed by the COR/PM.

PART 2 PRODUCTS

2.1 MATERIALS

- A. Berms, Embankments, or Stormwater Detention Basin Material
 - 1. Shall be native on-site fine grained, silty, sandy clay material, free of organic or other deleterious matter and shall not contain lumps or stones larger than 3 inches in maximum dimension. The materials shall include a minimum of 30 percent passing 200-mesh sieve and have a plasticity index of greater than 20 and less than 30. Material may be obtained and used from on-site excavation with the approval of the COR/PM.
- B. Engineered Fill Material for Influence Areas
 - 1. Shall be non-expansive material, with a plasticity index of less than 5, a liquid limit of less than 25, between 5 and 45 percent passing the No. 200 sieve, and shall not contain aggregates larger than 3 inches. Material may be obtained and used from on-site excavation with the approval of the COR/PM.
- C. Sand
 - 1. Material with 100 percent passing a 3/8 inch sieve, at least 90 percent passing a No. 4 sieve, and a sand equivalent value of not less than 30.
 - 2. The filter fabric shall be finished so that the filaments will retain their relative positive with respect to each other. The edges of fabric shall be finished to prevent the outer material from pulling away from the fabric.
- D. Aggregate Base
 - 1. Aggregate base shall be crushed rock aggregate base material meeting the requirements of Section 26, "Aggregate Bases", for 3/4 inch maximum grading of the Caltrans Standard Specifications.

PART 3 EXECUTION

3.1 PREPARATION

- A. Should indicated conditions conflict with actual conditions and contours, notify the COR/PM and await directions before proceeding. Commencement of Work indicates acceptance of existing conditions.

- B. Contractor shall protect adjacent property and existing improvements and structures as necessary to prevent undermining, caving of cuts, and miscellaneous damage. Protect structures, utilities, sidewalk, pavements, and other facilities from damage caused by settlement, lateral movement, undermining, washout, and other hazards created by earthwork operations.
- C. Excavations and trenches shall be properly sheeted to support adjacent earth banks, structures, construction materials, and equipment and to provide safe working conditions. No trench, pit, or other excavation shall remain open longer than is necessary to expeditiously carry out the work.

3.2 SITE PREPARATION

- A. Perform clearing and grubbing in accordance with Section 31 11 00.
- B. Material with concentrations of organics greater than 5 percent, as determined by ASTM D2974, shall be removed or placed in non-structural areas. Strippings shall not be used within embankment, structural, or pavement fills and shall be spread in the designated excess fill disposal area as directed by COR/PM.

3.3 REMOVAL OF WATER

- A. At all times, provide and maintain means and devices to remove and dispose of water entering excavations until backfill is complete.
- B. Groundwater may/should be anticipated at or within several feet of the elevations indicated in the report. The level of the groundwater will vary depending on the construction period.
- C. Verify groundwater elevations in areas where its presence is likely to impact construction activities.
- D. Determine means and methods and perform dewatering as needed to establish a stable structure base. Additional dewatering and/or other measures may be necessary to prevent flotation or disturbance of underground structures.
- E. Water disposal shall meet applicable Federal, State, and local requirements.

3.4 EXCAVATION

- A. Excavation method shall be approved under written acceptance, by the COR/PM prior to commencement of the Work.
- B. Excavate and remove earth material per specified requirements within the areas scheduled for subgrade construction.
- C. Pavement areas shall be excavated to a minimum depth of 8 inches below finish ground surface.
- D. Areas to receive fill outside of building and pavement areas shall be excavated to a minimum of 1.0 feet below existing grade. (Note: this requirement may be waived if areas are located in open areas where settlement or the presence of loose subgrade soils will not be detrimental, as determined by the COR/PM.)

- E. If solid bearing is not achieved at indicated elevations because of naturally occurring conditions, over-excavate per COR/PM direction. Costs for over-excavation shall be paid by contract change order at the unit cost provided in Contractor's bid.

3.5 COMPACTION

- A. Compact areas not accessible to heavy equipment with pneumatic hand tampers.
- B. Compact areas within 5 feet of footings, foundations, and walls with hand-held vibratory and/or impact type compaction equipment.
- C. Comply with all recommendations of the COR/PM and the requirements shown on drawings.
- D. Contractor shall allow for and accommodate the Government Special Inspector team, COR/PM to perform compaction testing.

3.6 SAWCUTTING

- A. Existing asphalt concrete or portland cement concrete to be removed shall be sawcut along a neat, straight line. Removal of existing asphalt concrete or Portland Cement concrete shall be performed in such a manner as to prevent chipping or spalling of the existing asphalt concrete or Portland Cement concrete that is to remain in place.

3.7 GRADE TOLERANCES

- A. The subgrade below base and subbase of the various pavement structural section types indicated in the Contract Documents shall not vary by more than 0.10 foot above or below the grade determined from the Contract Documents. The subgrade below asphalt shall not vary by more than 0.05 foot above or below the grade determined from the Contract Documents.
- B. The average flow line grade of ditches and swales shall conform to the grades determined from the Contract Documents, shall be free draining, and shall not vary from the designated grade by more than 0.10 foot above or below.
- C. Finished grades in all other areas shall not vary from the grades indicated in the Contract Documents by more than 0.1 foot above or below. Rough interim grades established prior to finish site grading operations shall not vary from the grades indicated in the Contract Documents by more than 0.2 foot above or below.

3.8 DISPOSAL OF EXCESS EXCAVATION

- A. Dispose of excess excavated materials to the on-site locations designated for excess fill disposal indicated in the Contract Documents or as directed by the COR/PM. Leave the disposal areas in a neat, uniformly graded, free draining condition or as indicated on the plans. Provide erosion control measures as required to prevent silt runoff.

3.9 SETTLEMENT

- A. Any settlement in backfill, fill, or in structures built over the backfill or fill, which may occur within the guarantee period will be considered to be caused by improper compaction methods and shall be corrected at the Contractor's expense. Any structures damaged by settlement shall be restored to their original condition by the Contractor at no cost to the Government.

3.10 FIELD QUALITY CONTROL

- A. Work does not meet specified requirements, COR/PM will notify Contractor who shall proceed to correct the deficient work and request a retest. Costs for retesting shall be paid for by the Contractor.

END OF SECTION

SECTION 31 23 33

TRENCHING AND BACKFILL

PART 1 GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Trenching and Backfill.
- B. Related Documents and Sections:
 - 1. Section 31 20 00 - Earth Moving.
 - 2. Section 31 25 00 - Erosion and Sedimentation Controls.

1.2 REFERENCES

- A. ASTM References:
 - 1. ASTM C33- Latest Edition - Concrete Aggregate.
 - 2. ASTM C94- Latest Edition - Ready-Mixed Concrete.
 - 3. ASTM C136- Latest Edition -Test Method for Sieve Analysis of Fine and Coarse Aggregates.
 - 4. ASTM D1557- Latest Edition - Test Methods for Laboratory Compaction Characteristics of Soil Using Modified Effort (56,000 ft-lbf/ft³ (2,700 kN-m/m³)).
 - 5. ASTM D2487- Latest Edition - Classification of Soils for Engineering Purposes (Unified Soil Classification System)
 - 6. ASTM D422- Latest Edition - Test Method for Particle-Size Analysis of Soils
 - 7. ASTM D4318- Latest Edition - Test Methods for Liquid Limit, Plastic Limit, and Plasticity Index of Soils.
 - 8. ASTM D6938- Latest Edition - Test Method for In-Place Density and Water Content of Soil and Soil-Aggregate by Nuclear Methods (Shallow Depth).
- B. Caltrans Testing Methods:
 - 1. #205 - Determining Percentages of Crushed Particles
 - 2. #217 - Sand Equivalent
 - 3. #229 - Durability Index
- C. Caltrans Standard Specifications, [Latest Edition].

1.3 DEFINITIONS

- A. Pipe Base: The trench area between the bottom of the trench and the bottom of the pipe. Extend full width and length of trench.
- B. Pipe Zone: Area of trench between the top of the pipe base and six inches above the pipe, unless otherwise indicated. Extend full width and length of trench.
- C. Backfill Zone: Area above Pipe Zone to finish grade.
- D. Relative Compaction: Field-measured dry weight expressed as a percent of maximum dry density of same soil determined in accordance with ASTM D1557.

- E. Unclassified Excavation: Nature of materials to be encountered is not identified or described.

1.4 DESCRIPTION

- A. Provide materials, services, and equipment required for trenching, backfilling, and compacting.
- B. Trenching, backfilling, and compacting shall have the approval of COR/PM. Work shall be done only under the general observation and, where required, the detailed inspection of the COR/PM. Do not backfill until each specific location is approved. Water lines shall be pressure tested and approved by the CSFM before pipe zone and backfill zone materials are installed.

1.5 SUBMITTALS

- A. Submit, under provisions of Section 01 33 00, product data and certificates of compliance for all materials proposed to be used under this Section
- B. Submit methods and procedures for excavation, backfilling, compaction, and moisture addition or drying of all materials.
- C. Dewatering Plan: Submit dewatering plan for trench construction below anticipated groundwater levels.
- D. Submit "Shoring and Bracing Drawings" prior to beginning any trench or structure excavation 5 feet deep or over, in accordance with Section 6705, California Labor Code. If such plan varies from the shoring system standards established in the construction Safety Orders of the State of California, such alternative system plans shall be prepared, stamped and signed by a civil or structural engineer licensed in the State of California at the Contractor's expense.
- E. Submit a construction drainage plan showing the collection and disposal of surface and subsurface water that may be encountered in the course of construction.

1.6 QUALITY ASSURANCE

- A. Facility will employ and pay for services of an independent testing laboratory to perform specified testing per CCR Title 24, and any other testing specifically indicated in the Contract Documents to verify compliance with the Contract Documents

PART 2 PRODUCTS

2.1 PIPE BASE AND PIPE ZONE

- A. Use sand conforming to ASTM C33 for conduit of any material less than 3-inch diameter and PVC pipe of any size.

- B. Use crushed, partially crushed, or naturally occurring granular material, free from organic and inorganic debris, liquid limit less than 50, and plasticity index less than 20, that meets the following requirements for underground piping three inch or larger diameter, unless otherwise indicated:

Sand Equivalent	35% minimum
Passing 3/4-inch square sieve	100%
Passing 3/8-inch square sieve	50% - 75%
Passing No. 8 square sieve	5% - 15%
Passing No. 200 square sieve	0% - 3%

2.2 BACKFILL MATERIAL

- A. Native material: Free from organic and inorganic debris and containing materials no larger than 3-inches maximum size.
- B. Sand Slurry Mixture: One sack cement mix with sand aggregate; maximum slump of four inches.

2.3 STABILIZATION MATERIAL

- A. Shall consist of uniformly graded, 2-inch minus coarse aggregate with percent by weight conforming to 100 percent passing the 3-inch sieve and 0 to 10 percent passing the No. 200 sieve.

2.4 STRUCTURAL FILL UNDER AND AROUND VAULTS, MANHOLES, AND STRUCTURES

- A. Shall be 3/4 inch class 2 aggregate base or equivalent. Aggregate Base shall be crushed rock aggregate base material meeting the requirements of Section 26 of the Caltrans Standard Specifications.

2.5 STEEL PLATE

- A. Shall be per Section 05 50 00 - Metal Fabrications.

2.6 CONCRETE FOR TRENCH BACKFILL

- A. Conform to ASTM C94, Alternate 3. Proportion to obtain a 28 day compressive strength of 2,500 pounds per square inch. Use a minimum of five sacks of cement per cubic yard of concrete.

PART 3 EXECUTION

3.1 GENERAL

- A. Verify that native excavated material to be reused as backfill meets specified requirements and is acceptable to COR/PM.
- B. Verify lines and grades of proposed trench/utilities.

- C. Water lines that are part of the fire protection system shall be tested per California State Fire Marshal (CSFM) requirements prior to placement of pipe zone and backfill materials.

3.2 REMOVAL OF WATER

- A. At all times, provide and maintain means and devices to remove and dispose of water entering trench during preparations for and during pipe laying, and until backfill of the pipe is complete.
- B. Groundwater may/should be anticipated at or within several feet of the elevations indicated in the report. The level of the groundwater will vary depending on the construction period.
- C. Verify groundwater elevations in areas where its presence is likely to impact construction activities.
- D. Determine means and methods and perform dewatering as needed to establish a stable trench and structure base.
- E. Dewatering facilities shall be installed and functioning prior to excavation below groundwater levels in order to avoid heave of the trench bottom and/or trench wall instability. Sufficient time shall be planned between dewatering and excavation to allow for drawdown of groundwater surfaces to below the lowest adjacent trench depths. Dewatering may consist of closely spaced well points, parallel subdrains, cutoff trenches, and/or other means and methods proved suitable by the Contractor.
- F. Prepare a dewatering plan and submit to the COR/PM. Dewatering operations shall be planned so as not to interfere with activities of other Contractors.
- G. Water disposal shall meet Federal, State, and local requirements including the approved Storm Water Pollution Prevention Plan (SWPPP) that has been prepared by the Contractor.

3.3 TRENCH EXCAVATION

- A. Trench excavation is unclassified. Excavate depth and width as shown or as directed. Allow for cover and pipe base under pipe. Remove loose matter.
- B. Comply with CAL-OSHA requirements regarding trench bracing and shoring.
- C. If Contractor elects to slope top of trench in lieu of trench bracing, the trench width shall be maintained at least 2 feet above top of pipe before sloping begins. Sloping, unless otherwise approved by the COR/PM, shall not be steeper than 1(H):1(V).
- D. The Contractor shall furnish and install all shoring, sheeting and bracing required to support adjacent earth banks and structures for the protection and safety of all personnel working in the trench. All shoring, sheeting and bracing shall conform to the requirements of the State or local agencies having jurisdiction over such matters. Remove shoring, sheeting and bracing in a manner that will protect the workman and prevent caving of banks and damage to the pipe, excavation, backfill or adjacent property.

- E. Contractor shall construct the trench to the line and grades as shown on the Contract Documents. Proper allowance shall be made for pipe thickness, bedding material and stabilization material.
- F. Any part of the trench excavated below grade shall be backfilled with stabilization or pipe base/zone material as approved by COR/PM and compacted to a density equal to the undisturbed trench bottom at Contractor's expense.
- G. All pipe with grades less than 1 percent shall be installed to grade and alignment established by an electronic, self-leveling, collimated laser beam which shall have good visibility and meet all Federal, State, and Engineer requirements as to safety, operation and field use. The laser beam shall have an off-grade warning system which shall operate until the instrument is corrected to grade. The beam shall have a minimum accuracy of + 0.001 percent of grade, + 0.01 percent of alignment, and a minimum visible range of 600 feet. The Contractor shall periodically check the accuracy of the laser setting. Corrections in grade shall be made at the Contractor's expense as directed by the COR/PM.
- H. The Contractor may use batter boards with a string line with horizontal level and vertical grade rod for grades over one percent, or may use other methods approved by the COR/PM.
- I. No dead flat or reverse grades will be accepted.
- J. Where pipelines are to be installed in embankments, embankment shall be placed and compacted to a minimum of 2 feet above the top of the pipe before trench excavation will be allowed.
- K. On all roadways, except with specific approval of the COR/PM [and the jurisdictional authority if the roadway is off-site], no more than 150 feet of open trench shall be excavated in advance of laying the pipe. No excavated trench shall remain open at the end of each day's work without trench plates. All operations shall be carried out in an orderly fashion. Backfilling, compacting, base and cleanup shall be accomplished as sections of the pipe are installed.
- L. Where it is necessary to cross or parallel drainage ditches and swales or channels, the backfill on the bottom and banks of such shall be carefully placed and compacted to 95 percent relative compaction with impervious material so as to avoid settlement or erosion. The shape of the banks and bottom shall be restored and left in good condition.

PART 4

4.1 PIPE BASE

- A. Provide pipe base for supporting pipe for full width of trench. Unless shown otherwise, minimum depth of pipe base below pipe shall be four inches and not less than three inches under pipe bell.
- B. Hand-grade ahead of pipe laying. Provide a firm, unyielding base.
- C. If trench is excavated below required depth for pipe base, fill the excess depth with stabilization or pipe base/zone material to proper subgrade. Place pipe material for full

width of trench in layers not exceeding six inches deep and compact until material does not yield or move.

- D. Authorized overexcavation and backfill for subgrade stabilization will be paid for by contract change order when the exposed subgrade is unstable and subgrade stabilization is required, as determined by the COR/PM. Stabilization required as a result of the Contractor's operations or inadequate dewatering shall be performed by the Contractor at no additional cost to the Facility.

4.2 PIPE ZONE

- A. Do not proceed with placing pipe zone material until pipe base stability has been approved by the COR/PM. Perform pipe base stabilization including dewatering and drying of the subgrade, removal of yielding soils as directed by the COR/PM and replacement with additional pipe base material, gravel or crushed rock (3-inch minus).
- B. Use pipe zone material within the pipe zone except where concrete encased. Place material simultaneously on both sides of pipe in a manner approved by the COR/PM. Lifts shall not exceed six inches.
- C. "Walk-in" each lift of backfill. Slice with a shovel or tamp with J-bars or similar devices so that all voids around pipe are filled.
- D. Give particular attention to zone from bottom of pipe to pipe springline. Ensure firm support to prevent lateral movement or pipe deflection during final backfilling.

4.3 BACKFILL ZONE

- A. Place moisture-conditioned backfill material in lifts not exceeding six inches for hand operated mechanical compactors and not exceeding eight inches for heavy equipment compactors.
- B. Compact backfill to at least 90 percent relative compaction to within 2 feet of subgrade.
- C. Compact the upper 24 inches of backfill to a minimum of 95 percent relative compaction when the trench is beneath pavement areas or where trench is beneath structures. Compact to 90 percent relative compaction in all other locations.
- D. Jetting will not be permitted.

4.4 SETTLEMENT OF PAVED AND UNPAVED AREAS

- A. The Contractor shall repair all damage caused by settlement deemed to have occurred if the following conditions exist:
 - 1. In paved areas, the depression of 3/8-inch below the average of the sides of the uncut portion shall be deemed a settlement.
 - 2. Along shoulder areas and unpaved portions of the roadways, a depression of 3/4-inch below the average of the sides of the uncut portion shall be deemed a settlement.
 - 3. Across all unpaved areas, or areas untravelled by automotive equipment, a depression of 1-1/2-inches below the average of the sides of the uncut portion shall be deemed a settlement. In this regard, any settlement that causes drainage problems or concentration causing water to run along the depression shall be subject to correction immediately during the entire guaranty period.

4.5 PAVING REMOVAL

- A. Asphalt concrete or concrete on roads shall be saw cut before excavation. Cutting with a spade or jackhammer or grader-mounted wheel will not be allowed. Armor coats on roads shall be cut with a suitable tool before excavation. Breaking of asphalt, concrete or armor coats with excavation equipment will not be permitted.
- B. All edges of asphalt concrete or armor coats shall be cut vertically, with a neat, square edge.
- C. In all cases, existing asphalt paving, concrete, or armor coating shall be saw cut after construction and just prior to final paving to a point 6 inches or wider than each side of the trench line. Saw cuts shall parallel or be perpendicular to center line of the trench.
- D. Excess paving shall be disposed of per the COR/PM's direction and shall not be used as backfill material.

4.6 FIELD QUALITY CONTROL

- A. Field testing will be performed under provisions of Division 1.
- B. COR/PM will conduct nuclear gauge moisture and density testing in accordance with ASTM 6938 procedures on each lift of trench materials placed every 100 feet of trench or every 100 cubic yards, whichever occurs sooner

4.7 COMPLETION REQUIREMENTS

- A. Dispose of suitable excess excavated material in fill area. Dispose of unsuitable excavated material in disposal area. Leave disposal area in a neat, free-draining condition.

END OF SECTION

SECTION 31 25 00

EROSION AND SEDIMENTATION CONTROLS

PART 1 GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Erosion and sediment control measures.
- B. Related Documents and Sections:
 - 1. Section 31 20 00 - Earth Moving.

1.2 REFERENCES

- A. ASTM A116 - Metallic-Coated Steel Woven Wire Fence Fabric.
- B. ASTM A615 - Deformed and Plain Carbon-Steel Bars for Concrete Reinforcement.
- C. ASTM A702 - Steel Fence Posts and Assemblies, Hot Wrought.
- D. ASTM D4632 - Test Method for Grab Breaking Load and Elongation of Geotextiles.
- E. ASTM D1682 - Test Methods for Breaking Loading and Elongation of Textile Fabrics
- F. CTM 206 - Test for Specific Gravity and Absorption of Course Aggregate.
- G. CTM 229 - Durability Index.

1.3 DESCRIPTION

- A. Provide materials, services, and equipment required for controlling pollutants in storm water runoff associated with construction activity.
- B. Contractor to prepare a Storm Water Pollution Prevention Plan (SWPPP). Refer to Section 00 31 00. The purpose of this section is to implement the plan and to provide for the protection of the following:
 - 1. Water Quality - Measures must be provided to prevent siltation of streams, rivers, lakes and bays etc.; avert instream degradation due to turbidity and pollutant load; and prevent toxic materials from leaving the construction site.
 - 2. Existing System - Methods must be provided to prevent construction sediment from entering existing drainage facilities.
 - 3. Adjacent Properties - Methods shall be employed to prevent any damage to adjacent public and private properties.
- C. Areas requiring protection shall include all areas disturbed by demolition, site preparation, or earthwork. Other areas including access roads, staging areas, and other areas potentially disturbed by the Contractor's activities shall be protected.
- D. Maintain fences, fiber rolls, straw mulch, dikes, check dams, sediment basins and other erosion control features provided under this Bid Package.

1.4 SUBMITTALS

- A. Submit, under provisions of Section 01 33 00, product data and certificates of compliance for all materials proposed to be used under this section.
- B. Submit revision form for any modification to the SWPPP.

1.5 SCHEDULE

- A. Construct erosion control measures early in the project, but no later than the start of excavation or hard demolition.
- B. Stake grading areas after receiving the Notice to Proceed and before any grading operations have taken place.

PART 2 PRODUCTS

2.1 MATERIALS

- A. Silt Fence Filter Fabric:
 - 1. A pervious sheet of synthetic polymer composed of at least 85 percent by weight ethylene, propylene, amide, ester or vinylidene yarn, woven or non-woven, and containing stabilizers and/or inhibitors to resist deterioration by heat, water, and ultraviolet light.
 - 2. Fabric shall conform to the following criteria:
 - a. Equivalent Opening Size (U.S. Standard Sieve): 70 to 100 range.
 - b. Tensile Strength: ASTM D1682, Method G; Minimum 200 pounds.
- B. Silt Fence Posts:
 - 1. Redwood, cedar, or Douglas fir, cut from sound timber, free from unsound knots, or other defects which render them unfit structurally.
 - 2. Metal posts; ASTM A702, Class B steel with anchor plate. Metal posts shall be minimum length of 5 feet.
- C. Wire Fence Fabric for Silt Fences:
 - 1. ASTM A116, Class 1; 39 inches wide, consisting of nine horizontal wires with vertical stays spaced 6 inches apart; top and bottom wires 10-gauge, remaining wires 12-1/2 gauge.
- D. Fiber Rolls:
 - 1. Prefabricated rolls of straw, flax or similar material.
 - 2. Rolled tubes of erosion control blanket/mat:
 - a. Roll length of erosion control blanket/mat into a tube of minimum 8-inch diameter.
 - b. Bind roll at each end and every 4 feet along length of roll with jute-type twine.
- E. Aggregate for Stabilized Construction Entrance: Asphalt concrete grindings shall not be used.
 - 1. 2 to 4 inches in size, washed, well-graded gravel or crushed rock conforming to the following quality requirements:

<u>Test</u>	California Test <u>Method</u>	<u>Requirement</u>
Apparent Specific Gravity	206	2.5 min
Absorption	206	4.2% max.
Durability Index	229	52 min.

- F. Straw bales shall be machine baled clean rice straw free of seed from noxious weeds using standard baling wire or string.

PART 3 EXECUTION

3.1 LIMITS OF WORK

- A. Confine soil disturbance, grading and machinery access to the construction areas shown on the Contract Documents.
- B. Orange construction fencing shall be installed along the southeast edge drip line of the tree line, adjacent to the ditch where the Work is to be performed. Fencing shall be placed approximately three feet (3') beyond the drip line of the trees (See Exhibit at the end of this Section). Orange construction fencing shall also be placed around the edge of the staging area in areas that do not require access.
- C. Avoid soil compaction, ground disturbing activities, and fill under the drip line of oaks and other native trees. Native trees that are killed or significantly damaged shall be replaced at a pre-determined minimum of three to one (3/1). Replacement trees shall be maintained for a minimum of three years.
- D. No payments will be made for additional Work or damages caused by the Contractor's performance of the Work, either inside or outside the Government property.

3.2 SILT FENCES

- A. On slopes, construct the fence to follow the contours as closely as possible. In small swales, curve the fence upstream at the sides to direct the flow toward the middle of the fence.
- B. Cut filter fabric from a continuous roll to avoid the use of joints. When joints are necessary, splice fabric only at a support post, with minimum 6-inch overlap, both ends securely fastened to the post.
- C. Space posts a maximum of ten feet apart; place securely into the ground, with a minimum buried depth of 12 inches for steel, three feet for wood.
- D. Excavate a trench approximately six inches wide and six inches deep along the line of posts and upslope from the barrier.
- E. Staple or wire filter fabric to the fence and extend into the trench as shown on the Contract Documents. Extend fabric approximately 36 inches above the original ground surface.
- F. Backfill the trench and compact soil over the toe of the filter fabric.
- G. Remove the silt fence at the completion of construction per direction of COR/PM.

3.3 FIBER ROLLS

- A. Locate fiber rolls on level contours spaced as follows:
 - 1. Slope inclination of 4:1 (H:V) or flatter: Fiber Rolls should be placed at a maximum interval of 20 feet. Slope inclination between 4:1 and 2:1 (H:V): Fiber Rolls should be placed at a maximum interval of 15 feet.
 - 2. Slope inclination 2:1 (H:V) or greater: Fiber Rolls should be placed at a maximum interval of 10 feet.
 - 3. Fiber Rolls at the toe of slopes greater than 5:1 (H:V) should be a minimum of 20-inch diameter or installations achieving the same protection (i.e. stacked smaller diameter fiber rolls, etc.).
- B. Turn the ends of the fiber roll up-slope to prevent runoff from going around the roll.
- C. Stake fiber rolls into a 2- to 4-inch-deep trench with a width equal to the diameter of the fiber roll.
- D. Drive stakes at the end of each fiber roll and spaced 4 feet maximum on center.
- E. Use wood stakes with a nominal classification of 0.75 inches by 0.75 inches and minimum length of 24 inches.
- F. If more than one fiber roll is placed in a row, the rolls should be overlapped, not abutted.

3.4 STRAW BALE DIKE

- A. Bales shall be placed in a row with ends tightly abutting. Place loose straw between adjacent bales to close voids. Each bale shall be anchored with two #4 rebar conforming to ASTM A615, Grade 40.

3.5 STABILIZED CONSTRUCTION ENTRANCE PAD

- A. Provide one stabilized construction entrance pad located on the primary construction road servicing the site. Maintain the entrance pad in a condition that will prevent tracking mud or flowing of sediment onto public right-of-ways.
- B. Stabilized construction entrance shall be minimum 50 feet long and 30 feet wide. Provide adequate turning radii at the entrance for construction vehicles. Aggregate depth shall be a minimum of 12 inches, or as directed by the COR/PM, designed for the heaviest vehicles and equipment used.
- C. Provide periodic top dressing with additional rock as conditions demand; repair and clean out trapped sediment. Remove any sediment spilled, dropped, washed or tracked onto public rights-of-way, through street sweeping or vacuuming.
- D. Clean vehicle and equipment wheels to remove any retained sediment prior to entrance onto public rights-of-way. When washing is used to prevent tracking, wash on an area stabilized with crushed stone that drains into an approved sediment trap or sediment basin. Prevent sediment from entering any storm drain, ditch, or watercourse through use of sand bags, gravel, boards, or other methods as approved by the Facility Representative.

3.6 WIND EROSION / AIR POLLUTION CONTROL

- A. Prevent wind erosion and air pollution by wetting down or applying other approved dust control measures to the work site. Control the generation of dust which could violate State and Local air pollution control standards, damage on-site/off-site facilities, and/or impact crops growing on adjacent properties.
- B. Apply water or other dust control measures to common areas that will be used by all Bid Package Contractors. Coordinate dust control Work performed under this contract with the dust control work of other Bid Package Contractors.

3.7 WATER POLLUTION CONTROL

- A. Comply with laws, rules, and regulations of the State of California, U.S. Army Corps of Engineers, and the Environmental Protection Agency prohibiting the pollution of lakes, oceans, bays, wetlands, streams, or river waters from the placing or dumping of refuse, construction materials, soils, or debris. In the event of a conflict, the most stringent requirement shall govern.

3.8 EQUIPMENT MAINTENANCE

- A. Perform equipment repairs and maintenance including lubrication and fueling at sites approved by the COR/PM.

3.9 EMERGENCY TREATMENT

- A. In the event of precipitation during construction which produces contaminated runoff from the project site, immediately provide additional erosion control measures such as check dams, temporary sediment basins, or other controls as necessary to prevent site runoff. Coordinate additional erosion control activities and measures with the COR/PM.

3.10 MAINTENANCE

- A. Inspect all silt fences, dikes, and other erosion control features immediately after each precipitation event that produces runoff at the erosion control installation and at least daily during prolonged events. Make required repairs to restore the erosion control function immediately.
- B. Inspect local roads to the site and roads adjacent to the construction entrance(s), daily. Sweep or vacuum daily to remove visible sediment and prior to forecasted rain events.
- C. Maintain erosion control features throughout project construction. Unless shown or specified to be removed, leave all erosion control features in good condition.
- D. Remove sediment deposits that exceed one-third the height of the barriers.
- E. Dispose of sediment deposits on-site at a location acceptable to the COR/PM. Leave the disposal area in a neat free draining condition.

END OF SECTION

SECTION 32 11 20

BASE COURSE FOR RIGID AND SUBBASE FOR FLEXIBLE PAVING

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 C29/C29M	(2017a) Standard Test Method for Bulk Density ("Unit Weight") and Voids in Aggregate
ASTM C117	(2017) Standard Test Method for Materials Finer than 75-um (No. 200) Sieve in Mineral Aggregates by Washing
ASTM C131/C131M	(2020) Standard Test Method for Resistance to Degradation of Small-Size Coarse Aggregate by Abrasion and Impact in the Los Angeles Machine
ASTM C136/C136M	(2019) Standard Test Method for Sieve Analysis of Fine and Coarse Aggregates
ASTM D75/D75M	(2019) Standard Practice for Sampling Aggregates
ASTM D1556/D1556M	(2015; E 2016) Standard Test Method for Density and Unit Weight of Soil in Place by Sand-Cone Method
ASTM D1557	(2012; E 2015) Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Modified Effort (56,000 ft-lbf/ft ³) (2700 kN-m/m ³)
ASTM D2487	(2017; E 2020) Standard Practice for Classification of Soils for Engineering Purposes (Unified Soil Classification System)
ASTM D3665	(2012; R 2017) Standard Practice for Random Sampling of Construction Materials
ASTM D4318	(2017; E 2018) Standard Test Methods for Liquid Limit, Plastic Limit, and Plasticity Index of Soils
ASTM D4718/D4718M	(2015) Standard Practice for Correction of Unit Weight and Water Content for Soils Containing Oversize Particles

ASTM D6938	(2017a) Standard Test Method for In-Place Density and Water Content of Soil and Soil-Aggregate by Nuclear Methods (Shallow Depth)
ASTM D7928	(2017) Standard Test Method for Particle-Size Distribution (Gradation) of Fine-Grained Soils Using the Sedimentation (Hydrometer) Analysis
ASTM E11	(2022) Standard Specification for Woven Wire Test Sieve Cloth and Test Sieves

1.2 DEGREE OF COMPACTION

Degree of compaction required, except as noted in the second sentence, is expressed as a percentage of the maximum laboratory dry density obtained by the test procedure resented in ASTM D1557 abbreviated as a percent of laboratory maximum dry density. Since ASTM D1557 applies only to soils that have 30 percent or less by weight of their particles retained on the $\frac{3}{4}$ -inch sieve, express the degree of compaction for material having more than 30 percent by weight of their particles retained on the $\frac{3}{4}$ -inch sieve as a percentage of the laboratory maximum dry density in accordance with ASTM D1557 Method C and corrected with ASTM D4718/D4718M.

1.3 SUBMITTALS

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

SD-03 Product Data

Plant, Equipment, and Tools; G Waybills and

Delivery Tickets

SD-06 Test Reports Initial

Tests; G In-Place

Tests; G

Test Section Report; G

1.4 QUALITY ASSURANCE

Perform sampling and testing using a laboratory approved in accordance with Section 01 45 00.00 10 QUALITY CONTROL. Do not start work requiring testing until the testing laboratory has been inspected and approved. All contractor quality control testing laboratories performing acceptance testing require USACE validation by the Material Testing Center (MTC) for both parent laboratory and on-site laboratory. Validation on all laboratories is required to remain current throughout the duration of the paving project. Contact the MTC manager listed at <https://mtc.erdc.dren.mil/requestvalidation.aspx#> for costs and scheduling.

Test the materials to establish compliance with the specified requirements and perform testing at the specified frequency. Furnish copies of test results within 24 hours of completion of the tests.

1.4.1 Sampling

Take samples for laboratory testing in conformance with ASTM D75/D75M.

1.4.2 Tests

1.4.2.1 Gradation

Perform gradation in conformance with ASTM C117 and ASTM C136/C136M using sieves conforming to ASTM E11.

1.4.2.2 Liquid Limit and Plasticity Index

Determine liquid limit and plasticity index in accordance with ASTM D4318.

1.4.2.3 Moisture-Density Determinations

Determine the laboratory maximum dry density and optimum moisture in accordance with paragraph DEGREE OF COMPACTION.

1.4.2.4 Field Density Tests

Measure field density in accordance with ASTM D1556/D1556M, or ASTM D6938. For the method presented in ASTM D1556/D1556M, use the base plate, as shown in the drawing. For the method presented in ASTM D6938, check the calibration curves and adjust them, if necessary, using only the sand cone method as described in Annex A2, of the ASTM publication. Use ASTM D6938 to determine the moisture content of the soil. Check the calibration curves furnished with the moisture gauges along with density calibration checks as described in ASTM D6938. Make the calibration checks of both the density and moisture gauges using the prepared containers of material method, as described in Annex A2, in ASTM D6938, on each different type of material to be tested at the beginning of a job and at intervals as directed. Submit calibration curves and related test results prior to using the device or equipment being calibrated.

1.4.2.5 Wear Test

Perform wear tests on subbase course and rigid pavement base course material in conformance with ASTM C131/C131M.

1.4.2.6 Weight of Slag

Determine weight per cubic foot of slag in accordance with ASTM C29/C29M.

1.5 ENVIRONMENTAL REQUIREMENTS

Perform construction when the atmospheric temperature is above 35 degrees F. When the temperature falls below 35 degrees F, protect all completed areas by approved methods against detrimental effects of freezing. Correct completed areas damaged by freezing, rainfall, or other weather conditions to meet specified requirements.

1.6 ACCEPTANCE

1.6.1 Tolerances

Acceptance of rigid pavement base course subbase course is based on compliance with the tolerances presented in Table 1. Remove and replace any course identified by the failing tests.

TABLE 1	
Measurement	Tolerance
Grade	Plus 0, Minus 1/2 inch
Smoothness	Plus/Minus 1/2 inch
Total Thickness	Plus/Minus 1/2 inch
Average Job Thickness	Plus/Minus 1/4 inch
Compaction	
Subbase	Mimimum 100 percent
	Mimimum 95 percent

1.6.2 Test Section

PART 2 PRODUCTS

2.1 MATERIALS

2.1.1 Subbase Course

Provide aggregates consisting of crushed stone or gravel, shell, sand, on-site recycled concrete aggregate (RCA), or other sound, durable, approved materials processed and blended or naturally combined. Provide aggregates which are free from lumps and balls of clay, organic matter, objectionable coatings, and other foreign material. Limit the percentage of loss to a maximum of 50 percent after 500 revolutions when tested in accordance with ASTM C131/C131M. Provide aggregate that is reasonably uniform in density and quality. Provide aggregates with a maximum size of 3/4 inch, a minimum of 70 percent passing the 3/4-inch sieve, and within the limits specified as follows:

Table 2			
Maximum Allowable Percentage by Weight Passing Square-Mesh Sieve			
Sieve Designation	No. 1	No. 2	No. 3
No. 10	50	80	100
No. 200	8	8	8

Provide a gradation for the separation layer meeting the gradation requirements of Table 2 Gradation No. 1 and the additional requirement that the 15 percent particle size (D15) of the separation layer is less than or equal to 5 times the 85 percent particle size (D85) of the underlying layer.

Limit particles having diameters less than 0.02 mm to a maximum of 3 percent by weight of the total sample tested as determined in accordance with ASTM D7928. Limit the portion of any blended component and of the completed course passing the No. 40 sieve to be either nonplastic or have a Liquid Limit not greater than 25 and a Plasticity Index not greater than 5.

2.1.2 Rigid Pavement Base Course

Provide aggregates consisting of crushed stone or gravel, shell, sand, or other sound, durable, approved materials processed and blended or naturally combined. Provide aggregates which are durable and sound, free from lumps and balls of clay, organic matter, objectionable coatings, and other foreign material. Limit the percentage of loss to a maximum of 50 percent after 500 revolutions when tested in accordance with ASTM C131/C131M. Provide aggregates with at least 75 percent by weight retained on each sieve having one freshly fractured face with the area at least equal to 75 percent of the smallest midsectional area of the piece. Provide aggregate that is reasonably uniform in density and quality. Provide aggregates having a maximum size of 2 inches, a minimum of 70 percent passing the 3/4-inch sieve, and within the limits specified as follows:

TABLE 3	
Maximum Allowable Percentage by Weight Passing Square-Mesh Sieve	
Sieve Designation	Rigid Pavement Base Course
No. 10	85
No. 200	15

Limit particles having diameters less than 0.02 mm to a maximum of 3 percent by weight of the total sample tested as determined in accordance with ASTM D7928. Limit the portion of any blended component and of the completed course passing the No. 40 sieve to be either nonplastic or have a liquid limit not greater than 25 and a plasticity index not greater than 6. Provide any additional stability required to maintain a working platform for construction equipment. If a test section can demonstrate that a material has adequate stability to support construction equipment, the fractured face requirement can be deleted, subject to approval by the Government.

2.2 TESTS, INSPECTIONS, AND VERIFICATIONS

2.2.1 Initial Tests

Perform one of each of the following Initial Tests on the proposed material prior to commencing construction to demonstrate that the proposed material meets all specified requirements prior to installation. Complete this testing for each source if materials from more than one source are proposed.

- a. Gradation .
- b. Liquid limit and plasticity index.
- c. Moisture-density relationship. d.
- e.
- f. .

Submit certified copies of test results for approval not less than 30 days before material is required for the work.

2.2.2 Approval of Material

Tentative approval of material will be based on initial test results.

2.3 EQUIPMENT, TOOLS, AND MACHINES

All plant, equipment, and tools used in the performance of the work are subject to approval by the Government before the work is started. Maintain all plant, equipment, and tools in satisfactory working condition at all times. Submit a list of proposed equipment, including descriptive data. Use equipment capable of minimizing segregation, producing the required compaction, meeting grade controls, thickness control, and smoothness requirements as set forth herein.

PART 3 EXECUTION

3.1 GENERAL REQUIREMENTS

Provide adequate drainage during the entire period of construction to prevent water from collecting or standing on the working area.

3.2 OPERATION OF AGGREGATE SOURCES

Clear, strip and excavate as required. Condition aggregate sources on Government property to readily drain and leave in a satisfactory condition upon completion of the work.

3.3 STOCKPILING MATERIAL

Clear and level storage sites prior to stockpiling of material. Stockpile all materials, including approved material available from excavation and grading, in the manner and at the locations designated. Stockpile aggregates on the cleared and leveled areas designated to prevent segregation. Stockpile materials obtained from different sources separately.

3.4 PREPARATION OF UNDERLYING COURSE OR SUBGRADE

Clean the underlying course or subgrade of all foreign substances prior to constructing the subbase or rigid pavement base course. Do not construct subbase or rigid pavement base course on underlying course or subgrade that is frozen. Construct the surface of the underlying course or subgrade to meet specified compaction and surface tolerances. Correct ruts or soft yielding spots in the underlying courses, areas having inadequate compaction, and deviations of the surface from the specified requirements set forth herein by loosening and removing soft or unsatisfactory material and adding approved material, reshaping to line and grade, and recompacting to specified density requirements. For cohesionless underlying courses or subgrades containing sands or gravels, as defined in ASTM D2487, stabilize the surface prior to placement of the overlying course. Stabilize by mixing the overlying course material into the underlying course and compacting by approved methods. Consider the stabilized material as part of the underlying course and meet all requirements of the underlying course. Do not allow traffic or other operations to disturb the finished underlying course and maintain in a satisfactory condition until the overlying course is placed.

3.5 GRADE CONTROL

Provide a finished and completed subbase and rigid pavement base courses conforming to the lines, grades, and cross sections shown. Place line and grade stakes as necessary for control.

3.6 MIXING AND PLACING MATERIALS

Mix and place the materials to obtain uniformity of the material at the water content specified. Make such adjustments in mixing or placing procedures or in equipment as directed to obtain the true grades, to minimize segregation and degradation, to reduce or accelerate loss or increase of water, and to provide a satisfactory course.

3.7 LAYER THICKNESS

Compact the completed course to the thickness indicated. Limit individual compacted lifts to a maximum thickness of 6 inches and a minimum thickness of 3 inches. Compact the course(s) to a total thickness that is within the tolerances of paragraph ACCEPTANCE. Where the measured thickness is more than 1/2 inch deficient, correct such areas by scarifying, adding new material of proper gradation, reblading, and recompacting as directed. Where the measured thickness is more than 1/2 inch thicker than indicated, the course will be considered as conforming to the specified thickness requirements. However, the requirements for the overlying course thickness and plan grade are still applicable. The average job thickness will be the average of all thickness measurements taken for the job and within the tolerances of paragraph ACCEPTANCE.

3.8 COMPACTION

Compact each lift of the material, as specified, with approved compaction equipment. For cohesive soils, maintain water content during the compaction procedure to within plus or minus 2 percent of optimum water content determined from laboratory tests as specified in this Section and for cohesionless soils, maintain a water content to facilitate compaction without bulking. Begin rolling at the outside edge of the surface and proceed to the center, overlapping on successive trips at least one-half the width of the roller. Slightly vary the length of alternate trips of the roller. Adjust speed of the roller as needed so that displacement of the aggregate does not occur. Compact mixture with hand-operated power tampers in all places not accessible to the rollers.

Continue compaction of the subbase rigid pavement base until each lift is compacted through the full depth to meet the compaction requirements of Table 1. Make such adjustments in compacting or finishing procedures to obtain true grades, to minimize segregation and degradation, to reduce or increase water content, and to ensure a compliant subbase and rigid pavement base course. Remove any materials that are found to be non-compliant and replace with compliant material or rework, as directed, to meet the requirements of this specification.

3.9 EDGES OF SUBBASE AND RIGID PAVEMENT BASE COURSE

Place approved material along the outer edges of the subbase and rigid pavement base course in sufficient quantity to compact to the thickness of the course being constructed. When the course is being constructed in two or more lifts, simultaneously roll and compact at least a 2 foot width of this shoulder material with the rolling and compacting of each lift of the subbase and rigid pavement base course, as directed.

3.10 FINISHING

Finish the surface of the top lift of rigid pavement base course after final compaction by cutting any overbuild to grade and rolling with a steel-wheeled roller. Do not add thin lifts of material to the top lift of rigid pavement base course to meet grade. If the elevation of the top lift of rigid pavement base course exceeds the tolerances of paragraph ACCEPTANCE, scarify the top lift to a depth of at least 3 inches and blend new material in and compact to bring to grade. Make adjustments to rolling and finishing procedures to minimize segregation and degradation, obtain grades, maintain moisture content, and insure an acceptable rigid pavement base course. If the surface becomes rough, corrugated, uneven in texture, or traffic marked prior to completion, scarify the non-compliant portion and rework and recompact it or replace as directed.

3.11 SMOOTHNESS TEST

Construct the top lift so that the surface shows no deviations exceeding the tolerances of paragraph ACCEPTANCE when tested with a 12-foot straightedge. Test the entire area in both a longitudinal and a transverse direction on parallel lines. Perform the transverse lines 15 feet or less apart, as directed. Perform the longitudinal lines at the centerline of each placement lane and at the 1/8th point in from each side of the lane. Hold the straightedge in contact with the surface and move ahead one-half the length of the straightedge for each successive measurement. Determine the amount of surface irregularity by placing the freestanding (unleveled) straightedge on the surface and measuring the maximum gap between the straightedge and the surface. Determine measurements along the entire length of the straight edge. Correct deviations exceeding the tolerances of Table 1 by removing material and replacing with new material, or by reworking existing material and compacting it to meet these specifications.

3.12 FIELD QUALITY CONTROL

3.12.1 In-Place Tests

Perform one of each of the following In-Place Tests on samples taken from the placed and compacted subbase and rigid pavement base course. Determine sample locations using random sampling in accordance with ASTM D3665. Take samples and test at the rates indicated.

- a. Perform density tests on every lift of material placed and at a frequency of one set of tests for every 500 square yards, or portion thereof, of completed area.
- b. Perform gradation on every lift of material placed and at a frequency of one gradation for every 1,000 square yards, or portion thereof, of material placed.
- c. Perform liquid limit and plasticity index tests at the same frequency as the gradation.
- d. Measure the thickness of each course at intervals providing at least one measurement for each 500 square yards or part thereof. Measure the thickness using test holes, at least 3 - inches in diameter through the course.

3.12.2 Approval of Material

Final approval of the materials will be based on tests for gradation, liquid limit, and plasticity index performed on samples taken from the completed and fully compacted course(s).

3.13 TRAFFIC

Completed portions of the rigid pavement base course can be opened to limited traffic, provided there is no marring or distorting of the surface by the traffic. Do not allow heavy equipment on the completed rigid pavement base course except when necessary for construction. When it is necessary for heavy equipment to travel on the completed rigid pavement base course, protect the area against marring or damage to the completed work. Repair damage to meet these specifications.

3.14 MAINTENANCE

Maintain the completed course in a satisfactory condition until the full pavement section is completed and accepted. Immediately repair any defects and repeat repairs as often as necessary to keep the area intact. Retest any course that was not paved over prior to the onset of winter to verify that it still complies with the requirements of this specification. Rework or replace any area that is damaged as necessary to comply with this specification.

3.15 DISPOSAL OF UNSATISFACTORY MATERIALS

Dispose of any unsuitable materials that have been removed outside the limits of Government-controlled land. No additional payments will be made for materials that have to be replaced.

End of Section

SECTION 32 11 20

AGGREBASE COURSE FOR FLEXIBLE PAVING

PART 1 GENERAL

1.1 REFERENCES

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

ASTM INTERNATIONAL (ASTM)

ASTM C29/C29M	(2017a) Standard Test Method for Bulk Density ("Unit Weight") and Voids in Aggregate
ASTM C88	(2018) Standard Test Method for Soundness of Aggregates by Use of Sodium Sulfate or Magnesium Sulfate
ASTM C117	(2017) Standard Test Method for Materials Finer than 75-um (No. 200) Sieve in Mineral Aggregates by Washing
ASTM C127	(2015) Standard Test Method for Density, Relative Density (Specific Gravity), and Absorption of Coarse Aggregate
ASTM C128	(2015) Standard Test Method for Density, Relative Density (Specific Gravity), and Absorption of Fine Aggregate
ASTM C131/C131M	(2020) Standard Test Method for Resistance to Degradation of Small-Size Coarse Aggregate by Abrasion and Impact in the Los Angeles Machine
ASTM C136/C136M	(2019) Standard Test Method for Sieve Analysis of Fine and Coarse Aggregates
ASTM D75/D75M	(2019) Standard Practice for Sampling Aggregates
ASTM D1556/D1556M	(2015; E 2016) Standard Test Method for Density and Unit Weight of Soil in Place by Sand-Cone Method
ASTM D1557	(2012; E 2015) Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Modified Effort (56,000 ft-lbf/ft ³) (2700 kN-m/m ³)
ASTM D2487	(2017; E 2020) Standard Practice for Classification of Soils for Engineering Purposes (Unified Soil Classification System)

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ASTM D3665	(2012; R 2017) Standard Practice for Random Sampling of Construction Materials
ASTM D4318	(2017; E 2018) Standard Test Methods for Liquid Limit, Plastic Limit, and Plasticity Index of Soils
ASTM D4718/D4718M	(2015) Standard Practice for Correction of Unit Weight and Water Content for Soils Containing Oversize Particles
ASTM D4791	(2019) Flat Particles, Elongated Particles, or Flat and Elongated Particles in Coarse Aggregate
ASTM D5821	(2013; R 2017) Standard Test Method for Determining the Percentage of Fractured Particles in Coarse Aggregate
ASTM D6938	(2017a) Standard Test Method for In-Place Density and Water Content of Soil and Soil-Aggregate by Nuclear Methods (Shallow Depth)
ASTM E11	(2022) Standard Specification for Woven Wire Test Sieve Cloth and Test Sieves

1.1 DEFINITIONS

For the purposes of this specification, the following definitions apply.

1.1.1 Aggregate Base Course

Aggregate base course (ABC) is well graded, durable aggregate uniformly moistened and mechanically stabilized by compaction.

1.1.2 Graded-Crushed Aggregate Base Course

Graded-crushed aggregate (GCA) base course is well graded, crushed, durable aggregate uniformly moistened and mechanically stabilized by compaction.

1.1.3 Degree of Compaction

Degree of compaction required, except as noted in the second sentence, is expressed as a percentage of the maximum laboratory dry density obtained by the test procedure presented in ASTM D1557 abbreviated as a percent of laboratory maximum dry density. Since ASTM D1557 applies only to soils that have 30 percent or less by weight of their particles retained on the 3/4-inch sieve, express the degree of compaction for material having more than 30 percent by weight of their particles retained on the 3/4-inch sieve as a percentage of the laboratory maximum dry density in accordance

with ASTM D1557 Method C and corrected with ASTM D4718/D4718M.

1.2 SUBMITTALS

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

SD-03 Product Data

Plant, Equipment, and Tools; G Waybills and

Delivery Tickets

SD-06 Test Reports Initial

Tests; G In-Place

Tests; G

Test Section Report; G

1.3 QUALITY ASSURANCE

Perform sampling and testing using a laboratory approved in accordance with Section 01 45 00.00 10 QUALITY CONTROL. Do not start work requiring testing until the testing laboratory has been inspected and approved. Test the materials to establish compliance with the specified requirements and perform testing at the specified frequency. Furnish copies of test results within 24 hours of completion of the tests.

1.3.1 Sampling

Take samples for laboratory testing in conformance with ASTM D75/D75M.

1.3.2 Tests

1.3.2.1 Gradation Analysis

Perform gradation analysis in conformance with ASTM C117 and ASTM C136/C136M using sieves conforming to ASTM E11..

1.3.2.2 Liquid Limit and Plasticity Index

Determine liquid limit and plasticity index in accordance with ASTM D4318.

1.3.2.3 Moisture-Density Determinations

Determine the laboratory maximum dry density and optimum moisture content in accordance with paragraph DEGREE OF COMPACTION.

1.3.2.4 Field Density Tests

Measure field density in accordance with ASTM D1556/D1556M, or ASTM D6938. For the method presented in ASTM D1556/D1556M use the base plate as shown in the drawing. For the method presented in ASTM D6938 check the calibration curves and adjust them, if necessary, using only the sand cone method as described in Annex A2 of ASTM D6938. Use ASTM D6938 to determine the moisture content of the soil. Check the calibration curves furnished with the moisture gauges along with density calibration checks as described in ASTM D6938. Make the calibration checks of both the density and moisture gauges using the prepared containers of material method, as described in Annex A2 of ASTM D6938, on each different type of material being tested at the beginning of a job and at intervals as directed. Submit calibration curves and related test results prior to using the device or equipment being calibrated.

1.3.2.5 Wear Test

Perform wear tests on ABC course material in conformance with ASTM C131/C131M.

1.3.2.6 Flat and Elongated Pieces

Determine flat and elongated pieces on ABC course material in conformance with ASTM D4791, Method A.

1.3.2.7 Soundness

Perform soundness tests on GCA in accordance with ASTM C88.

1.3.2.8 Fractured Faces

Perform fractured faces test on ABC coarse aggregate in conformance with ASTM D5821.

1.3.2.9 Weight of Slag

Determine weight per cubic foot of slag in accordance with ASTM C29/C29M on the ABC course material.

1.4 ENVIRONMENTAL REQUIREMENTS

Perform construction when the atmospheric temperature is above 35 degrees F. When the temperature falls below 35 degrees F, protect all completed areas by approved methods against detrimental effects of freezing. Correct completed areas damaged by freezing, rainfall, or other weather conditions to meet specified requirements.

1.5 ACCEPTANCE

1.5.1 Tolerances

Acceptance of ABC is based on compliance with the tolerances presented in Table 1. Remove any materials found to be non-compliant and replace with compliant material or rework, as directed, to meet the requirements of this specification

TABLE 1	
Measurement	Tolerance
Grade	Plus 1/4 inch, Minus 1/2 inch
TABLE 1	
Smoothness	Plus/Minus 3/8 inch
Individual Test Total Thickness	Plus/Minus
Average Job Thickness	Plus/Minus
Compaction	Minimum 100 percent

1.5.2 Test Section

A test section is not required.

PART 2 PRODUCTS

2.1 AGGREGATES

Provide ABC consisting of clean, sound, durable particles of crushed stone, crushed Gravel, crushed recycled concrete, angular sand, or other approved material. Provide ABC that is free of lumps of clay, organic matter, and other objectionable materials or coatings. The portion retained on the No. 4 sieve is known as coarse aggregate; that portion passing the No. 4 sieve is known as fine aggregate. When the coarse and fine aggregate is supplied from more than one source, provide aggregate from each source that meets the specified requirements.

2.1.1 Coarse Aggregate

Provide coarse aggregates with angular particles of uniform density. Separately stockpile coarse aggregate supplied from more than one source.

- a. Crushed Gravel: Provide crushed gravel that has been manufactured by crushing gravels and that meets all the requirements specified below.
- b. Crushed Stone: Provide crushed stone consisting of freshly mined quarry rock, meeting all the requirements specified below.
- c. Crushed Recycled Concrete: Provide crushed recycled concrete (RCA) consisting of previously hardened portland cement concrete or other concrete containing pozzolanic binder material. Provide RCA of a consistent gradation and properties obtained from on-base stockpiles or concrete pavement demolished under this contract. Provide recycled concrete that is free of all reinforcing steel, bituminous concrete surfacing, and any other foreign material that has been crushed and processed to meet the required gradations for coarse aggregate. Reject recycled concrete aggregate exceeding this value. Provide crushed recycled concrete that meets all other applicable requirements specified below.

2.1.1.1 Aggregate Base Course

Limit the percentage of loss of ABC coarse aggregate to a maximum of 50 percent when tested in accordance with ASTM C131/C131M. Provide aggregate that contains a maximum of 30 percent flat and elongated particles when tested in accordance with ASTM D4791, Method A. A flat particle is one having a ratio of width to thickness greater than 3; an elongated particle is one having a ratio of length to width greater than 3. In the portion retained on each sieve specified, provide crushed aggregates containing a minimum of 50 percent by weight of crushed pieces having two or more freshly fractured faces determined in accordance with ASTM D5821. When two fractures are contiguous, the angle between planes of the fractures is required to be a minimum of 30 degrees in order to count as two fractured faces. Manufacture crushed gravel from gravel particles 50 percent of which, by weight, are retained on the maximum size sieve listed in TABLE 2.

2.1.2 Fine Aggregate

Provide fine aggregates consisting of angular particles of uniform density.

2.1.2.1 Aggregate Base Course

Provide ABC fine aggregate that consists of screenings, angular sand, crushed recycled concrete fines, or other finely divided mineral matter processed or naturally combined with the coarse aggregate.

2.1.3 Gradation Requirements

Apply the specified gradation requirements to the completed base course. Provide aggregates that are continuously well graded within the limits specified in TABLE 2. Use sieves that conform to ASTM E11.

TABLE 2. GRADATION OF AGGREGATES			
Percentage By Weight Passing Square-Mesh Sieve			
Sieve Designation	No. 1	No. 2	No.3
2 inch	100	---	---
1-1/2 inch	70-100	100	---
1 inch	45-80	60-100	100
1/2 inch	30-60	30-65	40-70
No. 4	20-50	20-50	20-50
No. 10	15-40	15-40	15-40
No. 40	5-25	5-25	5-25
No. 200	0-8	0-8	0-8

NOTE 1: Limit particles having diameters less than 0.02 mm to a maximum of 3 percent by weight of the total sample tested as determined in accordance with ASTM D7928.

NOTE 2: The values are based on aggregates of uniform specific gravity. If materials from different sources are used for the coarse and fine

aggregates, test the materials in accordance with ASTM C127 and ASTM C128 to determine their specific gravities. Correct the percentages passing the various sieves as directed if the specific gravities vary by more than 10 percent.

NOTE 3: Gradations containing more than 30 percent retained on the ¾ inch sieve can produce inconsistent compacted density values when tested in accordance with paragraph DEGREE OF COMPACTION.

2.2 LIQUID LIMIT AND PLASTICITY INDEX

Apply liquid limit and plasticity index requirements to the completed course and to any component that is blended to meet the required gradation. Limit the portion of any component or of the completed course passing the No. 40 sieve to be either nonplastic or have a maximum liquid limit of 25 and a maximum plasticity index of 5.

2.3 TESTS, INSPECTIONS, AND VERIFICATIONS

2.3.1 Initial Tests

Perform one of each of the following initial tests on the proposed material prior to commencing construction to demonstrate that the proposed material meets all specified requirements when furnished. Complete this testing for each source if materials from more than one source are proposed. Submit certified copies of test results for approval a minimum of 30 days before material is required for the work.

- a. Gradation Analysis.
- b. Liquid limit and plasticity index.
- c. Moisture-density relationship.
- d. Wear.
- e. Flat and Elongated Pieces.
- g. Fractured Faces.
- h. Approval of Material

Tentative approval of material will be based on initial test results.

2.4 EQUIPMENT, TOOLS, AND MACHINES

All plant, equipment, and tools used in the performance of the work are subject to approval by the Government before the work is started. Maintain all plant, equipment, and tools in satisfactory working condition at all times. Submit a list of proposed equipment, including descriptive data. Use equipment capable of minimizing segregation, producing the required compaction, meeting grade controls, thickness control, and smoothness requirements as set forth herein.

PART 3 EXECUTION

3.1 GENERAL REQUIREMENTS

When the ABC is constructed in more than one lift, clean the previously constructed lift of loose and foreign matter by sweeping with power sweepers or power brooms. Use hand brooms in areas where power cleaning is not practicable. Provide adequate drainage during the entire period of construction to prevent water from collecting or standing on the working area.

3.2 OPERATION OF AGGREGATE SOURCES

Clear, strip, and excavate as required. Condition aggregate sources on Government property to readily drain and leave in a satisfactory condition upon completion of the work.

3.3 STOCKPILING MATERIAL

Clear and level storage sites prior to stockpiling of material. Stockpile all materials, including approved material available from excavation and grading, in the manner and at the locations designated. Stockpile aggregates on the cleared and leveled areas designated to prevent segregation. Stockpile materials obtained from different sources separately.

3.4 PREPARATION OF UNDERLYING COURSE OR SUBGRADE

Clean the underlying course or subgrade of all foreign substances prior to constructing the base course(s). Do not construct base course(s) on underlying course or subgrade that is frozen. Construct the surface of the underlying course or subgrade to meet specified compaction and surface tolerances. Correct ruts or soft yielding spots in the underlying courses, areas having inadequate compaction, and deviations of the surface from the specified requirements set forth herein by loosening and removing soft or unsatisfactory material and adding approved material, reshaping to line and grade, and recompacting to specified density requirements. For cohesionless underlying courses or subgrades containing sands or gravels, as defined in ASTM D2487, stabilize the surface prior to placement of the base course(s). Stabilize by mixing ABC into the underlying course and compacting by approved methods. Proof roll in accordance with paragraph PROOF ROLLING. Consider the stabilized material as part of the underlying course and meet all requirements of the underlying course. Do not allow traffic or other operations to disturb the finished underlying course and maintain in a compliant condition until the base course is placed.

3.5 GRADE CONTROL

Provide a finished and completed base course conforming to the lines, grades, and cross sections shown. Place line and grade stakes as necessary for control.

3.6 MIXING AND PLACING MATERIALS

3.6.1 Mixing

Mix the coarse and fine aggregates in a stationary plant. Make adjustments in mixing procedures or in equipment to obtain true grades, to minimize segregation or degradation, to obtain the required water content, and to produce a satisfactory base course meeting all requirements of this specification.

3.6.2 Placing

Place the mixed material on the prepared subgrade or subbase in lifts of uniform thickness with an approved spreader. Place the lifts so that when compacted they are true to the grades or levels required with the least possible surface disturbance. Where the base course is placed in more than one lift, clean the previously constructed lift of loose and foreign matter by sweeping with power sweepers, power brooms, or hand brooms. Make adjustments in placing procedures or equipment to obtain true grades, to minimize segregation and degradation, to adjust the water content, and to produce an acceptable base course.

3.7 LAYER THICKNESS

Compact the completed base course to the thickness indicated. Limit individual compacted lifts to a maximum thickness of 6 inches and a minimum thickness of 3 inches. Compact the base course(s) to a total thickness that is within the tolerances of paragraph ACCEPTANCE of the thickness indicated. Where the measured thickness is more than 1/2 inch deficient, correct such areas by scarifying, adding new material of proper gradation, reblading, and recompacting as directed. Where the measured thickness is more than 1/2 inch thicker than indicated, the course will be considered as conforming to the specified thickness requirements. However, the requirements for wearing course thickness and plan grade are still applicable. The average job thickness will be the average of all thickness measurements taken for the job and within the tolerances of paragraph ACCEPTANCE of the thickness indicated.

3.8 COMPACTION

Compact each lift of the base course, as specified, with approved compaction equipment. For cohesive soils, maintain water content during the compaction procedure to within plus or minus 2 percent of the optimum water content determined from laboratory tests as specified and for cohesionless soils, maintain the water content to facilitate compaction without bulking. Begin rolling at the outside edge of the surface and proceed to the center, overlapping on successive trips at least one-half the width of the roller. Slightly vary the length of alternate trips of the roller. Adjust speed of the roller as needed so that displacement of the aggregate does not occur. Compact mixture with hand-operated power tampers in all places not accessible to the rollers. Continue compaction until each lift is compacted through the full depth to meet the compaction requirements of Table 1. Make such adjustments in compacting or finishing procedures to obtain true grades, to minimize segregation and degradation, to reduce or increase water content, and to produce a compliant base course. Remove any materials found to be non-compliant and replace with compliant material or rework, as directed, to meet the requirements of this specification.

3.9 EDGES OF BASE COURSE

Place the base course(s) so that the completed section is a minimum of feet wider, on all sides, than the next lift that will be placed above it. Place approved material along the outer edges of the base course in sufficient quantity to compact to the thickness of the course being constructed. When the course is being constructed in two or more lifts, simultaneously roll and compact at least a 2-foot width of this shoulder material with the rolling and compacting of each lift of the base course.

3.10 FINISHING

Finish the surface of the top lift of base course after final compaction by cutting any overbuild to grade and rolling with a steel-wheeled roller. Do not add thin lifts of material to the top lift of base course to meet grade. If the elevation of the top lift of base course exceeds the tolerances of paragraph ACCEPTANCE, scarify the top lift to a depth of at least 3 inches and blend new material in and compact and proof roll to bring to grade. Make adjustments to rolling and finishing procedures to minimize segregation and degradation, obtain grades, maintain moisture content, and produce an acceptable base course. If the surface become rough, corrugated, uneven in texture, or traffic marked prior to completion, scarify the non-compliant portion and rework and recompact it or replace as directed.

3.11 SMOOTHNESS TEST

Construct the top lift so that the surface shows no deviations exceeding the tolerances of paragraph ACCEPTANCE when tested with a 12-foot straightedge. Test the entire area in both a longitudinal and a transverse direction on parallel lines. Perform the transverse lines at a maximum spacing of 15 feet or less apart, as directed. Perform the longitudinal lines at the centerline of each placement lane, regardless of whether multiple lanes are allowed to be paved at the same time, and at the 1/8th point in from each side of the lane. Hold the straightedge in contact with the surface and moved ahead one-half the length of the straightedge for each successive measurement. Determine the amount of surface irregularity by placing the freestanding (unleveled) straightedge on the pavement surface and measuring the maximum gap between the straightedge and the pavement surface. Determine measurements along the entire length of the straight edge. Correct deviations exceeding this amount by removing material and replacing with new material, or by reworking existing material and compacting it to meet these specifications.

3.12 FIELD QUALITY CONTROL

3.12.1 In-Place Tests

Perform each of the following in-place tests on samples taken from the placed and compacted and Determine sample locations using random sampling in accordance with ASTM D3665. Take samples and test at the rates indicated.

- a. Perform density tests on every lift of material placed and at a frequency of one set of tests for every 250 square yards, or portion thereof, of completed area. Gradations containing more than 30 percent retained on the $\frac{3}{4}$ inch sieve can produce inconsistent compacted density values when tested in accordance with paragraph DEGREE OF COMPACTION.
- b. Perform gradation analysis including 0.02 mm size material on every lift of material placed and at a frequency of one sieve analysis for every 500 square yards, or portion thereof, of material placed.
- c. Perform liquid limit and plasticity index tests at the same frequency as the sieve analysis. Measure the thickness of the base course at intervals providing at least one measurement for each 500 square yards of base course or part thereof. Measure the thickness using test holes, at least 3 inch in diameter through the base course.

3.12.2 Approval of Material

Final approval of the materials will be based on tests for gradation, liquid limit, and plasticity index performed on samples taken from the completed and fully compacted course(s).

3.13 TRAFFIC

Completed portions of the base course can be opened to limited traffic, provided there is no marring or distorting of the surface by the traffic. Do not allow heavy equipment on the completed base course except when necessary for construction. When it is necessary for heavy equipment to travel on the completed base course, protect the area against marring or damage to the completed work. Repair damage to meet these specifications.

3.14 MAINTENANCE

Maintain the base course in a satisfactory condition until the full pavement section is completed and accepted. Immediately repair any defects and repeat repairs as often as necessary to keep the area intact. Retest any base course that was not paved over prior to the onset of winter to verify that it still complies with the requirements of this specification. Rework or replace any area of base course that is damaged as necessary to comply with this specification.

3.15 DISPOSAL OF UNSATISFACTORY MATERIALS

Dispose of any unsuitable materials that have been removed outside the limits of Government-controlled land. No additional payments will be made for materials that have to be replaced.

End of Section

SECTION 32 12 13
BITUMINOUS TACK AND PRIME COAT

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 102 (2009; R 2013) Standard Method of Test for Spot
Test of Asphaltic Materials

ASTM INTERNATIONAL (ASTM)

ASTM D140/D140M (2016) Standard Practice for Sampling Asphalt
Materials

ASTM D946/D946M (2020) Standard Specification for Penetration-
Graded Asphalt Cement for Use in Pavement
Construction

ASTM D977 (2019a; E 2019) Standard Specification for
Emulsified Asphalt

ASTM D2397/D2397M (2019a) Standard Specification for
Cationic Emulsified Asphalt

ASTM D2995 (1999; R 2009) Determining Application Rate of
Bituminous Distributors

ASTM D6373 (2016) Standard Specification for
Performance Graded Asphalt Binder

1.1 SUBMITTALS

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

SD-03 Product Data

Waybills and Delivery Tickets Local/Regional
Materials

SD-06 Test Reports Sampling and Testing

1.2 QUALITY ASSURANCE

Certificates of compliance for asphalt materials delivered will be obtained and checked to ensure that specification requirements are met. Quantities of applied material will be determined. Payment will be for amount of residual asphalt applied. Tack coat materials will not be diluted. Prime coat materials when emulsions are used can be diluted on site with potable water up to 1 part emulsion to 1 part water.

1.3 DELIVERY, STORAGE, AND HANDLING

Inspect the materials delivered to the site for contamination and damage. Unload and store the materials with a minimum of handling.

1.4 EQUIPMENT, TOOLS AND MACHINES

1.4.1 General Requirements

Equipment, tools and machines used in the work are subject to approval. Maintain in a satisfactory working condition at all times. Calibrate equipment such as asphalt distributors, scales, batching equipment, spreaders and similar equipment within 12 months of their use. If the calibration expires during project, recalibrate the equipment before work can continue.

1.4.2 Bituminous Distributor

Provide a self-propelled distributor with pneumatic tires of such size and number to prevent rutting, shoving or otherwise damaging the surface being sprayed. Calibrate the distributor in accordance with ASTM D2995. Design and equip the distributor to spray the bituminous material in a uniform coverage at the specified temperature, at readily determined and controlled total liquid rates from 0.03 to 1.0 gallons per square yard, with a pressure range of 25 to 75 psi and with an allowable variation from the specified rate of not more than plus or minus 5 percent, and at variable widths. Include with 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 hose attachment suitable for applying bituminous material manually to areas inaccessible to the distributor. The distributor will be capable of circulating and agitating the bituminous material during the heating process.

1.4.3 Heating Equipment for Storage Tanks

Use steam, electric, or hot oil heaters for heating the bituminous material. Provide steam heaters consisting of steam coils and equipment for producing steam, so designed that the steam cannot come in contact with the bituminous material. Fix an armored thermometer to the tank with a temperature range from 40 to 400 degrees F so that the temperature of the bituminous material may be determined at all times.

1.4.4 Power Brooms and Power Blowers

Use power brooms and power blowers suitable for cleaning the surfaces to which the bituminous coat is to be applied.

1.5 ENVIRONMENTAL REQUIREMENTS

Apply bituminous coat only when the surface to receive the bituminous coat is dry. A limited amount of moisture (approximately 0.03 gallon/square yard) can be sprayed on the surface of unbound material when prime coat is used to improve coverage and penetration of asphalt material. Apply bituminous coat only when the atmospheric temperature in the shade is 50 degrees F or above and when the temperature has not been below 35 degrees F for the 12 hours prior to application, unless otherwise directed.

PART 2 PRODUCTS

2.1 PRIME COAT

Provide asphalt conforming to one of the following grades:

2.1.1 Emulsified Asphalt

Provide emulsified asphalt conforming to ASTM D977, Type SS1h ASTM D2397/D2397M, Type CSS-1h. Asphalt emulsion can be diluted up to 1 part water to 1 part emulsion for prime coat use. Do not dilute asphalt emulsion for tack coat use.

2.2 TACK COAT

2.2.1 Asphalt Cement

Provide asphalt cement conforming to ASTM D946/D946M or ASTM D6373 Grade CSS1h or SS1h.

2.2.2 Emulsified Asphalt

Provide emulsified asphalt conforming to ASTM D977, Type SS1h ASTM D2397/D2397M, Type CSS-1h. For prime coats the emulsified asphalt can be diluted with up to 1 part emulsion to 1 part water. No dilution is allowed for tack coat applications. The base asphalt used to manufacture the emulsion is required to show a negative spot when tested in accordance with AASHTO T 102 using standard naphtha.

2.2.3 Local/Regional Materials

Use Local/Regional Materials or products extracted, harvested, or recovered, as well as manufactured, within a 50-mile radius from the project site, if available from a minimum of three sources.

PART 3 EXECUTION

3.1 PREPARATION OF SURFACE

Immediately before applying the bituminous coat, remove all loose material, dirt, clay, or other objectionable material from the surface to be treated by means of a power broom or blower supplemented with hand brooms. Apply treatment only when the surface is dry and clean.

3.2 APPLICATION RATE

The exact quantities within the range specified, which may be varied to suit field conditions, will be determined by the Contract Manager.

3.2.1 Tack Coat

Apply bituminous material for the tack coat in quantities of not less than 0.03 gallons nor more than 0.10 gallons per square yard of residual asphalt onto the pavement surface as approved by the Contract Manager. Do not dilute asphalt emulsion when used as a tack coat.

3.2.2 Prime Coat

Apply bituminous material for the prime coat in quantities of not less than 0.05 gallons nor more than 0.12 gallons per square yard of residual asphalt for asphalt emulsion up to a 1 to 1 dilution rate or for residual asphalt for cutback asphalt.

3.3 APPLICATION TEMPERATURE

3.3.1 Viscosity Relationship

Apply asphalt at a temperature that will provide a viscosity between 10 and 60 seconds, Saybolt Furol, or between 20 and 120 centistokes, kinematic. Furnish the temperature viscosity relation to the Contract Manager.

3.3.2 Temperature Ranges

The viscosity requirements determine the application temperature to be used. The following is a normal range of application temperatures:

Cutback Asphalts	
MC-30	85-190 degrees F
SC-70, MC-70, RC-70	120-225 degrees F
SC-250, MC-250, RC-250	165-270 degrees F
Asphalt Emulsion	
All Grades	70-160 degrees F
Asphalt Cement	
All Grades	275-350 degrees F

Some of these temperatures for rapid cure cutbacks are above the flash point of the material and care should be taken in their heating.

3.4 APPLICATION

3.4.1 General

Following preparation and subsequent inspection of the surface, apply the bituminous prime or tack coat with the bituminous distributor at the specified rate with uniform distribution over the surface to be treated. Properly treat all areas and spots, not capable of being sprayed with the distributor, with the hand spray. Until the succeeding layer of pavement is placed, maintain the surface by protecting the surface against damage and by repairing deficient areas at no additional cost to the Government. If required, spread clean dry sand to effectively blot up any excess bituminous material. No smoking, fires, or flames other than those from the heaters that are a part of the equipment are permitted within 25 feet of heating, distributing, and transferring operations of cutback materials. Prevent all traffic, except for paving equipment used in constructing the surfacing, from using the underlying material, whether primed or not, until the surfacing is completed. The bituminous coat requirements are described herein.

3.4.2 Prime Coat

The prime coat is required if it will be at least 7 days before the asphalt mixture is constructed on the underlying (base course, etc.) compacted material. The type of liquid asphalt and application rate will be as specified herein. Protect the underlying layer from any damage (water, traffic, etc.) until the surfacing is placed. If the Contractor places the surfacing within seven days, the choice of protection measures or actions to be taken is at the Contractor's option. Repair (recompact or replace) damage to the underlying material caused by lack of, or inadequate, protection by approved methods at no additional cost to the Government. If the Contractor opts to use the prime coat, apply as soon as possible after consolidation of the underlying material. Apply the bituminous material uniformly over the surface to be treated at a pressure range of 25 to 75 psi; the rate will be as specified above in paragraph APPLICATION RATE. To obtain uniform application of the prime coat on the surface treated at the junction of previous and subsequent applications, spread building paper on the surface for a sufficient distance back from the ends of each application to start and stop the prime coat on the paper and to ensure that all sprayers will operate at full force on the surface to be treated. Immediately after application remove and destroy the building paper.

3.4.3 Tack Coat

Apply tack coat at the locations shown on the drawings. A tack coat should be applied to every bound surface (asphalt or concrete pavement) that is being overlaid with asphalt mixture and at transverse and longitudinal joints. Apply the tack coat when the surface to be treated is clean and dry. Immediately following the preparation of the surface for treatment, apply the bituminous material by means of the bituminous distributor, within the limits of temperature specified herein and at a rate as specified above in paragraph APPLICATION RATE. Apply the bituminous material so that uniform distribution is obtained over the entire surface to be treated. Treat lightly coated areas and spots missed by the distributor by spraying with a hand wand or using other approved method. Following the application of

bituminous material, allow the surface to cure without being disturbed for period of time necessary to permit setting of the tack coat. Apply the bituminous tack coat only as far in advance of the placing of the overlying layer as required for that day's operation. Maintain and protect the treated surface from damage until the succeeding course of pavement is placed.

3.5 CURING PERIOD

Following application of the bituminous material and prior to application of the succeeding layer of asphalt mixture allow the bituminous coat to cure and water or volatiles to evaporate prior to overlaying. Maintain the tacked surface in good condition until the succeeding layer of pavement is placed, by protecting the surface against damage and by repairing and recoating deficient areas.

3.6 FIELD QUALITY CONTROL

Obtain certificates of compliance for all asphalt material delivered to the project. Obtain samples of the bituminous material under the supervision of the Contract Manager. The sample may be retained and tested by the Government at no cost to the Contractor.

3.7 SAMPLING AND TESTING

Furnish certified copies of the manufacturer's test reports indicating temperature viscosity relationship for cutback asphalt or asphalt cement, compliance with applicable specified requirements, not less than 5 days before the material is required in the work.

3.7.1 Sampling

Unless otherwise specified, sample bituminous material in accordance with ASTM D140/D140M.

3.7.2 Calibration Test

Furnish all equipment, materials, and labor necessary to calibrate the bituminous distributor. Calibrate using the approved job material and prior to applying the bituminous coat material to the prepared surface. Calibrate the bituminous distributor in accordance with ASTM D2995.

3.7.3 Trial Applications

Before applying the spray application of tack or prime coat, apply three lengths of at least 100 feet for the full width of the distributor bar to evaluate the amount of bituminous material that can be satisfactorily applied.

3.7.3.1 Tack Coat Trial Application Rate

Unless otherwise authorized, apply the trial application rate of bituminous tack coat materials in the amount of 0.05 gallons per square yard. Make other trial applications using various amounts of material as may be deemed necessary.

3.7.3.2 Prime Coat Trial Application Rate

Unless otherwise authorized, apply the trial application rate of bituminous materials in the amount of 0.15 gallon per square yard. Make other trial applications using various amounts of material as may be deemed necessary.

3.7.4 Sampling and Testing During Construction

Perform quality control sampling and testing as required in paragraph FIELD QUALITY CONTROL.

3.8 TRAFFIC CONTROLS

Keep traffic off surfaces freshly treated with bituminous material. Provide sufficient warning signs and barricades so that traffic will not travel over freshly treated surfaces.

End of Section

SECTION 32 11 20
AGGREBASE COURSE FOR FLEXIBLE PAVING

PART 1 GENERAL

1.1 REFERENCES

1.1.1 Method of Measurement

Measurement of the quantity of hot-mix asphalt pavement per lot will be made for the purposes of assessing acceptance stipulated in paragraph ACCEPTANCE.

1.1.2 Basis of Payment

The measured quantity of hot-mixed asphalt pavement will be paid for and included in the lump sum contract price.

1.2 REFERENCES

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

AMERICAN ASSOCIATION OF STATE HIGHWAY AND TRANSPORTATION
OFFICIALS (AASHTO)

AASHTO M 156	(2013; R 2017) Standard Specification for Requirements for Mixing Plants for Hot-Mixed, Hot-Laid Bituminous Paving Mixtures
AASHTO T 304	(2011; R 2015) Standard Method of Test for Uncompacted Void Content of Fine Aggregate
AASHTO T 329	(2015) Standard Test Method for Moisture Content of Hot Mix Asphalt (HMA) by Oven Method ASPHALT INSTITUTE (AI)
AI MS-2	(2015) Asphalt Mix Design Methods

ASTM INTERNATIONAL (ASTM)

ASTM C29/C29M	(2017a) Standard Test Method for Bulk Density ("Unit Weight") and Voids in Aggregate
ASTM C117	(2017) Standard Test Method for Materials Finer than 75-um (No. 200) Sieve in Mineral Aggregates by Washing

ASTM C127	(2015) Standard Test Method for Density, Relative Density (Specific Gravity), and Absorption of Coarse Aggregate
ASTM C128	(2015) Standard Test Method for Density, Relative Density (Specific Gravity), and Absorption of Fine Aggregate
ASTM C131/C131M	(2020) Standard Test Method for Resistance to Degradation of Small-Size Coarse Aggregate by Abrasion and Impact in the Los Angeles Machine
ASTM C136/C136M	(2019) Standard Test Method for Sieve Analysis of Fine and Coarse Aggregates
ASTM C142/C142M	(2017) Standard Test Method for Clay Lumps and Friable Particles in Aggregates
ASTM C566	(2013) Standard Test Method for Total Evaporable Moisture Content of Aggregate by Drying
ASTM D75/D75M	(2019) Standard Practice for Sampling Aggregates
ASTM D140/D140M	(2016) Standard Practice for Sampling Asphalt Materials
ASTM D242/D242M	(2009; R 2014) Mineral Filler for Bituminous Paving Mixtures
ASTM D979/D979M	(2015) Sampling Bituminous Paving Mixtures
ASTM D2041/D2041M	(2011) Theoretical Maximum Specific Gravity and Density of Bituminous Paving Mixtures
ASTM D2172/D2172M	(2017; E 2018) Standard Test Methods for Quantitative Extraction of Asphalt Binder from Asphalt Mixtures
ASTM D2419	(2014) Sand Equivalent Value of Soils and Fine Aggregate
ASTM D2726/D2726M	(2019) Standard Test Method for Bulk Specific Gravity and Density of Non-Absorptive Compacted Bituminous Mixtures
ASTM D3203/D3203M	(2017) Standard Test Method for Percent Air Voids in Compacted Asphalt Mixtures

ASTM D3665	(2012; R 2017) Standard Practice for Random Sampling of Construction Materials
ASTM D3666	(2016) Standard Specification for Minimum Requirements for Agencies Testing and Inspecting Road and Paving Materials
ASTM D4791	(2019) Flat Particles, Elongated Particles, or Flat and Elongated Particles in Coarse Aggregate
ASTM D4867/D4867M	(2009; R 2014) Effect of Moisture on Asphalt Concrete Paving Mixtures
ASTM D5361/D5361M	(2016) Standard Practice for Sampling Compacted Asphalt Mixtures for Laboratory Testing
ASTM D5444	(2015) Mechanical Size Analysis of Extracted Aggregate
ASTM D5821	(2013; R 2017) Standard Test Method for Determining the Percentage of Fractured Particles in Coarse Aggregate
ASTM D6307	(2019) Standard Test Method for Asphalt Content of Asphalt Mixture by Ignition Method
ASTM D6373	(2016) Standard Specification for Performance Graded Asphalt Binder
ASTM E1274	(2018) Standard Test Method for Measuring Pavement Roughness Using a Profilograph

1.3 SUBMITTALS

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

SD-02 Shop Drawings Placement

Plan; G,

SD-03 Product Data

Diamond Grinding Plan: G, Mix

Design; G,

Contractor Quality Control; G, SD-04

Samples

Aggregates

Asphalt Cement Binder
SD-06 Test Reports

Aggregates; G, QC

Monitoring; G

SD-07 Certificates

Asphalt Cement Binder; G,

Laboratory Accreditation and Validation; G,

1.4 ACCEPTANCE

1.4.1 Acceptability of Work

Acquire the services of an independent commercial laboratory to perform acceptance testing. Acceptance of the plant produced mix and in-place requirements will be on a lot-to-lot basis. The materials and the pavement itself will be accepted on the basis of production testing. The Government may make check tests from split samples to validate the results of the production testing. Testing performed by the Government does not reduce the required testing of the independent commercial laboratory. Split samples will be taken for Government testing to reduce the variability between the independent commercial laboratory and the Government's test results. When the difference between the independent commercial laboratory and the Government's test results for split samples exceed the acceptable range of two results for multilaboratory precision for the appropriate test method (i.e. ASTM) then at least one of the laboratories is determined to be in error. An evaluation of procedures and equipment in both laboratories will be made to determine the cause(s) for the differences. Develop steps to correct procedures and equipment to bring multilaboratory precision to within acceptable limits.

1.4.2 Acceptance Requirements

Provide all sampling and testing required for acceptance. Where appropriate, acceptance for individual lots of asphalt pavement will be made based on laboratory air voids, in-place density, smoothness, and grade in accordance with the following paragraphs. Surface smoothness and grade determinations will be made on the lot as a whole. Exceptions or adjustments to this will be made in situations where the mix within one lot is placed as part of both the intermediate and surface courses, thus smoothness and grade measurements for the entire lot cannot be made.

1.4.3 Pavement Lots

A standard lot for all requirements is equal to one day's production or 2,000 tons, whichever is smaller. Divide each lot into four equal sublots in order to evaluate laboratory air voids and in-place density.

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When operational conditions cause a lot to be terminated before the specified four sublots have been completed, use the following procedure to adjust the lot size and number of tests for the lot. Where three sublots have been completed, they constitute a lot. Where one or two sublots have been completed, incorporate them into the next lot and the total number of sublots (i.e. 5 or 6 sublots) is used for acceptance criteria. Include partial lots at the end of asphalt production into the previous lot. Complete and report all theoretical maximum density, laboratory air voids, and in-place density testing within 24 hours after construction of each lot.

1.4.4 Sublot Sampling

Take one mixture sample for each sublot in accordance with ASTM D979/D979M from a random truck or another location for determining theoretical maximum density, laboratory air voids, any additional testing the Government desires, and Contractor Quality Control. All samples will be selected randomly, using commonly recognized methods of assuring randomness conforming to ASTM D3665 and employing tables of random numbers or computer programs.

1.4.5 Additional Sampling and Testing

The Government reserves the right to direct additional samples and tests for any area which appears to deviate from the specification requirements. The cost of any additional testing will be paid for by the Government. Testing in these areas will be treated as a separate lot. Acceptance will be made for the quantity of asphalt pavement represented by these tests in accordance with the provisions of this section.

1.4.6 Theoretical Maximum Density (TMD)

Measure theoretical maximum density one time for each sublot in accordance with ASTM D2041/D2041M for purposes of calculating laboratory air voids and determining in-place density. The average TMD for each lot will be determined as the average TMD of the random sublot samples. When the TMD on both sides of a longitudinal joint is different, the average of these two TMD values will be used as the TMD needed to calculate the percent joint density.

1.4.7 Laboratory Air Voids

Provide three test specimens prepared from the same sample for each set of laboratory compacted specimens. Compact the specimens within 2 hours of the time the mixture was loaded into trucks at the asphalt plant. Do not reheat samples prior to compaction. Provide insulated containers as necessary to maintain the sample temperature. Measure the bulk density of laboratory compacted specimens in accordance with ASTM D2726/D2726M. Determine laboratory air voids from one set (three laboratory compacted specimens) for each sublot sample in accordance with ASTM D3203/D3203M.

1.4.7.1 Tolerance

Provide laboratory air voids with a mean absolute deviation of 1.00 percent or less from the JMF for each lot. Remove and replace lots that do not meet the laboratory air voids requirement at least 4 inches into the cold (existing) lane adjacent to the longitudinal joint, at no additional cost to the Government.

The mean absolute deviation of the laboratory air void contents from the JMF air void content will be evaluated as shown in the example below.

1.4.7.2 Calculating Laboratory Air Voids

Laboratory air void calculations for each lot will use the average theoretical maximum density values obtained for the lot. Determine the average TMD in accordance with paragraph THEORETICAL MAXIMUM DENSITY (TMD). The mean absolute deviation of the laboratory air void contents (one from each subplot) from the JMF air void content will be evaluated as in the following example:

Assume that the laboratory air voids are determined from 4 sublots where one set of laboratory compacted specimens is from a single subplot. The laboratory air voids for the 4 sublots are determined to be 3.5, 3.0, 4.0, and 3.7. Assume that the target air voids from the JMF is 4.0. The mean absolute deviation is then:

$$\text{Mean Absolute Deviation} = (|3.5 - 4.0| + |3.0 - 4.0| + |4.0 - 4.0| + |3.7 - 4.0|)/4$$

$$\text{Mean Absolute Deviation} = (0.5 + 1.0 + 0.0 + 0.3)/4 = (1.8)/4 = 0.45$$

The mean absolute deviation for laboratory air voids is determined to be 0.45. It can be seen that 0.45 is less than 1.00 percent. The lot is acceptable for laboratory air voids.

1.4.8 In-place Density

Obtain one random 4 inch or 6-inch diameter core from the mat and joint of each subplot in accordance with ASTM D5361/D5361M for determining in-place density. Cut samples neatly with a diamond core drill bit. Obtain random cores that are the full thickness of the layer being placed. Select core locations randomly using the procedures contained in ASTM D3665. Locate cores for mat density no closer than 12 inches from a transverse or longitudinal joint including the pavement edge. Center all cores for joint density on the joint. Discard samples that are clearly defective as a result of sampling and take an additional random core. When the random core is less than 1 inch thick, it will not be included in the analysis. In this case, obtain another random core sample. Clean and tack coat dry core holes before filling with asphalt mixture. Fill all core holes with asphalt mixture and compact using a standard Marshall hammer to the density specified. Provide all tools, labor, and materials for cutting samples, cleaning, and filling the cored pavement. Measure in-place density in accordance with ASTM D2726/D2726M using each core obtained from the mat and joint.

1.4.8.1 Tolerance

Provide a minimum in-place mat density of 93.0 percent and a minimum in-place joint density of 90.0 percent for each lot. The average in-place mat and joint densities are expressed as a percentage of the average theoretical maximum density (TMD) for the lot. Determine the average TMD in accordance with paragraph THEORETICAL MAXIMUM DENSITY (TMD). Remove and replace lots that do not meet the in-place mat density requirement at least 4 inches into the cold (existing) lane adjacent to the longitudinal joint, at no additional cost to the Government. Remove and replace the longitudinal joint when the lot does not meet the in-place joint density, at no additional cost to the Government. Use a 10 feet wide paving lane that is centered over the joint.

1.4.9 Surface Smoothness

Use a straightedge and profilograph for measuring surface smoothness. Use the profilograph method for all longitudinal testing, except for paving lanes less than 0.25 miles in length. Use the straightedge method for transverse testing, for longitudinal testing where the length of each pavement lane is less than 0.25 miles, and at the ends of the paving limits for the project. Smoothness requirements do not apply over crowns or grade breaks. Maintain detailed notes of the testing results and provide a copy to the Government immediately after each day's testing.

1.4.9.1 Smoothness Requirements

1.4.9.1.1 Straightedge Testing

Provide finished surfaces of the pavements with no abrupt change of 1/4 inch or more when checked with an approved 12-foot straightedge. Remove and replace surface lift lots when the surface smoothness exceeds 3/8 inch, at no additional cost to the Government. High spots can be diamond ground as an alternative to remove and replace in order to meet surface smoothness requirements at individual locations.

1.4.9.1.2 Profilograph Testing

Provide finished surfaces with a Profile Index not greater than 9 inches per mile when tested with an approved California-type profilograph. Remove and replace the lot when the Profile Index exceeds the tolerance by 4.0 inches per mile or more, at no additional cost to the Government. Correct any small individual area with surface deviation which exceeds the tolerance given above by more than 5.0 inches per mile or more by diamond grinding to meet the specification requirements above or remove and replace at no additional cost to the Government.

1.4.9.2 Testing Method

After the final rolling, but not later than 24 hours after placement, test the surface of the pavement in each entire lot in a manner to reveal surface irregularities exceeding the tolerances specified above. If any pavement areas are diamond ground, retest these areas immediately after diamond grinding. The maximum area allowed to be corrected by diamond grinding is 10 percent of the total area of the lot. Test the entire area of the pavement with a profilograph. Check a number of random locations along with any observed suspicious locations primarily at transverse and longitudinal joints with the straightedge.

1.4.9.2.1 Straightedge Testing

Use the straightedge to measure abrupt changes in surface smoothness. Hold the straightedge in contact with the pavement surface and measure the maximum distance between the straightedge and the pavement surface. Determine the amount of surface irregularity by placing the freestanding (unleveled) straightedge on the pavement surface and allowing it to rest upon the two highest spots covered by its length and measuring the maximum gap between the straightedge and the pavement surface in the area between these two high points.

1.4.9.2.2 Profilograph Testing

Perform profilograph testing using an approved California profilograph and procedures described in ASTM E1274. Provide equipment that utilizes electronic recording and automatic computerized reduction of data to indicate "must-grind" bumps and the Profile Index for the pavement. Use a "blanking band" that is 0.2 inch wide and the "bump template" spanning 1 inch with an offset of 0.4 inch. Provide profilograph operated by an approved, factory-trained operator on the alignments specified above. Provide a copy of the reduced tapes to the Government at the end of each day's testing.

1.4.9.2.3 Bumps ("Must Grind" Areas)

Reduce any bumps ("must grind" areas) shown on the profilograph trace which exceed 0.4 inch in height by diamond grinding until they do not exceed 0.3 inch when retested. Taper diamond grinding in all directions to provide smooth transitions to areas not requiring diamond grinding. The following will not be permitted: (1) skin patching for correcting low areas, (2) planing or milling for correcting high areas. Perform additional profilograph testing in all areas corrected by diamond grinding.

1.4.10 Plan Grade

Provide a final wearing surface of pavement conforming to the elevations and cross sections shown and not vary more than 0.05 foot from the plan grade established and approved at site of work. Within 5 working days after completion of a particular lot incorporating the final wearing course, test the final wearing surface of the pavement for conformance with specified plan grade requirements. Match finished surfaces at juncture with other pavements with finished surfaces of abutting pavements. Deviation from the plan elevation will not be permitted in areas of pavements where closer conformance with planned elevation is required for the proper functioning of drainage and other appurtenant structures involved. For parking lots, the grade will be determined by running lines of levels at intervals of 25 feet or less longitudinally and transversely to determine the elevation of the completed pavement surface. Diamond grinding can be used to remove high spots to meet grade requirements. Skin patching for correcting low areas or planing or milling for correcting high areas will not be permitted. Maintain detailed notes of the results of the testing and provide a copy to the Government immediately after each day's testing. Remove and replace surface lift lots when individual locations exceed 0.05-foot tolerance, at no additional cost to the Government. High spots can be diamond ground as an alternative to remove and replace in order to meet plan grade requirements at individual locations.

1.4.11 Laboratory Accreditation and Validation

Provide laboratories used to develop the Job Mix Formula (JMF), perform acceptance testing, and Contractor Quality Control testing that meet the requirements of ASTM D3666. Provide laboratories with a masonry saw having a diamond blade for trimming pavement cores and samples. Perform all required test methods by an accredited laboratory. Schedule and provide payment for laboratory inspections. Additional payment or a time extension due to failure to acquire the required laboratory accreditation is not allowed. Submit a certificate of compliance signed by the manager of the laboratory stating that it meets these requirements to the Government prior to the start of construction.

At a minimum, include the following certifications:

- a. Qualifications of personnel; laboratory manager, supervising technician, and testing technicians.
- b. A listing of equipment to be used in developing the job mix.
- c. A copy of the laboratory's quality control system.

1.5 ENVIRONMENTAL REQUIREMENTS

Do not place the asphalt mixture upon a wet surface or when the surface temperature of the underlying course is less than specified in Table 1. The temperature requirements may be waived by the Government, if requested; however, meet all other requirements including compaction.

Table 1. Surface Temperature Limitations of Underlying Course	
Mat Thickness, inches	Degrees F
3 or greater	40
Less than 3	45

PART 2 PRODUCTS

2.1 SYSTEM DESCRIPTION

Perform the work consisting of pavement courses composed of mineral aggregate and asphalt material heated and mixed in a central mixing plant and placed on a prepared course. Provide asphalt pavement designed and constructed in accordance with this section conforming to the lines, grades, thicknesses, and typical cross sections shown on the drawings. Construct each course to the depth, section, or elevation required by the drawings and rolled, finished, and approved before the placement of the next course. Submit proposed Placement Plan indicating lane widths and longitudinal joints for each course or lift.

2.1.1 Asphalt Mixing Plant

Provide plants used for the preparation of asphalt mixture conforming to the requirements of AASHTO M 156 with the following changes:

2.1.1.1 Truck Scales

Weigh the asphalt mixture on approved scales, or on certified public scales at no additional expense to the Government. Inspect and seal scales at least annually by an approved calibration laboratory.

2.1.1.2 Inspection of Plant

Provide access to the Government at all times, to all areas of the plant for checking adequacy of equipment; inspecting operation of the plant; verifying weights, proportions, and material properties; checking the temperatures maintained in the preparation of the mixtures and for taking samples. Provide assistance as requested, for the Government to procure any desired samples.

2.1.1.3 Storage bins

The asphalt mixture can be stored in non-insulated storage bins for a period of time not exceeding 3 hours. The asphalt mixture can be stored in insulated storage bins for a period of time not exceeding 8 hours. Provide the mix drawn from bins that meets the same requirements as mix loaded directly into trucks.

2.1.2 Hauling Equipment

Provide trucks used for hauling asphalt mixture that have tight, clean, and smooth metal beds. To prevent the mixture from adhering to them, lightly coat the truck beds with a minimum amount of paraffin oil, lime solution, or other approved material. Do not use petroleum based products as a release agent. Provide each truck with a suitable cover to protect the mixture from adverse weather, contamination, and loss of material during hauling. When necessary due to long haul distance and cold weather, provide insulated truck beds with covers (tarps) that are securely fastened.

2.1.3 Asphalt Pavers

Provide mechanical spreading and finishing equipment consisting of a self-powered paver, capable of spreading and finishing the mixture to the specified line, grade, and cross section. Provide paver screed capable of laying a uniform mixture to meet the specified thickness, smoothness, and grade without physical or temperature segregation, the full width of the material being placed. Provide a paver with a vibrating screed to be used during all placement.

2.1.3.1 Receiving Hopper

Provide paver with a receiving hopper of sufficient capacity to permit a uniform spreading operation and a distribution system to place the mixture uniformly in front of the screed without segregation. Provide a screed that effectively produces a finished surface of the required evenness and texture without tearing, shoving, or gouging the mixture.

2.1.3.2 Automatic Grade Controls

Provide a paver equipped with a control system capable of maintaining the specified screed elevation. One of three methods can be used to control grade: stringline, laser, or computerized elevations along with GPS. For multiple layers it is acceptable to control the grade in the underlying layer and control the grade of the surface layer by applying a constant thickness over the underlying layer which has been placed to the desired grade. Slope control can also be used to control the grade of the surface for roads but is not acceptable for wide pavements such as parking lots. Provide transverse slope controller capable of maintaining the screed at the desired slope within plus or minus 0.1 percent.

A ski-type device of not less than 30 ft can be used to provide improved smoothness. Use a shoe on one side of the paver to match an existing paved surface to provide a smooth joint.

2.1.4 Rollers

Provide rollers in good condition and operate at slow speeds to avoid displacement of the asphalt mixture. Provide sufficient number, type, and weight of rollers to compact the mixture to the required density while it is still in a workable condition. Do not use equipment which causes excessive crushing of the aggregate.

2.1.5 Diamond Grinding

Those performing diamond grinding are required to have a minimum of three years' experience in diamond grinding. In areas not meeting the specified limits for surface smoothness and plan grade, reduce high areas to attain the required smoothness and grade, except as depth is limited below. Reduce high areas by diamond grinding the asphalt pavement with approved equipment. Perform diamond grinding by sawing with saw blades impregnated with an industrial diamond abrasive. Assemble the saw blades in a cutting head mounted on a machine designed specifically for diamond grinding that produces the required texture and smoothness level without damage to the asphalt pavement or joint faces. Provide diamond grinding equipment with saw blades that are 1/8-inch wide, a minimum of 60 blades per 12 inches of cutting head width, and capable of cutting a path a minimum of 3 feet wide. Diamond grinding equipment that causes raveling, fracturing of aggregate, or disturbance to the underlying material will not be allowed. The maximum area corrected by diamond grinding the surface of the asphalt pavement is 10 percent of the total area of any lot. The maximum depth of diamond grinding is 1/2 inch. Provide diamond grinding machine equipped to flush and vacuum the pavement surface. Dispose of all debris from diamond grinding operations off Government property. Prior to diamond grinding, submit a Diamond Grinding Plan for review and approval. At a minimum, include the daily reports for the deficient areas, the location and extent of deficiencies, corrective actions, and equipment. Remove and replace all pavement areas requiring plan grade or surface smoothness corrections in excess of the limits specified.

Prior to production diamond grinding operations, perform a test section at the approved location, consisting of a minimum of two adjacent passes with a minimum length of 40 feet to allow evaluation of the finish and transition between adjacent passes. Production diamond grinding operations cannot be performed prior to approval.

2.2 AGGREGATES

Use CALTRANS Standard Specification 2018 for Asphalt Concrete Mix. Notify the Government at least 7 days before sampling aggregates. Obtain samples in accordance with ASTM D75/D75M that are representative of the materials to be used for the project. Provide aggregates consisting of crushed stone, crushed gravel, crushed slag, screenings, natural sand, and mineral filler as required. The portion of material retained on the No. 4 sieve is coarse aggregate. The portion of material passing the No. 4 sieve and retained on the No. 200 sieve is fine aggregate. The portion passing the No. 200 sieve is defined as mineral filler. Submit sufficient materials to produce 200 pounds of blended mixture for mix design verification.

Submit all aggregate test results and samples to the Government at least 14 days prior to start of construction. Perform job aggregate testing no earlier than 6 months before contract award.

2.2.1 Coarse Aggregate

Provide coarse aggregate consisting of sound, tough, durable particles, free from films of material that would prevent thorough coating and bonding with the asphalt material and free from organic matter and other deleterious substances. Provide coarse aggregate particles meeting the following requirements:

- a. The percentage of loss not greater than 40 percent after 500 revolutions when tested in accordance with ASTM C131/C131M.
- c. At least 75 percent by weight of coarse aggregate containing two or more fractured faces when tested in accordance with ASTM D5821 with fractured faces produced by crushing.
- d. The particle shape essentially cubical and the aggregate containing not more than 10 percent, by weight, of flat and elongated particles (5:1 ratio of length to thickness) when tested in accordance with ASTM D4791, Method B.
- e. Slag consisting of air-cooled, blast furnace slag with a compacted weight of not less than 75 lb/cu ft when tested in accordance with ASTM C29/C29M.
- f. Clay lumps and friable particles not exceeding 0.3 percent, by weight, when tested in accordance with ASTM C142/C142M.

2.2.2 Fine Aggregate

Provide fine aggregate consisting of clean, sound, tough, durable particles. Provide aggregate particles that are free from coatings of clay, silt, or any objectionable material, contain no clay balls, and meet the following requirements:

- a. Quantity of natural sand (noncrushed material) added to the aggregate blend not exceeding 15 percent by weight of total aggregate.
- b. Individual fine aggregate sources with a sand equivalent value greater than 45 when tested in accordance with ASTM D2419.
- c. Fine aggregate portion of the blended aggregate with an uncompacted void content greater than 45.0 percent when tested in accordance with AASHTO T 304 Method A.
- d. Clay lumps and friable particles not exceeding 0.3 percent, by weight, when tested in accordance with ASTM C142/C142M.

2.2.3 Mineral Filler

Provide mineral filler consisting of a nonplastic material meeting the requirements of ASTM D242/D242M.

2.2.4 Aggregate Gradation

Provide a combined aggregate gradation that conforms to gradations specified in Table 2, when tested in accordance with ASTM C136/C136M and ASTM C117, and does not vary from the low limit on one sieve to the high limit on the adjacent sieve or vice versa, but grades uniformly from coarse to fine. Provide a JMF within the specification limits; however, the gradation can exceed the limits when the allowable deviation from the JMF shown in Tables 4 and 5 are applied.

Table 2. Aggregate Gradations			
Sieve Size, inch	Gradation 1 Percent Passing by Mass	Gradation 2 Percent Passing by Mass	Gradation 3 Percent Passing by Mass
1	100	---	---
3/4	90-100	100	---
1/2	68-88	90-100	100
3/8	60-82	69-89	90-100
No. 4	45-67	53-73	58-78
No. 8	32-54	38-60	40-60
No. 16	22-44	26-48	28-48
Table 2. Aggregate Gradations			
Sieve Size, inch	Gradation 1 Percent Passing by Mass	Gradation 2 Percent Passing by Mass	Gradation 3 Percent Passing by Mass
No. 30	15-35	18-38	18-38
No. 50	9-25	11-27	11-27
No. 100	6-18	6-18	6-18
No. 200	3-6	3-6	3-6

2.3 ASPHALT CEMENT BINDER

Provide asphalt cement binder that conforms to ASTM D6373 Performance Grade (PG) 64-10. Provide test data indicating grade certification by the supplier at the delivery of each load to the mix plant. Submit copies of these certifications to the Government. The supplier is defined as the last source of any modification to the binder. The Government may sample and test the binder at the mix plant at any time before or during mix production. Submit 5-gallon sample of the asphalt cement or asphalt binder not less than 14 days before start of the test section for mix design verification and approval. Obtain samples for this verification testing in accordance with ASTM D140/D140M and in the presence of the Government. Provide these samples to the Government for the verification testing, which will be performed at the Government's expense.

2.4 MIX DESIGN

Develop the mix design. Perform Job Mix formula (JMF) and aggregates testing no earlier than 6 months before contract award. Provide asphalt mixture composed of well-graded aggregate, mineral filler if required, and asphalt material. Provide aggregate fractions sized, handled in separate size groups, and combined in such proportions that the resulting mixture meets the grading requirements of Table 2. Do not produce asphalt pavement for acceptance until a JMF has been approved. Use laboratory compaction temperatures for Polymer Modified Asphalts as recommended by the asphalt binder manufacturer. Determine the Tensile Strength Ratio (TSR) of the composite mixture in accordance with ASTM D4867/D4867M. Compact the TSR specimens to an air void content of 7 percent plus or minus 1 percent. If the Tensile Strength Ratio (TSR) of the composite mixture is less than 75, reject the aggregates or treat the asphalt mixture with an anti-stripping agent. Add a sufficient amount of anti-stripping agent to produce a TSR of not less than 75. If an antistrip agent is required, provide it at no additional cost to the Government. Provide sufficient materials to produce 200 pound of blended mixture to the Government for verification of mix design at least 14 days prior to construction of test section.

2.4.1 JMF Requirements

Submit the proposed JMF in writing, for approval, at least 14 days prior to the start of the test section including, as a minimum:

- a. Percent passing each sieve size.
- b. Percent of asphalt cement.
- c. Percent of each aggregate and mineral filler to be used.
- d. Asphalt performance grade or penetration grade.
- e. Laboratory mixing temperature.
- f. Laboratory compaction temperature.
- g. Temperature-viscosity relationship of the asphalt cement
- h. Plot of the combined gradation on the 0.45 power gradation chart, stating the nominal maximum size.
- i. Graphical plots and summary tabulation of air voids, voids in the mineral aggregate, and unit weight versus asphalt content as shown in AI MS-2. Include summary tabulation that includes individual specimen data for each specimen tested.
- j. Specific gravity and absorption of each aggregate.
- k. Percent natural sand.
- l. Percent particles with two or more fractured faces (in coarse aggregate).
- m. Fine aggregate angularity.
- n. Percent flat or elongated particles in coarse aggregate.

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- p. Tensile Strength Ratio and wet/dry specimen test results.
- q. Antistrip agent (if required).
- r. List of all modifiers.
- s. Percentage and properties (asphalt content, aggregate gradation, and aggregate properties) of RAP in accordance with paragraph RECYCLED ASPHALT PAVEMENT, if RAP is used.

Table 3. Mix Design Criteria			
Test Property	Marshall (50 Blows)	Marshall (75 Blows)	Superpave (50 gyrations)
Stability, pounds, minimum (NA for Superpave)	1000 ⁽¹⁾	1800 ⁽¹⁾	NA
Flow, 0.01 inch, (NA for Superpave)	8-18	8-16	NA
Test Property	Marshall (50 Blows)	Marshall (75 Blows)	Superpave (50 gyrations)
Air voids, percent	3-5	3-5	3-5
Minimum Percent Voids in Mineral Aggregate (VMA) ⁽²⁾			
Gradation 1	13.0	13.0	13.0
Gradation 2	14.0	14.0	14.0
Gradation 3	15.0	15.0	15.0
TSR, minimum percent	75	75	75
(1) This is a minimum requirement. Provide significantly higher average during construction to ensure compliance with the specifications.			
(2) Calculate VMA in accordance with AI MS-2, based on ASTM C127 and ASTM C128 bulk specific gravity for the aggregate.			

2.4.2 Adjustments to JMF

The JMF for each mixture is in effect until a new formula is approved in writing by the Government. Should a change in sources of any materials be made, perform a new mix design and a new JMF approved before the new material is used. Make minor adjustments within the specification limits to the JMF to optimize mix volumetric properties. Adjustments to the original JMF are limited to plus or minus 4 percent on the No. 4 and coarser sieves; plus, or minus 3 percent on the No. 8 to No. 50 sieves; and plus, or minus 1 percent on the No. 100 sieve and No. 200 sieve.

Asphalt content adjustments are limited to plus or minus 0.40 from the original JMF. If adjustments are needed that exceed these limits, develop a new mix design.

2.5 RECYCLED HOT MIX ASPHALT

Provide recycled asphalt mixture consisting of reclaimed asphalt pavement (RAP), coarse aggregate, fine aggregate, mineral filler, and asphalt cement. Provide RAP of a consistent gradation, asphalt content, and properties. Maintain RAP stockpiles free from contamination including coal-tar sealers. Limit the maximum RAP chunk size to 2 inches when feeding RAP into the plant. The individual aggregates in a RAP chunk are not to exceed the maximum size aggregate of the gradation specified in Table 2. Design the recycled asphalt mixture using procedures contained in AI MS-2. Provide RAP job mix that meets the requirements of paragraph MIX DESIGN. Limit the amount of RAP so the asphalt binder from the RAP does not exceed 30 percent of the total asphalt content.

2.5.1 RAP Aggregates and Asphalt Cement

Provide a blend of aggregates used in the recycled mix that meet the requirements of paragraph AGGREGATES. Establish the percentage of asphalt binder in the RAP for the mixture design according to ASTM D2172/D2172M or ASTM D6307 using the appropriate dust correction procedure.

2.5.2 RAP Mix

Select the virgin asphalt binder as described below:

- a. For 0 to 20 percent recycled binder content - no change in virgin binder selection.
- b. For 20+ percent to 30 percent recycled binder content - select virgin binder one grade softer than normal.

PART 3 EXECUTION

3.1 CONTRACTOR QUALITY CONTROL

3.1.1 General Quality Control Requirements

Submit the Quality Control Plan. Do not produce hot-mix asphalt for acceptance until the quality control plan has been approved. In the quality control plan, address all elements which affect the quality of the pavement including, but not limited to:

- a. Mix Design and unique JMF identification code
- b. Aggregate Grading
- c. Quality of Materials
- d. Stockpile Management and procedures to prevent contamination
- e. Proportioning

- f. Mixing and Transportation
- g. Mixture Volumetrics
- h. Moisture Content of Mixtures
- i. Placing and Compaction
- j. Joints
- k. Surface Smoothness
- l. Truck bed release agent

3.1.2 Testing Laboratory

Provide a fully equipped asphalt laboratory located at the plant or job site that is equipped with heating and air conditioning units to maintain a temperature of 75 plus or minus 5 degrees F. Provide laboratory facilities that are kept clean and all equipment maintained in proper working condition. Provide the Government with unrestricted access to inspect the laboratory facility, to witness quality control activities, and to perform any check testing desired. The Government will advise in writing of any noted deficiencies concerning the laboratory facility, equipment, supplies, or testing personnel and procedures. When the deficiencies are serious enough to adversely affect test results, immediately suspend the incorporation of the materials into the work. Incorporation of the materials into the work will not be permitted to resume until the deficiencies are corrected.

3.1.3 Quality Control Testing

Perform all quality control tests applicable to these specifications and as set forth in the Quality Control Program. Use the independent commercial laboratory for acceptance testing in paragraph ACCEPTANCE. Use in-house capabilities or the independent commercial laboratory for quality control testing. Required elements of the testing program include but are not limited to tests for the control of asphalt content, aggregate gradation, aggregate moisture, moisture in the asphalt mixture, temperatures, VMA, and in-place density. Develop a Quality Control Testing Plan as part of the Quality Control Program.

3.1.3.1 Asphalt Content

Determine asphalt content a minimum of twice per lot (a lot is defined in paragraph PAVEMENT LOTS) using the ignition method in accordance with ASTM D6307. Use the extraction method in accordance with ASTM D2172/D2172M if the correction factor for the ignition method in ASTM D6307 is greater than 1.0. The asphalt content for the lot will be determined by averaging the test results.

3.1.3.2 Aggregate Properties

Determine aggregate gradations a minimum of twice per lot from mechanical analysis of extracted aggregate in accordance with ASTM D5444,

ASTM C136/C136M, and ASTM C117. Determine the specific gravity of each aggregate size grouping for each 20,000 tons in accordance with ASTM C127 or ASTM C128. Determine fractured faces for gravel sources for each 20,000 tons in accordance with ASTM D5821. Determine the uncompacted void content of natural sand, manufactured sand, and blended aggregate for each 20,000 tons in accordance with AASHTO T 304 Method A.

3.1.3.3 Moisture Content of Aggregate

Determine the moisture content of aggregate used for production a minimum of once per lot in accordance with ASTM C566.

3.1.3.4 Moisture Content of Asphalt Mixture

Determine the moisture content of the asphalt mixture at least once per lot in accordance with AASHTO T 329.

3.1.3.5 Temperatures

Check temperatures at least four times per lot, at necessary locations to determine the temperature at the dryer, the asphalt cement binder in the storage tank, the asphalt mixture at the plant, and the asphalt mixture at the job site.

3.1.3.6 VMA

Obtain mixture samples at least four times per lot. Calculate the VMA of each specimen in accordance with AI MS-2 based on ASTM C127 and ASTM C128 bulk specific gravity for the aggregate. Provide VMA within the limits of Table 3.

3.1.3.7 In-Place Density

Conduct any necessary testing to ensure the specified density is achieved. A nuclear gauge or other non-destructive testing device can be used to monitor pavement density.

3.1.3.8 Additional Testing

Perform any additional testing deemed necessary to control the process.

3.1.3.9 QC Monitoring

Submit all QC test results to the Government on a daily basis as the tests are performed. The Government reserves the right to monitor any of the Contractor's quality control testing and to perform duplicate testing as a check to the Contractor's quality control testing.

3.1.4 Sampling

When directed by the Government, sample and test any material which appears to not meet specification requirements unless such material is voluntarily removed and replaced or deficiencies corrected. Perform all sampling in accordance with standard procedures specified.

3.1.5 Control Charts

For process control, establish and maintain linear control charts on both individual samples and the running average of last four samples for the parameters listed in Table 4, as a minimum. Post the control charts as directed by the Government and maintain current at all times. Identify the following on the control charts: the project number, the test parameter being plotted, the individual sample numbers, the Action and Suspension Limits listed in Table 4 applicable to the test parameter being plotted, and the test results. Also show target values (JMF) on the control charts as indicators of central tendency for the cumulative percent passing, asphalt content, and laboratory air voids parameters. When the test results exceed applicable Action Limit, take immediate steps to bring the process back in control. When the test results exceed applicable Suspension Limit, halt production until the problem is solved. When the Suspension Limit is exceeded for individual values or running average values, the Government has the option to require removal and replacement of the material represented by the samples or to leave in place and base acceptance on mixture volumetric properties and in place density. Use the control charts as part of the process control system for identifying trends so that potential problems can be corrected before they occur. Make decisions concerning mix modifications based on analysis of the results provided in the control charts. In the Quality Control Plan, indicate the appropriate action to be taken to bring the process into control when certain parameters exceed their Action Limits.

Table 4. Action and Suspension Limits for the Parameters to be Plotted on Individual and Running Average Control Charts				
Parameter to be Plotted	Individual Samples		Running Average of	
	Action Limit	Suspension Limit	Action Limit	Suspension Limit
No. 4 sieve, Cumulative percent passing, deviation for JMF target; plus or minus values	6	8	4	5
No. 30 sieve, Cumulative percent passing, deviation for JMF target; plus or minus values	4	6	3	4
No. 200 sieve, Cumulative percent passing, deviation for JMF target; plus or minus values	1.4	2.0	1.1	1.5
Asphalt content, percent deviation from JMF target; plus or minus value	0.4	0.5	0.2	0.3
Stability, pounds (minimum) (NA for Superpave)				
75 Blow JMF	1800	1700	1900	1800
50 Blow JMF	1000	900	1100	1000
Flow, 0.01 inch (NA for Superpave)				
75 Blow JMF	8 min.	7 min.	9 min.	8 min.
	16 max.	17 max.	15 max.	16 max.
50 Blow JMF	8 min.	7 min.	9 min.	8 min.
	18 max.	19 max.	17 max.	18 max.
Laboratory Air Voids, percent deviation from JMF target value	No specific action and suspension limits set since this parameter is used for acceptance			

In-place Mat Density, percent of TMD	No specific action and suspension limits set since this parameter is used for acceptance			
In-place Joint Density, percent of TMD	No specific action and suspension limits set since this parameter is used for acceptance			
VMA				
Gradation 1	13.5	13.0	13.3	13.0
Gradation 2	14.5	14.0	14.3	14.0
Gradation 3	15.5	15.0	15.3	15.0

3.2 PREPARATION OF ASPHALT BINDER MATERIAL

Heat the asphalt cement material while avoiding local overheating. Provide a continuous supply of the asphalt material to the mixer at a uniform temperature. Maintain the temperature of the asphalt delivered to the mixer to provide a suitable viscosity for adequate coating of the aggregate particles. For hot-mix, do not heat unmodified asphalt to a temperature exceeding 325 degrees F when added to the aggregate. Do not heat modified asphalt to a temperature exceeding 350 degrees F when added to the aggregate.

3.3 PREPARATION OF MINERAL AGGREGATE

Heat and dry the aggregate prior to mixing. Provide a rate of heating and a maximum temperature that does not damage the aggregates. Do not heat the aggregate to a temperature exceeding 350 degrees F when the asphalt binder is added. Maintain the temperature no lower than is required to obtain complete coating and uniform distribution on the aggregate particles and to provide a mixture of satisfactory workability.

3.4 PREPARATION OF ASPHALT MIXTURE

Weigh or meter the aggregates and the asphalt cement and introduce into the mixer the amount specified by the JMF. Mix the combined materials until the aggregate obtains a uniform coating of asphalt binder and is thoroughly distributed throughout the mixture. The moisture content of all asphalt mixture upon discharge from the plant is not to exceed 0.5 percent by total weight of mixture as measured by AASHTO T 329.

3.5 PREPARATION OF THE UNDERLYING SURFACE

Immediately before placing the asphalt mixture, clean the underlying course of dust and debris. Apply a prime coat in accordance with Section 32 12 13 BITUMINOUS TACK AND PRIME COATS.

3.6 TEST SECTION

Prior to full production, place a test section for each JMF used. Construct a test section 250 to 500 feet long and two paver passes wide with a longitudinal cold joint. Do not place the second lane of test section until the temperature of pavement edge is less than 175 degrees F. Construct the test section with the same depth as the course which it represents. Ensure the underlying grade or pavement structure upon which the test section is to be constructed is the same or very similar to underlying layer for the project. Use

the same equipment and procedures in construction of the test section as on the remainder of the course represented by the test section. Construct the test section as part of the project pavement, as approved by the Government.

3.6.1 Sampling and Testing for Test Section

Obtain one sample at the plant from a random truck. Compact three specimens and test for laboratory air voids. Test a portion of the same sample for theoretical maximum density (TMD), aggregate gradation, asphalt content, and TSR. Adjust the compactive effort as required to provide TSR specimens with an air void content of 7 plus or minus 1 percent. Obtain four randomly selected cores from each finished pavement mat (eight total), four from the longitudinal joint, and test for density. Perform random sampling in accordance with procedures contained in ASTM D3665. Construction may continue provided the test results are within the tolerances or exceed the minimum values shown in Table 5. If all test results meet the specified requirements, the test section may remain as part of the project pavement. If test results exceed the tolerances shown, remove and replace the test section and construct another test section at no additional cost to the Government.

Table 5. Test Section Requirements for Material and Mixture Properties	
Property	Specification Limit
Aggregate Gradation-Percent Passing (Individual Test Result)	
Property	Specification Limit
No. 4 and larger	JMF plus or minus 8
No. 8, No. 16, No. 30, and No. 50	JMF plus or minus 6
No. 100 and No. 200	JMF plus or minus 2.0
Asphalt Content, Percent (Individual Test Result)	JMF plus or minus 0.5
Laboratory Air Voids, Percent (Average of 3 specimens)	JMF plus or minus 1.0
VMA, Percent (Average of 3 specimens)	See Table 3
Tensile Strength Ratio (TSR) (At 7 percent plus/minus 1 percent air void content)	75 percent minimum
Conditioned Strength	60 psi minimum
Mat Density, Percent of TMD (Average of 4 Random Cores)	93.0 minimum
Joint Density, Percent of TMD (Average of 4 Random Cores)	90.0 minimum

Stability, pounds (Average of 3 specimens) (for Marshall only)	1000 minimum for 50 blows
Flow, 0.01 inch (Average of 3 specimens) (for Marshall only with non-modified asphalt)	8 - 18 for 50 blows

3.6.2 Additional Test Sections

If the initial test section should prove to be unacceptable, make the necessary adjustments to the JMF, plant operation, placing procedures, and rolling procedures before beginning construction of a second test section. Construct and evaluate additional test sections, as required, for conformance to the specifications. Full production paving is not allowed until an acceptable section has been constructed and accepted.

3.7 TRANSPORTING AND PLACING

3.7.1 Transporting

Transport asphalt mixture from the mixing plant to the site in clean, tight vehicles. Schedule deliveries so that placing and compacting of mixture is uniform with minimum stopping and starting of the paver. Provide adequate artificial lighting for night placements. Hauling over freshly placed material will not be permitted until the material has been compacted as specified, and allowed to cool to 140 degrees F.

3.7.2 Placing

Place the mix in lifts of adequate thickness and compact at a temperature suitable for obtaining density, surface smoothness, and other specified requirements. Upon arrival, place the mixture to the full width by an asphalt paver; strike off in a uniform layer of such depth that, when the work is completed, the required thickness is obtained, and the surface conforms to the grade and contour indicated. Do not broadcast waste mixture onto the mat or recycle into the paver hopper. Collect waste mixture and dispose offsite. Regulate the speed of the paver to eliminate pulling and tearing of the asphalt mat. Begin placement of the mixture along the centerline of a crowned section or on the high side of areas with a one-way slope. Place the mixture in consecutive adjacent strips having a minimum width of 10 feet. Offset the longitudinal joint in one course from the longitudinal joint in the course immediately below by at least 1 foot; however, locate the joint in the surface course at the centerline of the pavement. Offset transverse joints in one course by at least 10 feet from transverse joints in the previous course. Offset transverse joints in adjacent lanes a minimum of 10 feet. On isolated areas where irregularities or unavoidable obstacles make the use of mechanical spreading and finishing equipment impractical, the mixture can be spread and luted by hand tools.

3.8 COMPACTION OF MIXTURE

3.8.1 General

- a. After placing, thoroughly and uniformly compact the mixture by rolling. Compact the surface as soon as possible without causing displacement, cracking, or shoving. Determine the sequence of rolling operations and the type of rollers used with the exception that application of more than three passes with a vibratory roller in the vibrating mode is prohibited. Maintain the speed of the roller, at all times, sufficiently slow to avoid displacement of the asphalt mixture and to be effective in compaction. Correct at once any displacement occurring as a result of reversing the direction of the roller, or from any other cause.
- b. Furnish sufficient rollers to handle the output of the plant. Continue rolling until the surface is of uniform texture, true to grade and cross section, and the required field density is obtained. To prevent adhesion of the mixture to the roller, keep the wheels properly moistened, but excessive water is not permitted. In areas not accessible to the roller, thoroughly compact the mixture with hand tampers or small compactors. Remove the full depth of any mixture that becomes loose and broken, mixed with dirt, contains check-cracking, or is in any way defective. Replace with fresh asphalt mixture and immediately compact to conform to the surrounding area. Perform this work at no expense to the Government. Skin patching is not allowed.

3.8.2 Segregation

The Government can sample and test any material that looks deficient. When the in-place material appears to be segregated, the Government has the option to sample the material and have it tested and compared to the aggregate gradation, asphalt content, and in-place density requirements in Table 5. If the material fails to meet these specification requirements, remove and replace the extent of the segregated material the full depth of the layer of asphalt mixture at no additional cost to the Government. When segregation occurs in the mat, take appropriate action to correct the process so that additional segregation does not occur.

3.9 JOINTS

Construct joints to ensure a continuous bond between the courses and to obtain the required density. Provide all joints with the same texture as other sections of the course and meet the requirements for smoothness and grade.

3.9.1 Transverse Joints

Do not pass the roller over the unprotected end of the freshly laid mixture, except when necessary to form a transverse joint. When necessary to form a transverse joint, construct by means of placing a bulkhead or by tapering the course. Utilize a dry saw cut on the transverse joint full depth and width on a straight line to expose a vertical face prior to placing the adjacent lane. Remove the cutback material from the project. In both methods, provide a light tack coat of asphalt material to all contact surfaces before placing any fresh mixture against the joint.

3.9.2 Longitudinal Joints

Provide a joint that meets density and smoothness requirements for joints and has uniform texture. Cut back longitudinal joints which are irregular, damaged, uncompacted, cold (less than 175 degrees F at the time of placing adjacent lanes), or otherwise defective, a maximum of 3 inches from the top of the course with a cutting wheel to expose a clean, sound, near vertical surface for the full depth of the course. Remove all cutback material from the project. Provide a light tack coat of asphalt material to all contact surfaces prior to placing any fresh mixture against the joint.

End of Section

SECTION 32 11 20
PAVEMENT MARKINGS

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 ASSOCIATION OF STATE HIGHWAY AND TRANSPORTATION
OFFICIALS (AASHTO)

AASHTO M 249	(2012; R2016) Standard Specification for White and Yellow Reflective Thermoplastic Striping Material (Solid Form)
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ASTM INTERNATIONAL (ASTM)

ASTM D4061	(2013) Standard Test Method for Retroreflectance of Horizontal Coatings
ASTM D4280	(2012) Extended Life Type, Nonplowable, Raised, Retroreflective Pavement Markers
ASTM D6628	(2003; R 2015) Standard Specification for Color of Pavement Marking Materials
ASTM E1710	(2011) Standard Test Method for Measurement of Retroreflective Pavement Marking Materials with CEN-Prescribed Geometry Using a Portable Retroreflectometer
ASTM E2177	(2011) Standard Test Method for Measuring the Coefficient of Retroreflected Luminance (RL) of Pavement Markings in a Standard Condition of Wetness
ASTM E2302	(2003; R 2016) Standard Test Method for Measurement of the Luminance Coefficient Under Diffuse Illumination of Pavement Marking Materials Using a Portable Reflectometer

1.1 SUBMITTALS

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

SD-03 Product Data

Surface Preparation Equipment List; G,
Application Equipment List; G
Exterior Surface Preparation
Safety Data Sheets; G
media for roads; G Waterborne Paint; G
Solventborne Paint; G
Thermoplastic compound; G
Raised Pavement Markers Primers and Adhesives; G

SD-06 Test Reports

Reflective Media for Airfields; G
Reflective Media for Roads; G
Waterborne Paint; G
Solventborne Paint; G
High Build Acrylic Coating (HBAC); G
Thermoplastic Compound; G
Raised Pavement Markers Primers and Adhesives, G
Test Reports

SD-07 Certificates

Qualifications; G
Media for Roads Waterborne Paint
Solventborne Paint
Volatile Organic Compound, (VOC); G

Thermoplastic Compound; G

SD-08 Manufacturer's Instructions

Waterborne Paint; G

Solventborne Paint; G

Thermoplastic Compound; G

1.2 QUALITY ASSURANCE

1.2.1 Regulatory Requirements

Submit certificate stating that the proposed pavement marking paint meets the Volatile Organic Compound, (VOC) regulations of the local Air Pollution Control District having jurisdiction over the geographical area in which the project is located. Submit Safety Data Sheets for each product.

1.2.2 Qualifications

Submit documentation certifying that pertinent personnel are qualified for equipment operation and handling of applicable chemicals. The documentation should include experience on five projects of similar size and scope with references for all personnel.

1.3 DELIVERY AND STORAGE

Deliver paint materials, thermoplastic compound materials, and reflective media 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, only in areas approved by the Contracting Officer, for maintaining materials at temperatures recommended by the manufacturer. Make available paint stored at the project site or segregated at the source for sampling not less than 30 days prior to date of required approval for use to allow sufficient time for testing. Notify the Contracting Officer when paint is available for sampling.

1.4 PROJECT/SITE CONDITIONS

1.4.1 Environmental Requirements

1.4.1.1 Weather Limitations for Application

Apply pavement markings to clean, dry surfaces, and unless otherwise approved, only when the air and pavement surface temperature is at least 5 degrees F above the dew point and the air and pavement temperatures are within the limits recommended by the pavement marking manufacturer. Allow pavement surfaces to dry after water has been used for cleaning or rainfall has occurred prior to striping or marking. Test the pavement surface for moisture before beginning work each day and after cleaning.

Do not commence marking until the pavement is sufficiently dry and the pavement condition has been approved by the Contracting Officer. Employ the "plastic wrap method" to test the pavement for moisture as specified in paragraph TESTING FOR MOISTURE.

1.4.1.2 Weather Limitations for Removal of Pavement Markings on Roads and Automotive Parking Areas

Pavement surface must be free of snow, ice, or slush; with a surface temperature of at least 40 degrees F and rising at the beginning of operations, except those involving shot or sand blasting or grinding. Cease operation during thunderstorms, or during rainfall, except for waterboarding and removal of previously applied chemicals. Cease waterblasting where surface water accumulation alters the effectiveness of material removal.

1.4.2 Traffic Controls

Place warning signs conforming to MUTCD near the beginning of the worksite and well ahead of the worksite for alerting approaching traffic from both directions. Place small markers 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. Mark painting equipment with large warning signs indicating slow-moving painting equipment in operation.

When traffic must be rerouted or controlled to accomplish the work, provide necessary warning signs, flag persons, and related equipment for the safe passage of vehicles.

PART 2 PRODUCTS

2.1 EQUIPMENT

2.1.1 Surface Preparation and Paint Removal

2.1.1.1 Surface Preparation Equipment for Roads and Automotive Parking Areas

Submit a surface preparation equipment list by serial number, type, model, and manufacturer. Include descriptive data indicating area of coverage per pass, pressure adjustment range, tank and flow capacities, and safety precautions required for the equipment operation. Mobile equipment must allow for removal of markings without damaging the pavement surface or joint sealant. Maintain machines, tools, and equipment used in the performance of the work in satisfactory operating condition.

2.1.1.1.1 Sandblasting Equipment

Use mobile sandblasting equipment capable of producing a pressurized stream of sand and air that effectively removes paint from the surface without filling voids with debris in asphalt or tar pavements or removing joint sealants in Portland cement concrete pavements. Include with the equipment and air compressor, hoses, and nozzles of adequate size and capacity for removing paint. Equip the compressor with traps and coalescing filters that maintain the compressed air free of oil and water.

2.1.1.1.2 Waterblasting Equipment

Use mobile waterblasting equipment capable of producing a pressurized stream of water that effectively removes paint from the pavement surface without significantly damaging the pavement. Provide equipment, tools, and machinery which are safe and in good working order at all times.

2.1.1.1.3 Grinding or Scarifying Equipment

Use equipment capable of removing surface contaminants, paint build-up, or extraneous markings from the pavement surface without leaving any residue. Clean the surface by hydro blast to remove surface contaminants and ash after a weed torch is used to remove paint.

2.1.1.1.4 Chemical Removal Equipment

Use chemical equipment capable of applying and removing chemicals and paint from the pavement surface, leaving only non-toxic biodegradable residue without scarring or other damage to the pavement or joints and joint seals.

2.1.2 Application Equipment

Submit application equipment list appropriate for the material(s) to be used. Include manufacturer's descriptive data and certification for the planned use that indicates area of coverage per pass, pressure adjustment range, tank and flow capacities, and all safety precautions required for operating and maintaining the equipment. Provide and maintain machines, tools, and equipment used in the performance of the work in satisfactory operating condition or remove them from the work site. Provide mobile and maneuverable application equipment to the extent that straight lines can be followed and normal curves can be made in a true arc.

2.1.2.1 Paint Application Equipment

2.1.2.1.1 Hand-Operated, Push-Type Machines

Provide hand-operated push-type applicator machine of a type commonly used for application of water-based paint or two-component, chemically curing paint, thermoplastic, or preformed tape, to pavement surfaces for small marking projects, such as legends and cross-walks, automotive parking areas, or surface painted signs. Provide applicator machine equipped with the necessary tanks and spraying nozzles capable of applying paint uniformly at coverage specified. Hand operated spray guns may be used in areas where push-type machines cannot be used.

2.1.2.1.2 Self-Propelled or Mobile-Drawn Spraying Machines

Provide self-propelled or mobile-drawn 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.

2.1.2.1.2.1 Road Marking

Provide equipment used for marking roads 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.

2.1.2.1.2.2 Hand Application

Provide spray guns for hand application of paint in areas where the mobile paint applicator cannot be used.

2.1.2.2 Thermoplastic Application Equipment

2.1.2.2.1 Thermoplastic Material

Apply thermoplastic material with equipment that is capable of providing continuous uniformity in the dimensions and reflectorization of the marking.

2.1.2.2.2 Application Equipment

- a. Provide application equipment capable of continuous mixing and agitation of the material, with conveying parts which prevent accumulation and clogging between the main material reservoir and the extrusion shoe or spray gun. All parts of the equipment which come into contact with the material must be easily accessible and exposed for cleaning and maintenance. All mixing and conveying parts up to and including the extrusion shoes and spray guns must maintain the material at the required temperature with heat-transfer oil or electrical-element-controlled heat.
- b. Provide application equipment constructed to ensure continuous uniformity in the dimensions of the stripe. Provide an applicator with a means for cleanly cutting off stripe ends squarely and providing a method of applying "skiplines." Provide equipment capable of applying varying widths of traffic markings.
- c. Provide mobile and maneuverable application equipment allowing straight lines to be followed and normal curves to be made in a true arc. Provide equipment used for the placement of thermoplastic pavement markings of two general types: mobile applicator and portable applicator.
- d. Equip the applicator with a pressurized or drop-on type bead dispenser capable of uniformly dispensing reflective glass spheres at controlled rates of flow. The bead dispenser must operate automatically to begin flow prior to the flow of binder to assure that the strip is fully reflectorized.

2.1.2.2.3 Mobile Application Equipment

Provide a truck-mounted, self-contained pavement marking machine that is capable of hot applying thermoplastic by either the extrusion or spray method.

- a. Equip the unit to apply the thermoplastic marking material at temperatures according to the manufacturer's instructions, at widths varying from 3 to 12 inches, with an automatic pressurized or drop-on bead dispensing system, capable of operating continuously, and of installing a minimum of 20,000 lineal feet of longitudinal markings in an 8-hour day.
- b. Equip the mobile unit with a melting kettle which holds a minimum of 6000 pounds of molten thermoplastic material; capable of heating the thermoplastic composition to temperatures as recommended by the manufacturer. Use a thermostatically controlled heat transfer liquid. Heating of the composition by direct flame is not allowed.

Oil and material temperature gauges must be visible at both ends of the kettle.

- c. Equip mobile units for application of extruded markings with a minimum of two extrusion shoes; located one on each side of the truck, capable of marking simultaneous edge line and centerline stripes; each being a closed, oil-jacketed unit; holding the molten thermoplastic at a temperature as recommended by the manufacturer; and 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, of generally uniform cross section.
- d. Equip mobile units for application of spray markings with a spray gun system capable of marking simultaneous edgeline and centerline stripes. Surround (jacket) the spray system with heating oil to maintain the molten thermoplastic at a temperature of 375 to 425 degrees F, capable of spraying a stripe of 3 to 12 inches in width, and in thicknesses varying from 0.060 inch to 0.098 inch, of generally uniform cross section.
- e. Equip the mobile unit with an electronic programmable line pattern control system, 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, equip the mobile unit 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.

2.1.2.2.4 Portable Application Equipment

Provide portable hand-operated equipment, specifically designed for placing special markings such as crosswalks, stop bars, legends, arrows, and short lengths of lane, edge and centerlines; and capable of applying thermoplastic pavement markings by the extrusion method. Equip the portable applicator with all the necessary components, including a materials storage reservoir, bead dispenser, extrusion shoe, and heating accessories, capable of holding the molten thermoplastic at the temperature recommended by the manufacturer, and 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.

2.1.2.3 Reflective Media Dispenser

Attach the dispenser for applying the reflective media to the thermoplastic dispenser and designed to operate automatically and simultaneously with the applicator through the same control mechanism. The bead applicator must 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.

2.1.2.4 Preformed Tape Application Equipment

Provide and use mechanical application equipment for the placement of preformed marking tape which is a mobile pavement marking machine specifically designed for use in applying pressure-sensitive pavement marking tape of varying widths. Equip the applicator with rollers, or other suitable compaction device to provide initial adhesion of the material with the pavement surface. Use additional tools and devices as needed to properly seat the applied material as recommended by the manufacturer.

2.2 MATERIALS

Use thermoplastic for roads. The maximum allowable VOC content of pavement markings is 150 grams per liter. Color of markings are indicated on the drawings and must conform to ASTM D6628 for roads and automotive parking areas and SAE AMS-STD-595A for airfields. Provide materials conforming to the requirements specified herein.

2.2.1 Thermoplastic Compound

2.2.1.1 Composition Requirements

Thermoplastic compound must conform to AASHTO M 249. Formulate the binder component as an alkyd resin.

2.2.1.2 Primer

- a. Asphalt concrete primer: Provide thermosetting adhesive primer with a solids content of pigment reinforced synthetic rubber and synthetic plastic resin dissolved or dispersed in a volatile organic solvent for asphaltic concrete pavements. The solids content must 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, must dry to a tack-free condition in less than 5 minutes.
- b. Portland cement concrete primer: Provide an epoxy resin primer for Portland cement concrete pavements, of the type recommended by the manufacturer of the thermoplastic composition.

2.2.2 Raised Pavement Markers Primers and Adhesives

Use either metallic or nonmetallic markers of the button or prismatic reflector type. Provide permanent color markers as specified for pavement marking, which retain the color and brightness under the action of traffic. Provide button markers with a diameter of not less than 4 inches, spaced not more than 40 feet apart on solid longitudinal lines. Make broken centerline marker spacing in segments of with gaps indicated between segments. Provide button markers with rounded surfaces presenting a smooth contour to traffic and not projecting more than 3/4 inch above level of pavement. Provide nonplowable pavement markers and adhesive epoxy conforming to ASTM D4280.

2.2.3 Reflective Media

PART 3 EXECUTION

3.1 EXAMINATION

3.1.1 Testing for Moisture

Test the pavement surface for moisture before beginning pavement marking 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 Contracting Officer or authorized representative. Employ the "plastic wrap method" to test the pavement for moisture as follows: Cover the pavement with a 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. Re-test surfaces when work has been stopped due to rain.

3.1.2 Surface Preparation Demonstration

Prior to surface preparation, demonstrate the proposed procedures and equipment. Prepare areas large enough to determine cleanliness and rate of cleaning.

3.1.3 Test Stripe Demonstration

Prior to paint application, demonstrate test stripe application within the work area using the proposed materials and equipment. Apply separate test stripes in each of the line widths and configurations required herein using the proposed equipment. Make the test stripes long enough to determine the proper speed and operating pressures for the vehicle(s) and machinery, but not less than 50 feet long.

3.1.4 Application Rate Demonstration

During the Test Stripe Demonstration, demonstrate compliance with the application rates specified herein. Document the equipment speed and operating pressures required to meet the specified rates in each configuration of the equipment and provide a copy of the documentation to the Contracting Officer prior to proceeding with the work.

3.1.5 Retroreflective Value Demonstration

After the test stripes have cured to a "no-track" condition, demonstrate compliance with the average retroreflective values specified herein. Take a minimum of ten readings on each test stripe with a Retroreflectometer with a direct readout in millicandelas per square meter per lux (mcd/m²/lx). Perform testing in accordance with ASTM D4061, ASTM E1710, ASTM E2177, and ASTM E2302.

3.1.6 Level of Performance Demonstration

The Contracting Officer will be present at the application demonstrations to observe the results obtained and to validate the operating parameters of the vehicle(s) and equipment. If accepted by the Contracting Officer, the test stripe is the measure of performance required for this project. Do not proceed with the work until the demonstration results are satisfactory to the Contracting Officer.

3.2 EXTERIOR SURFACE PREPARATION

Allow new pavement surfaces to cure for a period of not less than 30 days before application of marking materials. Thoroughly clean surfaces have 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 residual curing compounds, and other coatings adhering to the pavement by water blasting.

- a. For Portland Cement Concrete pavement, grinding, light shot blasting, or 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 on most pavements, to either remove existing coatings, or for surface preparation.

- b. Do not use shot blasting 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.

3.2.1 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.

3.2.2 Early Painting of Asphalt Pavements

For asphalt pavement systems requiring painting application at less than 30 days, apply the paint and beads at half the normal application rate, followed by a second application at the normal rate after 30 days.

3.3 APPLICATION

Apply pavement markings to dry pavements only.

3.3.1 Thermoplastic Compound

Place thermoplastic pavement markings, free from dirt or tint, upon dry pavement. The temperature must be a minimum of 40 degrees F and rising at the time of installation. 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.

3.3.1.1 Primer

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 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.

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. 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.

3.3.1.2 Reflective Media

Immediately after installation of the thermoplastic material, mechanically apply drop-on reflective glass spheres conforming to FS TT-B-1325 Type I (Gradation A) 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. Accomplish drop-on application of the glass spheres to ensure even distribution at the specified rate of coverage. If there is a malfunction of either thermoplastic applicator or reflective media dispenser, discontinue operations until

deficiency is corrected.

3.3.2 Raised Pavement Markers

Align prefabricated markers carefully at the spacing indicated on the drawings and permanently fix in place by means of epoxy adhesives. To ensure good bond prior to applying adhesive, thoroughly clean all areas where markers are to be set by water blasting and use of compressed air.

3.3.3 Cleanup and Waste Disposal

Keep the worksite clean and free of debris and waste from the removal and application operations. Dispose of debris at approved sites.

3.4 FIELD QUALITY CONTROL

3.4.1 Sampling and Testing

As soon as the paint and thermoplastic materials and reflective media 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. Two quarts will be for sampling and testing by the Contractor and two quarts will be for retention by the Government. Accomplish adequate mixing prior to sampling to ensure a uniform, representative sample. A batch is defined as the 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 certified copies of the test reports, prior to the use of the materials at the jobsite. Include in the report of test results a listing of any specification requirements not verified by the test laboratory.

3.4.2 Material 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. Provide test results substantiating conformance to the specified requirements with each certificate of compliance.

3.4.3 Dimensional Tolerances

Apply all markings in the standard dimensions provide in the drawings. New markings may deviate a maximum of 10 percent larger than the standard dimension. The maximum deviation allowed when painting over an old marking is up to 20 percent larger than the standard dimensions.

3.4.4 Bond Failure Verification

Inspect newly applied markings for signs of bond failure based on visual inspection and comparison to results from Test Stripe Demonstration paragraph.

3.4.5 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 individual bead spheres embedded and 50 percent of the individual bead spheres exposed.

3.4.6 Retroreflective Markings

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 Retroreflectometer). The minimum acceptable average for yellow markings is 175 millicandelas per square meter per lux (mcd/m²/lx). Compute readings by averaging a minimum of 10 readings taken within the area at random locations. Re-mark areas not meeting the retroreflective requirements stated above.

3.4.7 Material Bond Verification and Operations Area Cleanup for Airfields

Vacuum sweep the aircraft operating area before it is opened for aircraft operations to preclude potential foreign object damaged to aircraft engines. 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.

End of Section

APPENDIX I – SUBMITTAL LIST

List of Required Submittals										
Project:	Joint Forces Training Base - Lexington Drive Asphalt Repair									
SPEC. SECTION	DESCRIPTION OF ITEM TO BE SUBMITTED	D A T A	S H O P D W G	S A M P L E	T E S T R E P O R T	C E R T I F I C A T E	G U A R A N T E E	HAS REQUIREMENT BEEN MET?	DATE	REVIEWER
	DIVISION 1 -General Requirements									
01 32 00	SD-01 Preconstruction Submittals									
	Construction Schedule	X								
01 33 00	SD-01 Preconstruction Submittals									
	Submittal Register	X								
	Certificate of Insurance	X				X				
	Schedule of Values	X								
01 35 29	SD-01 Preconstruction Submittals									
	Accident Prevention Plan	X								
	Activity Hazard Analysis	X								
	SD-06 Test Reports									
	Incident Reports	X								
	Accident Reports	X								
	Citations and Violations	X								
01 45 00.10 20	Quality Control									
	SD-01 Preconstruction Submittals									
	Quality Control Plan	X				X				
01 74 19	SD-01 Preconstruction Submittals									
	Construction Waste Management Plan		X			X				
01 78 00	SD-10 Close out Documents									
	As-Built Drawings	X								
	As-Built Specifications	X								

List of Required Submittals										
Project:	Joint Forces Training Base - Lexington Drive Asphalt Repair									
SPEC. SECTION	DESCRIPTION OF ITEM TO BE SUBMITTED	D A T A	S H O P D W G	S A M P L E	T E S T R E P O R T	C E R T I F I C A T E	G U A R A N T E E	HAS REQUIREMENT BEEN MET?	DATE	REVIEWER
	Product Data	X	X							
	Warranties	X				X	X			
03 30 00	DIVISION 3 - CONCRETE									
	MIX TICKETS	X				X	X			
	ENGINEERED DESIGN MIX	X								
	DIVISION 31 -Earthwork									
31 23 33	Trenching & Backfill									
	SD-2 Shop Drawing									
	Excavation & Backfill Methods	X								
	Dewatering Plan	X								
31 25 00	Erosion & Sediment Control									
	SD-2 Product Data									
	SWPP Plan	X								
	DIVISION 32 - Exterior Improvements									
32 11 20	Base Course for Rigid & Flexible Paving									
	SD-3 Product Data									
	Delivery Tickets	X								
	SD-06 Test Reports									
	Test Section Report	X								
32 11 23	Supports for Plaster and Gypsum Board									
	SD-3 Product Data									

List of Required Submittals										
Project:	Joint Forces Training Base - Lexington Drive Asphalt Repair									
SPEC. SECTION	DESCRIPTION OF ITEM TO BE SUBMITTED	D A T A	S H O P D W G	S A M P L E	T E S T R E P O R T	C E R T I F I C A T E	G U A R A N T E E	HAS REQUIREMENT BEEN MET?	DATE	REVIEWER
	Delivery Tickets	X								
	SD-06 Test Reports									
	Test Section Report	X								
32 12 13	Bituminous Tack & Prime Coat									
	SD-3 Product Data									
	Delivery Tickets	X								
	SD-06 Test Reports									
	Test Section Report	X								
32 12 16.16	Aggregate Course for Flexible Paving									
	SD-02 Shop Drawings									
	Placement Plan		X							
	SD-03 Product Data									
	Mix Design	X								
	Diamond Grinding Plan	X								
	SD-07 Certificates									
	Asphalt Cemnet Binder					X				
	Lab Certification					X				
32 17 23	Pavemnet Markings									
	SD-03 Product Data									
	Surface Prep Equipment	X								
	Reflective Media for Roads	X								

List of Required Submittals												
Project:	Joint Forces Training Base - Lexington Drive Asphalt Repair											
SPEC. SECTION	DESCRIPTION OF ITEM TO BE SUBMITTED	D A T A	S H O P D W G	S A M P L E	T E S T R E P O R T	C E R T I F I C A T E	G U A R A N T E E	HAS REQUIREMENT BEEN MET?	DATE	REVIEWER		
	Safety Data Sheets	X										
	SD-06 Test Reports											
	Reflective Media for Roads				X							
	Paint				X							
	Thermoplastic Compound				X							

Attachment 03
Rate Sheet

Attachment 3

Rate Sheet

Contractor agrees to provide CMD **Joint Forces Training Base Lexington Drive Inbound and ABIs 1 to 4.** services, as described herein:

Contractor shall provide all materials, labor, bonds, licenses, insurance, equipment, tools, permits, taxes, transportation, and fees to complete civil pavement execution, repair, and restriping of Lexington Drive and ABIs 1-4.

BASE BID: LEXINGTON DRIVE BASE SCOPE (APPROX. 20,500 SF / 2,800 SY)

Description	Price
• Full-Depth Patching: Require complete removal and structural stabilization. Excavate underlying subgrade sections to a depth of 22 inches, re-compact the subgrade, and repave with a minimum of 6 inches of asphalt.	\$
Same-Day Paving Rule: New asphalt concrete (AC) for pavement repairs must be placed the exact same day that removals are performed to eliminate open structural subgrade exposure.	\$
• Base Bid Total Price	\$

The lowest responsive, responsible contractor with the lowest base bid price shall be awarded the contract. Based on the availability of funds, Alternative Bid Items shall be awarded. The Alternative Bid Item to be awarded shall be determined by the Contracting Officer.

ALTERNATIVE BID ITEM: Refer to drawing sheet C3)

Description	Price
B-1 Inbound Main Entrance Rehabilitation (11,300 SF +/-)	\$
B-2 Visitor Vehicle Parking Area Rehabilitation (843 SF +/-)	\$
B-3 New Concrete Slab Transition, Shiloh Way (W- Entrance) (862 SF +/-)	\$
B-4 New Concrete Slab Transition, Shiloh Way (E- Entrance) (330 SF +/-)	\$
ABI Total Price	\$

GRAND TOTAL PRICE (Base Bid & ABI)

\$ _____

Attachment 04
IGE

06I2409 - BASE BID

INPUT CELLS

all others locked

all others locked

AR

ipment, MULT x2 DEISEL PRICE - ENGR INPUT

0\$deisel/day X 3 trucks+ 75\$x8x3 men

ipment, MULT x2 DEISEL PRICE - ENGR INPUT

5

ENGINEERS ESTIMATE		06I2409 - ABI #1		INPUT CELLS		all others locked		DATE:	8.13.26
PROJ									
BY		AR							
2025 RSMeans		SPREAD SHEET FOR ITEMIZING COSTS FOR SUB CONTRACTOR (VIEWED FROM GENERALS POINT OF VIEW)							
LINE NUMBER	DESCRIPTION	UNIT	QUANTITY	TOTAL INCL O&P	TOTAL				
CONTRACTOR INSPECTIONS									
ENGR EST	contractor VIF utilities, coord (keepVabandon)	EA	1	\$2,500.00	\$2,500.00				
ENGR EST	contractor supplied QA/QC	EA	1	\$10,000.00	\$10,000.00				
01 45 23.50 5500	soil tech	day	10	\$612.00	\$6,120.00				
02 45 23.50 0600-2200	ASPHALT (gravel/sand/material testing)	ea	1	\$2,500.00	\$2,500.00				
ASPHALT REMOVAL		11,300 sf							
02 41 13.17 5050	4"-6" THICK	SY	1,256	\$12.35	\$15,506.11	DEMO ONLY			
31 14 13.23 1520	SKID STEER, 100' HAUL	SY	1,256	\$4.71	\$5,913.67	LOADING			
31 23 23.20 1025	HUAL OFF(12cy, 15mph, 10 miles)	CY	279	\$19.25	\$22,320.99	Hualing, no loading equipment, MULT x2 DEISEL PRICE - ENGR INPUT			
SOIL REMOVAL		11,300 sf							
31 14 13.23 1520	SKID STEER, 100' HAUL (14")	SY	1,256	\$10.99	\$13,798.56	LOADING			
ENGR EST	spoils left at JFTB site, 3 trucks	day	5	\$4,950.00	\$24,750.00	3 trucksx\$750/day +300\$deisel/day X 3 trucks+ 75\$x8x3 men			
31 14 13.23 1520	SKID STEER, 14" STOCKPILE FOR TREATMENT	SY	1,256	\$10.99	\$13,798.56	LOADING			
31 14 13.23 1520	SKID STEER, 100' HAUL (8")	SY	1,256	\$6.28	\$7,884.89	LOADING			
31 23 23.20 1025	L OFF(12cy, 15mph, 8 miles), 8" FOR BASE SECT	CY	279	\$19.25	\$22,320.99	Hualing, no loading equipment, MULT x2 DEISEL PRICE - ENGR INPUT			
SUBSURFACE PREP/CONDITION		11,300 sf							
31 23 23.23 9000	WATER 3,000 GAL	BCY	488	\$2.75	\$1,342.75	min 1200/day			
32 23 23.23 5040	RIDING, VIBRATING ROLLER -4 PASSES	BCY	488	\$0.82	\$1,200.00	min 1200/day			
31 14 13.23 1520	SKID STEER, 14" STOCKPILE BACK FOR TREAT	SY	1,256	\$10.99	\$13,798.56	LOADING			
31 32 19.16 1510	GEOTEXTILE STABILIZATION FABRIC	SY	1,256	\$5.70	\$7,156.67				
ENGR EST	instal, fold out	ea	1	\$600.00	\$600.00	2men X75\$X4hours			
BASE PREP		11,300 sf							
ENGR EST	8" class II bulk purchase	ton	490	\$20.00	\$9,793.33	20\$/ton			
31 23 23.20 1025	HUAL ON(12cy, 15mph, 8 miles), 8" BASE	CY	279	\$19.25	\$22,320.99	Hualing, no loading equipment, MULT x2 DEISEL PRICE - ENGR INPUT			
31 23 23.23 9000	WATER 3,000 GAL	BCY	279	\$2.75	\$12,000.00	min 1200/day X 10 days			
31 23 23.23 5040	RIDING, VIBRATING ROLLER -4 PASSES	BCY	279	\$0.82	\$6,000.00	min 1200/day..... 5DAYS			
AC WORK		11,300 sf							
32 12 16.13 3000	PRIME COAT	SY	1,256	\$4.79	\$6,014.11				
32 12 16.13 0120	2" BINDER COURSE	SY	1,256	\$12.40	\$15,568.89				
32 12 16.13 3100	INTERMEDIATE TACK COAT	SY	1,256	\$2.31	\$2,900.33				
32 12 16.13 0120	2" BINDER COURSE	SY	1,256	\$12.40	\$15,568.89				
32 12 16.13 3100	INTERMEDIATE TACK COAT	SY	1,256	\$2.31	\$2,900.33				
32 12 16.13 0380	2" WEARING COURSE	SY	1,256	\$13.90	\$17,452.22				
CONC ISLAND									
ASPHALT REMOVAL		980 sf							
enr est	cutting	ea	1	\$1,200.00	\$1,200.00	DEMO ONLY			
02 41 13.17 5050	4"-6" THICK	SY	109	\$12.35	\$1,344.78	DEMO ONLY			
31 14 13.23 1520	SKID STEER, 100' HAUL	SY	109	\$4.71	\$512.87	LOADING			
31 23 23.20 1025	HUAL OFF(12cy, 15mph, 10 miles)	CY	24	\$19.25	\$1,935.80	Hualing, no loading equipment, MULT x2 DEISEL PRICE - ENGR INPUT			
SUBSURFACE PREP/CONDITION ~ top 2"		980 sf							
31 23 23.23 9000	WATER 3,000 GAL	BCY	6	\$2.75	\$600.00	min 1200/day			
31 23 23.23 7040	WALK BEHIND TAMPER	BCY	6	\$5.40	\$200.00	min 1200/day			
BASE PREP		980 sf							
ENGR EST	2" class II bulk purchase	ton	11	\$20.00	\$212.33	20\$/ton			
31 23 23.20 1025	HUAL ON(12cy, 15mph, 8 miles), 2" BASE	CY	6	\$19.25	\$483.95	Hualing, no loading equipment, MULT x2 DEISEL PRICE - ENGR INPUT			
31 23 23.23 9000	WATER 3,000 GAL	BCY	6	\$2.75	\$600.00	min 1200/day			
31 23 23.23 7040	WALK BEHIND TAMPER	BCY	6	\$5.40	\$200.00	min 1200/day			
6" CONC AREAS		653 sf							
ENGR EST -	REBAR MATERIAL, #4 @ 16"	LB	820	\$1.00	\$820.33	MATERIAL COST ONLY, BASED ON ENET 2016 PRICES			
ENGR EST -	#4 REBAR INSTALLATION (cutt/tie/etc.)	EA	1	\$2,400.00	\$2,400.00	1 DAYS LABORx4 PEOPLE @ 75\$/HR			
03 30 53.40 4840	6" of concrete	SF	653	\$7.40	\$4,832.20	INCLUDE FORMS			
03 31 13.70 4600	OVER 6", DIRECT CHUTE, STRIKEOFF	CY	12	\$24.00	\$290.22				
03 35 13.30 0200	bull float, manual float, manual steel trowel	sf	653	\$1.64	\$1,070.92				

<u>Gutter</u>												MATERIAL COST ONLY, BASED ON ENET 2016 PRICES																			
32 16 13.13 0404				FORMS AND CONCRETE COMPLETE				LF		163														\$20.50				\$3,341.50			
				CONTINGENCY (10% total assumed)				EA		1														10%				\$28,095.57			
Sub Total																								\$		330,171.30					
TOTAL TAKEOFFS FROM PLANS AND SPECIFICATIONS TALLIED COST TO GENERAL FROM SUB CONTRACTORS (INCLUDES SUBS %, INSUR, OH &P TOTALS)														\$330,171.30																	
BONDING		BONDING COMPANY REQUIREMENTS								CONTRACTOR COST (% OF BOND TO PUT UP)																					
		BID		20%		\$66,034.26		x 2%						\$1,320.69																	
		PERFORMANCE		100%		\$330,171.30		x 10% 5-15%		> 5-15% RISK ASSESSMENT				\$33,017																	
		PAYMENT		40%		\$132,068.52		x 10% 5-15%		> 5-15% RISK ASSESSMENT				\$13,207																	
CITY INDEX		WEIGHT ACCORDING TO CITY INDEX (INDICATE AVE OR WEIGHTED)																													
		CITY		Los Angeles		122.00 WTD										\$83,097.51															
GENERAL OVERHEAD				10%										\$46,081																	
GENERAL PROFIT				10%										\$46,081																	
GENERAL CONDITIONS				6%										\$27,649																	
BASE		TOTAL ESTIMATE								\$580,625																					

ENGINEERS ESTIMATE				DATE:		8.13.26
PROJ	06I2409 - ABI#2		INPUT CELLS		all others locked	
BY	AR					
2025 RSMeans						
SPREAD SHEET FOR ITEMIZING COSTS FOR SUB CONTRACTOR (VIEWED FROM GENERALS POINT OF VIEW)						
LINE NUMBER	DESCRIPTION	UNIT	QUANTITY	TOTAL INCL O&P	TOTAL	
CONTRACTOR INSPECTIONS						
02 45 23.50 0600-2200	concrete (gravel/sand/material testing)	ea	1	\$500.00	\$500.00	
CONC DEMO/AC AREA						
			843 sf			
enr est	cutting	ea	1	\$600.00	\$600.00	
02 41 13.17 5700	CONC DEMO AND OFFSITE	SF	843	\$2.73	\$2,301.39	
SUBSURFACE PREP/CONDITION ~ top 2"						
			843 sf			
31 23 23.23 9000	WATER 3,000 GAL	BCY	5	\$2.75	\$600.00	
31 23 23.23 7040	WALK BEHIND TAMPER	BCY	5	\$5.40	\$200.00	
BASE PREP						
			843 sf			
ENGR EST	2" class II bulk purchase	ton	9	\$20.00	\$182.65	
31 23 23.20 1025	HUAL ON(12cy, 15mph, 8 miles), 2" BASE	CY	5	\$19.25	\$416.30	
31 23 23.23 9000	WATER 3,000 GAL	BCY	5	\$2.75	\$600.00	
31 23 23.23 7040	WALK BEHIND TAMPER	BCY	5	\$5.40	\$200.00	
6" CONC AREAS/RAMP						
			843 sf			
ENGR EST -	REBAR MATERIAL, #4 @ 16"	LB	1,059	\$1.00	\$1,059.02	
ENGR EST -	#4 REBAR INSTALLATION (cutt/tie/etc.)	EA	1	\$4,800.00	\$4,800.00	
03 30 53.40 4840	6" of concrete	SF	843	\$7.40	\$6,238.20	
03 31 13.70 4600	OVER 6", DIRECT CHUTE, STRIKEOFF	CY	16	\$24.00	\$374.67	
03 35 13.30 0200	bull float, manual float, manual steel trowel	sf	843	\$1.64	\$1,382.52	
enr est	misc, specialty area	ea	1	\$2,000.00	\$2,000.00	
ARCH STRIPING + SIGNAGE						
ENGR EST -	ADA, VAN, STRIPS	EA	1	\$3,000.00	\$3,000.00	
	CONTINGENCY (10% total assumed)	EA	1	10%	\$1,895.47	
	Sub Total				\$	26,350.22
TOTAL TAKEOFFS FROM PLANS AND SPECIFICATIONS TALLIED COST TO GENERAL FROM SUB CONTRACTORS (INCLUDES SUBS %, INSUR, OH &P TOTALS)						\$26,350.22
BONDING	BONDING COMPANY REQUIREMENTS			CONTRACTOR COST (% OF BOND TO PUT UP)		
	BID	20%	\$5,270.04	x 2%		\$105.40
	PERFORMANCE	100%	\$26,350.22	x 5%	5-15% > 5-15% RISK ASSESSMENT	\$1,318
	PAYMENT	40%	\$10,540.09	x 5%	5-15% > 5-15% RISK ASSESSMENT	\$527
CITY INDEX	WEIGHT ACCORDING TO CITY INDEX (INDICATE AVE OR WEIGHTED)					
	CITY	Los Angeles	122.00 WTD	\$6,226.03		
GENERAL OVERHEAD		10%	\$3,453			
GENERAL PROFIT		10%	\$3,453			
GENERAL CONDITIONS		6%	\$2,072			
BASE		TOTAL ESTIMATE				\$43,503

DEMO ONLY
3 trucksx\$750/day +300\$deisel/day X 3 trucks+ 75\$x8x3 men

min 1200/day
min 1200/day

20\$/ton
Hualing, no loading equipment, MULT x2 DEISEL PRICE - ENGR INPUT
min 1200/day
min 1200/day

MATERIAL COST ONLY, BASED ON ENET 2016 PRICES
2 DAYS LABORx4 PEOPLE @ 75\$/HR
INCLUDE FORMS

DEMO ONLY

MATERIAL COST ONLY, BASED ON ENET 2016 PRICES

ENGINEERS ESTIMATE		06I2409 - ABI #3		INPUT CELLS		all others locked		DATE:		8.13.26	
PROJ											
BY		AR									
2025 RSMeans		SPREAD SHEET FOR ITEMIZING COSTS FOR SUB CONTRACTOR (VIEWED FROM GENERALS POINT OF VIEW)									
LINE NUMBER		DESCRIPTION		UNIT		QUANTITY		TOTAL INCL O&P		TOTAL	
CONTRACTOR INSPECTIONS											
02 45 23.50 0600-2200		concrete (gravel/sand/material testing)		ea		1		\$500.00		\$500.00	
CONC DEMO/AC AREA											
02 41 13.17 5700		CONC DEMO AND OFFSITE		SF		862		\$2.73		\$2,353.26	
SUBSURFACE PREP/CONDITION ~ top 2"											
31 23 23.23 9000		WATER 3,000 GAL		BCY		5		\$2.75		\$600.00	
31 23 23.23 7040		WALK BEHIND TAMPER		BCY		5		\$5.40		\$200.00	
BASE PREP											
ENGR EST		2" class II bulk purchase		ton		9		\$20.00		\$186.77	
31 23 23.20 1025		HUAL ON(12cy, 15mph, 8 miles), 2" BASE		CY		5		\$19.25		\$425.68	
31 23 23.23 9000		WATER 3,000 GAL		BCY		5		\$2.75		\$600.00	
31 23 23.23 7040		WALK BEHIND TAMPER		BCY		5		\$5.40		\$200.00	
8" CONC AREAS											
ENGR EST -		REBAR MATERIAL, #5 @ 16"		LB		1,681		\$1.00		\$1,680.90	
ENGR EST -		#5 REBAR INSTALLATION (cutt/tie/etc.)		EA		1		\$2,400.00		\$2,400.00	
03 30 53.40 4840		8" of concrete		SF		862		\$9.87		\$8,505.07	
03 31 13.70 4600		OVER 6", DIRECT CHUTE, STRIKEOFF		CY		21		\$24.00		\$510.81	
03 35 13.30 0200		bull float, manual float, manual steel trowel		sf		862		\$1.64		\$1,413.68	
		CONTINGENCY (10% total assumed)		EA		1		10%		\$1,907.62	
Sub Total										\$ 21,483.78	
TOTAL TAKEOFFS FROM PLANS AND SPECIFICATIONS TALLIED COST TO GENERAL FROM SUB CONTRACTORS (INCLUDES SUBS %, INSUR, OH &P TOTALS)										\$21,483.78	
BONDING		BONDING COMPANY REQUIREMENTS						CONTRACTOR COST (% OF BOND TO PUT UP)			
		BID		20%		\$4,296.76		x 2%		\$85.94	
		PERFORMANCE		100%		\$21,483.78		x 5% 5-15%		> 5-15% RISK ASSESMENT \$1,074	
		PAYMENT		40%		\$8,593.51		x 5% 5-15%		> 5-15% RISK ASSESMENT \$430	
CITY INDEX		WEIGHT ACCORDING TO CITY INDEX (INDICATE AVE OR WEIGHTED)									
		CITY		Los Angeles		122.00 WTD		\$5,076.19			
GENERAL OVERHEAD				10%		\$2,815					
GENERAL PROFIT				10%		\$2,815					
GENERAL CONDITIONS				6%		\$1,689					
BASE		TOTAL ESTIMATE								\$35,469	

3 trucksx\$750/day +300\$deisel/day X 3 trucks+ 75\$x8x3 men

min 1200/day

min 1200/day

20\$/ton

Hualing, no loading equipment, MULT x2 DEISEL PRICE - ENGR INPUT

min 1200/day

min 1200/day

MATERIAL COST ONLY, BASED ON ENET 2016 PRICES

1 DAYS LABORx4 PEOPLE @ 75\$/HR

INCLUDE FORMS

ENGINEERS ESTIMATE		06I2409 - ABI #4		INPUT CELLS		all others locked		DATE:		8.13.26	
PROJ											
BY		AR									
2025 RSMeans		SPREAD SHEET FOR ITEMIZING COSTS FOR SUB CONTRACTOR (VIEWED FROM GENERALS POINT OF VIEW)									
LINE NUMBER		DESCRIPTION		UNIT		QUANTITY		TOTAL INCL O&P		TOTAL	
CONTRACTOR INSPECTIONS											
02 45 23.50 0600-2200		concrete (gravel/sand/material testing)		ea		1		\$500.00		\$500.00	
CONC DEMO											
02 41 13.17 5700		CONC DEMO AND OFFSITE		SF		330		\$2.73		\$900.90	
SUBSURFACE PREP/CONDITION ~ top 2"											
31 23 23.23 9000		WATER 3,000 GAL		BCY		2		\$2.75		\$600.00	
31 23 23.23 7040		WALK BEHIND TAMPER		BCY		2		\$5.40		\$200.00	
BASE PREP											
ENGR EST		2" class II bulk purchase		ton		4		\$20.00		\$71.50	
31 23 23.20 1025		HUAL ON(12cy, 15mph, 8 miles), 2" BASE		CY		2		\$19.25		\$162.96	
31 23 23.23 9000		WATER 3,000 GAL		BCY		2		\$2.75		\$600.00	
31 23 23.23 7040		WALK BEHIND TAMPER		BCY		2		\$5.40		\$200.00	
8" CONC AREAS											
ENGR EST -		REBAR MATERIAL, #5 @ 16"		LB		644		\$1.00		\$643.50	
ENGR EST -		#5 REBAR INSTALLATION (cutt/tie/etc.)		EA		1		\$2,400.00		\$2,400.00	
03 30 53.40 4840		8" of concrete		SF		330		\$9.87		\$3,256.00	
03 31 13.70 4600		OVER 6", DIRECT CHUTE, STRIKEOFF		CY		8		\$24.00		\$195.56	
03 35 13.30 0200		bull float, manual float, manual steel trowel		sf		330		\$1.64		\$541.20	
engr est		specialy area, gutter		ea		1		\$1,000.00		\$1,000.00	
		CONTINGENCY (10% total assumed)		EA		1		10%		\$977.16	
Sub Total										\$ 12,248.78	
TOTAL TAKEOFFS FROM PLANS AND SPECIFICATIONS TALLIED COST TO GENERAL FROM SUB CONTRACTORS (INCLUDES SUBS %, INSUR, OH &P TOTALS)										\$12,248.78	
BONDING		BONDING COMPANY REQUIREMENTS				CONTRACTOR COST (% OF BOND TO PUT UP)					
		BID		20%		\$2,449.76		x 2%		\$49.00	
		PERFORMANCE		100%		\$12,248.78		x 5% 5-15%		> 5-15% RISK ASSESSMENT \$612	
		PAYMENT		40%		\$4,899.51		x 5% 5-15%		> 5-15% RISK ASSESSMENT \$245	
CITY INDEX		WEIGHT ACCORDING TO CITY INDEX (INDICATE AVE OR WEIGHTED)									
		CITY		Los Angeles		122.00 WTD		\$2,894.14			
GENERAL OVERHEAD				10%		\$1,605					
GENERAL PROFIT				10%		\$1,605					
GENERAL CONDITIONS				6%		\$963					
BASE		TOTAL ESTIMATE									
										\$20,222	

Attachment 05
Project Drawings Bid Set

24 x 36

1

2

3

4

5

6

7

8

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10

11

12

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12

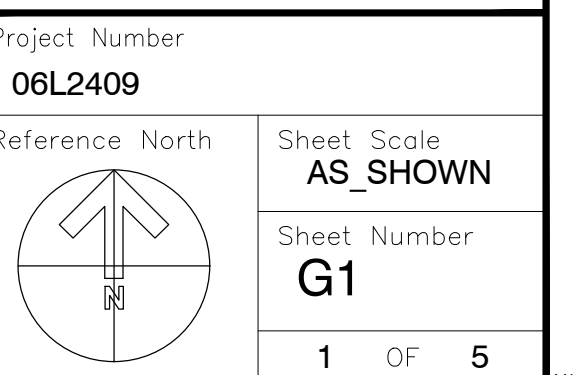
Figure 10.1 illustrates three types of detail tags and section cut symbols used in architectural drawings. Each example shows a circular detail with a leader line pointing to a specific part of the detail.

- Example 1:** A circular detail with a leader line pointing to a specific part. The labels are:
 - DETAIL NUMBER
 - SHEET NUMBER
- Example 2:** A circular detail with a leader line pointing to a specific part. The labels are:
 - DETAIL NUMBER
 - DETAIL NAME
 - DETAIL TAG
 - SCALE
- Example 3:** A circular detail with a leader line pointing to a specific part. The labels are:
 - DETAIL NUMBER
 - SECTION CUT
 - SHEET NUMBER

1. CONTRACTOR SHALL VISIT SITE AND VERIFY ALL DIMENSIONS AND CONDITIONS OF WORK AREA PRIOR TO ORDERING OR FABRICATING ANY MATERIALS.
2. CONTRACTOR SHALL BE RESPONSIBLE FOR ALL DAMAGE TO UTILITIES INCURRED DURING THE PROGRESS OF WORK OF THIS PROJECT. THIS DAMAGE INCLUDES, BUT IS NOT LIMITED TO DAMAGE TO ELECTRICAL RUNS, SEWER, GAS OR WATER PIPING AND CABLE TV WIRES/CABLES. INSPECT ALL SURFACES OF ALL AREAS OF THE WORK PRIOR TO INITIATING ANY TASKS WHICH MAY RESULT IN SUCH DAMAGE.
3. CONTRACTOR SHALL REVIEW THE PLANS AND SPECIFICATIONS PRIOR TO STARTING ANY WORK ON THIS PROJECT. ANY ERRORS AND/OR OMISSIONS, ERRORS IN DIMENSIONS OR ANY CONDITION WHICH WILL NOT PERMIT CONSTRUCTION OF THE WORK SHOWN ON THESE DRAWINGS SHALL BE BROUGHT TO THE ATTENTION OF THE PROJECT MANAGER. CONTRACTOR SHALL NOT BEGIN WORK UNTIL PROJECT MANAGER HAS CLARIFIED ALL SUCH CONCERNS TO THE SATISFACTION OF ALL PARTIES.
4. ALL MATERIAL DEMOLISHED AS PART OF THE WORK OF THIS PROJECT SHALL BE REMOVED FROM THE SITE AND RECYCLED OR DISPOSED OF IN ACCORDANCE WITH PROJECT SPECIFICATIONS AND ALL LOCAL, STATE AND FEDERAL REGULATIONS.
5. CONTRACTOR IS RESPONSIBLE TO PROVIDE ADEQUATE PUBLIC SAFETY AND TRAFFIC CONTROL. SAFE VEHICULAR AND PEDESTRIAN ACCESS SHALL BE PROVIDED AT ALL TIMES DURING CONSTRUCTION.
6. THE SCOPE OF WORK DOES NOT ALLEVIATE CONTRACTOR OF HIS/HER RESPONSIBILITY FOR REVIEWING THE CONSTRUCTION DOCUMENTS AND UNDERSTANDING THE EFFORT REQUIRED TO COMPLETE THE PROJECT.
7. CONTRACTOR SHALL COORDINATE WITH PROJECT MANAGER TO COORDINATE THE FOLLOWING
 - 7.1. LAY DOWN AREA
 - 7.2. ACCESS, TEMPORARY ROADS AND SHAKE OUT AREA
 - 7.3. STAGING
8. ALL ACCESS SHALL BE DONE IN A SAFE MANNER AND WITHIN THE OPERATIONAL LIMITS OF THE EQUIPMENT AND PERSONNEL.
9. DO NOT SCALE DRAWINGS.
10. PROVIDE CONSTRUCTION BARRIERS TO PROTECT PERSONNEL.
11. REPAIR ALL EXISTING SURFACES DAMAGED TO ACCOMMODATE NEW CONSTRUCTION.

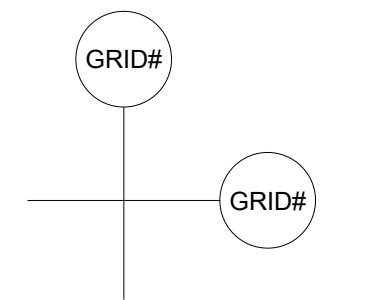
SCALE: NONE

SCALE: NONE

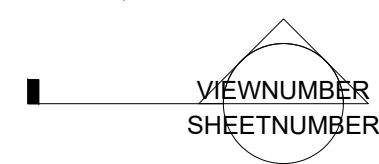


CIVIL SYMBOLS

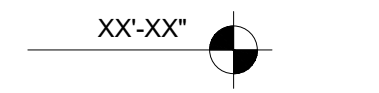
GRID LINES



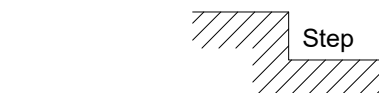
SECTION CALL OUT (AS SHOWN)



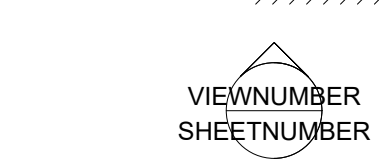
ELEVATION



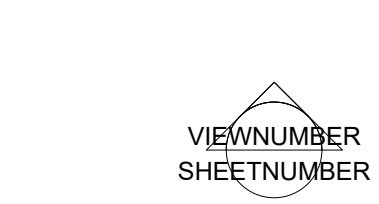
STEP IN ELEVATION



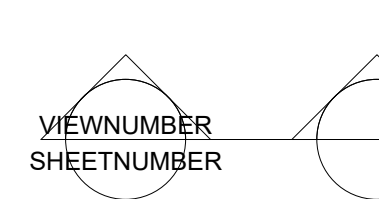
INTERIOR ELEVATION (AS SHOWN)



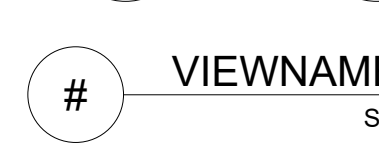
EXTERIOR ELEVATION (AS SHOWN)



FULL SECTION (AS SHOWN)



VIEW NAME (AS SHOWN)



CENTERLINE



CIVIL ABBREVIATIONS

& Ø	AND AT DIAMETER
A	A
AB ADDL ARCH	ANCHOR BOLT(S) ADDITIONAL ARCHITECTURAL
B	B
BM BOT, BOTT	BEAM BOTTOM
C	C
CONT CP CTR CTRD	CONTINUOUS COMPLETE PENETRATION CENTER CENTERED
D	D
DIA	DIAMETER
E	E
(E) EA	EXISTING EACH
F	F
FW	FIELD WELD
L	L
L LSB	ANGLE LOW STRENGHT BOLT
M	M
MB MECH MEP MIN	MACHINE BOLT MECHANICAL MECHANICAL/ELECTRICAL/PLUMBING MINIMUM
N	N
NA NIC NO, # NTS	NOT APPLICABLE, NOT AVAILABLE NOT IN CONTRACT NUMBER NOT TO SCALE
O	O
OH OPNG OPP	OPPOSITE HAND OPENING OPPOSITE
P	P
PERP	PERPENDICULAR
S	S
SAD SED SIM SLH SLV SQ	SEE ARCHITECTURAL DRAWINGS SEE ELECTRICAL DRAWINGS SIMILAR SHORT LEG HORIZONTAL SHORT LEG VERTICAL SQUARE
T	T
T24 T&B T.O THRU TYP	TITLE 24 CALIFORNIA BUILDING CODE TOP AND BOTTOM TOP OF THROUGH TYPICAL
U	U
UON	UNLESS OTHERWISE NOTED
V	V
VERT VIF	VERTICAL VERIFY IN FIELD
W	W
w/ w/in w/o	WITH WITHIN WITHOUT
X	X
x	BY

STATEMENT OF SPECIAL INSPECTIONS

- THE CALIFORNIA MILITARY DEPARTMENT (CMD) SHALL EMPLOY A TESTING AND INSPECTION AGENCY/BODY, ONE OR MORE SPECIAL INSPECTORS TO PROVIDE INSPECTION DURING CONSTRUCTION, WHERE REQUIRED PER SPECIFICATIONS.
- "TESTING AND INSPECTION AGENCY" SHALL BE APPROVED BY CMD TO PERFORM THE SPECIFIC TESTING AND INSPECTION PROGRAM FOR THIS PROJECT. AGENCY SHALL BE INDEPENDENT; OF CMD-J9, CONTRACTORS(S), ETC., AND DEMONSTRATE TO CMD THE USE OF ADEQUATE TESTING EQUIPMENT AND EMPLOYMENT OF QUALIFIED PERSONNEL FOR INSPECTION OF THE PARTICULAR TYPE OF MATERIAL, CONSTRUCTION OR OPERATION REQUIRING SPECIAL INSPECTIONS.
- SPECIAL INSPECTOR(S) SHALL PROVIDE WRITTEN DOCUMENTATION TO THE CMD DEMONSTRATING RELEVANT EXPERIENCE AND TRAINING. INSPECTOR QUALIFICATION AND CERTIFICATIONS FOR SUCH INSPECTIONS SHALL BE CURRENT AND MAINTAINED IN GOOD STANDING OVER DURING OF PROJECT. SPECIAL INSPECTION(S) SHALL BE APPROVED BY CMD.
- APPROVAL ITEMS SHALL BE SUBMITTED TO AND ACCEPTED BY THE ENGINEER OF RECORD AND BUILDING AUTHORITY. CONTRACTOR(S) ARE RESPONSIBLE FOR ALL LABELING, INSPECTION AND TESTING, IDENTIFICATION METHODS.
- CONTRACTOR(S) ARE RESPONSIBLE FOR COORDINATING INSPECTION TIMES, MATERIALS AND AREAS OF REVIEW FOR INSPECTIONS.
- JOB SITE VISITS BY ENGINEER (OBSERVATION) OR BUILDING OFFICIAL DO NOT CONSTITUTE AND ARE NOT A SUBSTITUTE FOR INSPECTION BY SPECIAL INSPECTOR(S). OBSERVATION FREQUENCY AND EXTENT PER SPECIFICATIONS.
- INSPECTION OF FABRICATION ITEM(S) SHALL BE CARRIED OUT BY SPECIAL INSPECTOR AT SITE OF FABRICATION, UNLESS WORK DONE ON PREMISES OF FABRICATION APPROVED FOR SUCH WORK WITH SPECIAL INSPECTION BY THE BUILDING AUTHORITY. AT COMPLETION OF FABRICATION, OFFSITE FABRICATOR SHALL SUBMIT CERTIFICATE OF COMPLIANCE TO CMD STATING WORK WAS PERFORMED IN ACCORDANCE WITH THE APPROVED CONSTRUCTION DOCUMENTS.
- ALL INSPECTION REPORTS SHALL BE SUBMITTED TO CMD. THE FINAL REPORTS BY THE SPECIAL INSPECTOR(S) MUST CERTIFY THAT THE FINAL IN PLACE PRODUCT COMPLIES WITH THE APPROVED CONTRACT DOCUMENTS: APPROVED PLANS, SPECIFICATIONS.
- CONTINUOUS SPECIAL INSPECTION CONSISTS OF FULL TIME INSPECTION, PERIODIC INSPECTION CONSISTS OF PART TIME OR INTERMITTENT INSPECTION. HIERARCHY DEFINITIONS SHALL BE AS FOLLOWS:
 - BUILDING AUTHORITY - CMD/J9
 - 2025 CALIFORNIA BUILDING CODE
 - UFC - USCS DESIGN GUIDES
 - INTERNATIONAL BUILDING CODE
 - MATERIAL SPECIFIC CODES
- CMD INSPECTOR OF RECORD (IOR) IN COORDINATION WITH CONTRACTORS(S) SHALL DETERMINE NUMBER OF INSPECTIONS NECESSARY (SUBJECT TO BUILDING AUTHORITY APPROVAL) TO ADEQUATELY PERFORM INSPECTION PROGRAM.
- IT IS SOLELY THE CONTRACTOR'S RESPONSIBILITY TO COORDINATE/PERFORM/ENFORCE: INSPECTIONS, OVERSEE REQUIRED SUBMITTALS, ENSURE TESTING AND INSPECTION OPERATIONS ARE PERFORMED TO THE SATISFACTORY EXTEND OF THE SPECIAL INSPECTION PROGRAM.

INSPECTION OF CONCRETE CONSTRUCTION

VERIFICATION AND INSPECTION	CONTINUOUS	PERIODIC
1. INSPECTION OF REINFORCING STEEL AND PLACEMENT		X
2. VERIFIED USE OF DESIGN MIX		X
3. AT TIME OF CONCRETE PLACEMENT SAMPLE FOR STRENGTH TESTS, PERFORM SLUMP, AIR TESTS AND DETERMINE THE TEMPERATURE OF THE CONCRETE.	X	
4. INSPECTION OF CONCRETE PLACEMENT FOR PROPER APPLICATION.	X	
5. INSPECTION FOR MAINTENANCE OF SPECIFIED CURING TEMPERATURE AND TECHNIQUES.		X
6. VERIFICATION OF IN-SITU CONCRETE STRENGTH PRIOR TO REMOVAL OF SHORES AND FORMS.		X
7. INSPECT FORMWORK FOR SHAPE, LOCATION AND DIMENSIONS OF CONCRETE MEMBER BEING FORMED.		X

INSPECTION OF SOILS

VERIFICATION AND INSPECTION	CONTINUOUS	PERIODIC
1. VERIFY MATERIALS BELOW CONCRETE AREAS ARE ADEQUATE	X	
2. VERIFY EXCAVATIONS ARE EXTENDED TO PROPER DEPTH AND MATERIAL		X
3. VERIFY USE OF PROPER LIFT THICKNESS	X	
4. PRIOR TO PLACEMENT OF FILL, INSPECT SUBGRADE AND VERIFY PROPER PREPARATION		X

CIVIL MATERIALS SHADE TYPE

NEW EXIST



NATIVE SOIL (EARTH)



COMPACTED SOIL (RE-COMPACTED EARTH)



GRAVEL ROCK FILL (AGGREGATE BASE)



CONCRETE



ASPHALT DETAILS



ASPHALT PLAN

NOTES:

- GHOSTED/DULLED GRAPHICS SHADES MAY REFLECT EXISTING MATERIALS, CONDITIONS, ETC.
- GHOSTED/DULLED GRAPHIC SHADES MAY ALSO REFLECT THE NEED TO SHOW MATERIALS AT LIGHTER COLOR AS TO NOT PULL ATTENTION FROM THE PERTINENT ASPECTS OF A DRAWING DETAIL.
- ANY DISCREPANCY BETWEEN NEW, EXISTING OR IN-PLACE, RE-USED MATERIALS IMPACTING CONTRACTOR RESPONSIBILITY SHALL BE IMMEDIATELY BROUGHT TO THE ATTENTION OF THE PROJECT MANAGER.

CONCRETE

- THE MINIMUM 28-DAY COMPRESSIVE STRENGTH AND TYPE OF CONCRETE SHALL BE AS FOLLOWS:
 - EXTERIOR CONCRETE
 - SLAB WORK 150 PCF $f_c = 4000$ PSI F3
 - GUTTERS 150 PCF $f_c = 4000$ PSI F3
- ALL CONCRETE SHALL BE READY-MIX CONCRETE AND SHALL BE BATCHED, MIXED AND DELIVERED TO THE SITE IN CONFORMANCE WITH ASTM C94. ALL WORK GOVERNING: DESIGN, REINFORCING, PLACING AND CURING OF STRUCTURAL CONCRETE SHALL ADHERE TO THE REQUIREMENT OF "AMERICAN CONCRETE INSTITUTE" (ACI) 318, 30 AND 117-LATEST EDITIONS.
- CONTRACTOR SHALL SUBMIT MIX DESIGNS FOR REVIEW BY TESTING LABORATORY AND CMD. DO NOT PLACE CONCRETE PRIOR TO REVIEW OF MIX DESIGNS.
- ALL CEMENTITIOUS MATERIALS SHALL BE INCLUDED IN CALCULATING WATER/CEMENT RATION OF CONCRETE MIX. CONCRETE MIX DESIGN AND TESTING SHALL MEET THE REQUIREMENTS OF THE CBC. ALL CONCRETE MIXES SHALL BE DESIGNED, STAMPED AND SEALED BY A LICENSED CALIFORNIA CIVIL ENGINEER, REPRESENTING BATCH PLANT.
- PORTLAND CEMENT SHALL BE TYPE III AND SHALL CONFORM TO ASTM C150, LOW ALKALI.
- CONCRETE SUPPLIER SHALL FURNISH CERTIFICATION STATEMENT TO CMD THAT CEMENT HAS BEEN TESTED IN COMPLIANCE WITH THE REQUIREMENTS OF ASTM C150 AND PROPOSED ADMIXTURES MEET CLASSIFICATION OF ASTM C618.
- AGGREGATES IN NORMAL WEIGHT CONCRETE SHALL CONFORM TO ASTM C33.
- UNLESS OTHERWISE NOTED, WATER USED IN MIX SHALL BE CLEAN AND POTABLE CONFORMING TO ASTM C1602.
- CALCIUM CHLORIDE OR ADMIXTURES CONTAINING CHLORIDE SHALL NOT BE USED. DO NOT USE CONCRETE CONTAINING CHLORIDES.
- CONTROLLED LOW-STRENGTH MATERIAL (CLSM) LEAN CONCRETE, WHERE SPECIFICALLY INDICATED, SHALL CONTAIN A MINIMUM OF 2 SACKS OF CEMENT PER CUBIC YARD OF CONCRETE.
- CONTRACTOR SHALL SUBMIT ALL PROPOSED LOCATIONS OF CONSTRUCTION JOINTS FOR REVIEW BY THE CMD PRIOR TO STARTING CONSTRUCTION. SEE SLAB-ON-GRADE AND CIVIL SUBMITTAL NOTES.
- DIMENSIONS ARE TO THE FACE OF MAIN BARS, TIES, ETC., AND DENOTE CLEAR COVERAGE. THE MINIMUM CONCRETE COVER SHALL BE AS FOLLOWS UON.
 - CONCRETE CAST AGAINST AND PERMANENTLY EXPOSED TO EARTH 3"
 - CONCRETE EXPOSED TO EARTH OR WEATHER BUT PLACED INFORMS:
 - #5 BARS, W31 OR D31 WIRE AND SMALLER 1-1/2"
 - #6 BARS AND LARGER
- FORMS SHALL BE PROPERLY CONSTRUCTED, CONFORM TO CONCRETE SHAPE AS SHOWN, SUFFICIENTLY TIGHT TO PREVENT LEAKAGE, SUFFICIENTLY STRONG AND BRACED TO MAINTAIN SHAPE AND ALIGNMENT UNTIL NO LONGER NEED TO SUPPORT CONCRETE.
- FORMS AND SHORING SHALL NOT BE REMOVED UNTIL CONCRETE HAS ATTAINED SUFFICIENT STRENGTH TO WITHSTAND ALL LOADS IMPOSED WITHOUT EXCESSIVE STRESS, CREEP OR DEFLECTION.
- ALL ITEMS TO BE CAST IN CONCRETE SUCH AS REINFORCING STEEL, DOWELS, BOLTS, ANCHOR RODS, PIPES, SLEEVES, SHALL BE SECURELY TIED IN POSITION BEFORE CONCRETE PLACEMENT.
- REINFORCING SHALL BE CLEANED OF LOOSE RUST, OIL, MUD, DIRT, MILL SCALE, ICE OR OTHER COATINGS PRIOR TO CONCRETE PLACEMENT.
- ALL DEBRIS, NAILS, MISC. WOOD SCRAP, FOAM, ETC. SHALL BE REMOVED PRIOR TO CONCRETE PLACEMENT.
- ALL CONSTRUCTION JOINT SURFACES SHALL BE CLEANED AND LAITANCE REMOVED. JOINTS SHALL BE WETTED AND STANDING WATER OR ICE REMOVED PRIOR TO CONCRETE PLACEMENT.
- CONTRACTOR SHALL NOTIFY THE EOR/IOIR AT LEAST 48 HOURS (2-CALNDAR WEEK DAYS) PRIOR TO PLACEMENT OF CONCRETE.
- OBTAIN APPROVAL FROM ALL AFFECTED TRADES PRIOR TO PLACING CONCRETE.
- CONCRETE SHALL BE CONVEYED FROM MIXER TO PLACE OF FINAL DEPOSIT BY METHODS THAT WILL PREVENT SEPARATION OF MATERIALS. CONCRETE SHALL BE DEPOSITED IN FINAL POSITION IN A MANNER TO AVOID SEGREGATION.
- UNLESS OTHERWISE NOTED, EXPOSED CORNERS OF SLABS, CONCRETE, ETC. SHALL BE FORMED WITH A 3/4" CHAMFER OR TOOLED EDGE (1/2" RADIUS).
- ALL CONCRETE SHALL BE THOROUGHLY CONSOLIDATED, WORKED AROUND REINFORCING AND EMBEDDED ITEMS AND INTO CORNERS OF FORMS.
- CONCRETE SHALL BE MAINTAINED ABOVE 50°F AND IN A MOIST CONDITION FOR A MINIMUM 7 DAYS AFTER PLACEMENT. UNLESS APPROVED BY CMD. SEE SLAB-ON-GRADE NOTES FOR ADDITIONAL INFORMATION.
- COLD WEATHER AND HOT WEATHER MEASURES SHALL BE EMPLOYED TO PROTECT CONCRETE DURING PLACEMENT AND CURING.

SLAB-ON-GRADE

- SEE CONCRETE GENERAL NOTES FOR ADDITIONAL INFORMATION.
- ALL CONCRETE PLACEMENT AND CURING OPERATIONS SHALL BE PERFORMED IN ACCORDANCE WITH ACI 302.1, ACI 318 AND ACI 360 LATEST EDITIONS.
- UNLESS AN ALTERNATIVE IS ACCEPTED BY THE EOR, SLAB SHALL MOIST CURE. WET CURE SYSTEM SHALL CONSIST OF BURLAP AND SPRINKLED SYSTEM FOR A MINIMUM OF 14 DAYS.
- SLAB WORK JOINT SPACING SHALL NOT EXCEED:
 - JOINTS SHALL MATCH EXISTING ADJACENT TO FULLEST POSSIBLE EXTENT (TOOLED OR CUT), ESTABLISH WITH CMD SITE PERSONNEL.
- SAWCUT TO BE MADE WITHIN 8 HRS OF SETTING CONCRETE, IF APPLICABLE

REINFORCING STEEL

- REINFORCING GRADES FOR CONCRETE:
 - ALL BARS EXCEPT FOR THOSE TO BE WELDED. ASTM 615, GR 60 (ALL BARS SHALL BE DEFORMED UON)
- ALL REINFORCEMENT SHALL BE CLEARLY MARKED TO FACILITATE IDENTIFICATION DURING FINAL IN-PLACE INSPECTION.
- ALL REINFORCEMENT SHALL BE BENT COLD PRIOR TO PLACEMENT IN FORMWORK, REINFORCEMENT EMBEDDED IN SUBSTRATE SHALL NOT BE BENT.
- REINFORCEMENT SHALL BE TIED OR SECURED IN PLACE BY MANUFACTURED BAR POSITIONERS PRIOR TO CONCRETE PLACEMENT. CONTRACTOR PROVIDE ALL ACCESSORIES TO SUPPORT REINFORCING IN POSITIONS SHOWN.
- ALL DOWELS, ANCHOR BOLTS, EMBEDS, HOLD DOWNS AND OTHER HARDWARE SET IN CONCRETE SHALL BE TIED IN PLACE PRIOR TO PLACEMENT OF CONCRETE. "WET SETTING" NOT PERMITTED.
- MAINTAIN MINIMUM CLEAR FROM FACE OF CONCRETE TO EDGE OF ALL REINFORCEMENT AS REQUIRED IN AMERICAN CONCRETE INSTITUTE (ACI) 318 - LATEST EDITION.
- REINFORCEMENT SHALL BE PLACED IN ACCORDANCE WITH THE CONCRETE REINFORCING STEEL INSTITUTE (CRSI) "MANUAL OF STANDARD PRACTICE", LATEST EDITION.
- SPLICES IN ADJACENT BARS SHALL NOT BE CLOSER THAN 24" CLEAR MEASURED ALONG THE LENGTH OF THE BAR (STAGGER ALL SPLICES). LAP #4 BARS MIN 24"; #5 BARS MIN 30" UON.
- REINFORCING SPACING SHOWN ARE MAXIMUM ON CENTER AND ALL REINFORCING IS CONTINUOUS, UON.
- REINFORCING STEEL SHALL BE KEPT CLEAN AND FREE OF RUST, DIRT, OIL, ETC AND OTHER MATERIALS THAT MAY IMPAIR BOND ABILITY OF REINFORCING.
- CHAIRS OR SPACERS FOR REINFORCING SHALL BE NON FERROUS OR PLASTIC COATED WHEN RESTING ON EXPOSED SURFACES.

HOT MIX ASPHALT (HMA) NOTES

- RECLAIMED ASPHALT IS NOT ALLOWED FOR THIS PROJECT UNDER ANY CIRCUMSTANCES
- SHALL BE HMA MIX CONFORMING TO PERFORMANCE GRADE 64-10.
- FINAL IN PLACE HMA DENSITY SHALL EXCEED 94% MAX THEORETICAL DENSITY AND JOINT DENSITIES SHALL EXCEED 92.5%
- TACK COATS SHALL BE APPLIED TO CLEAN, DUST FREE AREAS IMMEDIATELY BEFORE PLACEMENT OF ASPHALT.
- PRIME COATS SHALL BE APPLIED TO STABLE BASE AND ALLOWED TO CURE PER MANUFACTURER RECOMMENDATIONS BEFORE PLACEMENT OF ASPHALT.

GENERAL NOTES

- FOR METHODS AND MATERIAL NOT SHOWN, CBC 2025 REQUIREMENTS SHALL GOVERN. WORK AND CONSTRUCTION SHALL COMPLY WITH ALL OTHER APPLICABLE BUILDING CODES, GEOGRAPHIC REPORTS, REGULATORY AND SAFETY REQUIREMENTS.
- TYPICAL DETAILS AND NOTES SHALL APPLY UNLESS SPECIFICALLY SHOWN OR NOTED OTHERWISE. DETAILS NOT FULLY SHOWN SHALL BE OF THE SAME NATURE AS SHOWN FOR SIMILAR CONDITION.
- DRAWINGS AND SPECIFICATIONS SHALL BE CONSIDERED PART OF THE CONTRACT DOCUMENTS. CONTRACTOR SHALL BE RESPONSIBLE FOR REVIEW AND COORDINATION OF DRAWINGS AND SPECIFICATIONS PRIOR TO THE START OF CONSTRUCTION. DISCREPANCIES SHALL BE BROUGHT TO THE ATTENTION OF THE CONTRACT MANAGER PRIOR TO THE START OF CONSTRUCTION, ANY WORK PERFORMED IN CONFLICT WITH THE CONTRACT DOCUMENTS OR CODE REQUIREMENTS SHALL BE CORRECTED BY THE CONTRACTOR AT THE CONTRACTOR'S EXPENSE.
 - DEFICIENCIES BROUGHT FORTH BY IOR/INSPECTOR(S) ON BEHALF OF THE BUILDING OFFICIAL RELATING TO REGULATIONS; METHOD OF CONSTRUCTION (PHASES OF CONTROL), CODE REQUIREMENTS - DO NOT CONSTITUTE POTENTIAL CHANGES: CHANGE ORDERS(S), ADDENDUMS, AMENDMENTS, ETC.
- CONTRACT DOCUMENTS REPRESENT FINISHED CONSTRUCTION ITEMS, THEY DO NOT INDICATE THE METHOD OF CONSTRUCTION. CONTRACTOR SHALL PROVIDE ALL MEASURES NECESSARY TO PROTECT THE PRODUCTS, CONSTRUCTION ITEMS DURING CONSTRUCTION. MEASURES INCLUDE, BUT ARE NOT LIMITED TO, BRACING, SHORING FOR LOADS DUE TO CONSTRUCTION EQUIPMENT AND MATERIALS. OBSERVATION VISITS TO THE SITE BY THE EOR/IOIR DO NOT INCLUDE INSPECTION OF THESE ITEMS.
- THE CONTRACTOR SHALL BE SOLELY RESPONSIBLE TO DESIGN AND PROVIDE ADEQUATE BRACINGS AND FORM WORK, ETC., AS REQUIRED FOR THE PROTECTION OF LIFE AND PROPERTY DURING THE CONSTRUCTION OF THIS PROJECT. ADJOINING PUBLIC AND PRIVATE PROPERTIES SHALL BE PROTECTED FROM DAMAGE DURING DEMOLITION AND/OR CONSTRUCTION. CONTRACTOR IS RESPONSIBLE FOR EMPLOYING ADEQUATE MEASURES OF PROTECTION OF PERSONNEL, STRUCTURES AND PROPERTIES DURING EXCAVATION, GRADING, ETC.
- IT IS THE CONTRACTOR'S RESPONSIBILITY TO COMPLY WITH THE "CONSTRUCTION SAFETY ORDERS" ISSUED BY TITLE 8/CALIFORNIA CODE OF REGULATION/OFFICE OF INDUSTRIAL SAFETY RELATIONS/DIVISION OF INDUSTRIAL SAFETY, LATEST EDITION, AND OSHA REQUIREMENTS AS THEY APPLY TO THIS PROJECT. EOR, CMD DO NOT ACCEPT ANY RESPONSIBILITY FOR CONTRACTOR'S FAILURE TO COMPLY WITH THE REQUIREMENTS.
- CONTRACTOR SHALL BE RESPONSIBLE FOR COORDINATING WORK OF ALL TRADES AND SHALL CHECK AND VERIFY ALL DIMENSION BEFORE PREPARING SHOP DRAWINGS, FABRICATION, OR CONSTRUCTION.
- DIMENSIONS RELATED TO EXISTING CONDITIONS SHALL BE FIELD VERIFIED BY THE CONTRACTOR. CONTRACTOR SHALL NOTIFY CMD OF CONFLICTS BETWEEN THE CONTRACT DRAWINGS, OR EXISTING CONDITIONS DIFFER FROM CONDITIONS SHOWN ON DRAWING PRIOR TO THE COMMENCEMENT OF WORK.
- CONTRACTOR IS NOT TO ORDER MATERIAL OR CONSTRUCT ANY PORTION OF THE WORK THAT IS IN CONFLICT UNTIL CONFLICT IS RESOLVED.

EXCAVATION, GRADING AND FILL

- ENGINEER OF RECORD IS NOT RESPONSIBLE FOR ANY GEOTECHNICAL ASPECT OF PROJECT.
- ALL SITE WORK, INCLUDING TRENCHING, COMPACTION OF OVER EXCAVATION OR FILL AND BACKFILL OPERATIONS SHALL COMPLY WITH APPLICABLE BUILDING CODE REQUIREMENTS.
- UNLESS OTHERWISE SHOWN, SOIL BACK FILL SHALL BE FREE OF ORGANIC MATERIAL, CONSTRUCTION DEBRIS, ETC. AND PLACED IN LIFTS AND COMPACTED.
- UNLESS RECOMMENDATION STATED OTHERWISE, ALL FILL MATERIALS SHALL BE PLACED IN SUCH A MANNER TO PROVIDE A DRY DENSITY OF 90% OR GREATER, UON.
- UNLESS OTHERWISE NOTED, GEOTECHNICAL EVALUATION OR SHOWN ON CIVIL DRAWINGS, SITE GRADING SHALL BE CONSTRUCTED AT A MINIMUM GRADIENT OF 1V:20H FOR A MINIMUM OF 10 FEET FROM FACE OF ALL STRUCTURES.
- CONTRACTOR SHALL BE SOLELY RESPONSIBLE FOR ALL EXCAVATION PROCEDURES INCLUDING LAGGING, SHORING AND PROTECTION OF ADJACENT PROPERTY, STRUCTURES, STREETS AND UTILITIES. ALL WORK AND CONSTRUCTION SHALL COMPLY WITH APPLICABLE BUILDING CODES.
- SUBSURFACE SOIL PREPARATION:
 - ALL EXISTING UNDOCUMENTED FILL SHALL BE REMOVED AND RE-COMPACTED. ALL TOP SOILS SHALL BE REMOVED AS REQUIRED, IF APPLICABLE.
 - OFFSITE FILL MATERIAL SHALL BE APPROVED BY THE EOR/IOIR PRIOR PLACEMENT.
- CONTRACTOR SHALL ENACT MEASURES TO PROTECT ALL UTILITY LINES, UNDERGROUND SERVICE AREAS, ETC. ENCOUNTERED DURING EXCAVATION AND BACKFILLING INCLUDING BUT NOT LIMITED TO
 - GROUND PENETRATING RADARS: GPR, HDR, DUAL-F, ETC.
- OFFSITE FILL MATERIAL TO BE CLASS II MATERIAL, 3/4" ROCK. MATERIAL SHALL BE COMPACTED TO 95% DRY DENSITY. SEE SPECIFICATIONS FOR ADDITIONAL INFORMATION.

STRUCTURAL OBSERVATIONS

- "STRUCTURAL OBSERVATION" SHALL BE DEFINED AS THE VISUAL OBSERVATION OF ELEMENTS.
- STRUCTURAL OBSERVATIONS ARE FOR GENERAL CONFORMANCE TO THE APPROVED CONTRACT DOCUMENTS.
- CONTRACTOR, CONTRACT MANAGER, ENGINEER OR RECORD SHALL SCHEDULE OBSERVATIONS PRIOR TO CONSTRUCTION.
- AT A MINIMUM, THE FOLLOWING CONSTRUCTION STAGES REQUIRE OBSERVATION BY THE EOR.
 - SLABWORK
 - GUTTERS
 - REINFORCING/CONSTRUCTION JOINTS/TEMPERATURE PROTECTION
- STRUCTURAL OBSERVATION SHALL NOT BE CONSIDERED TO REPLACE SPECIAL INSPECTION IN ANY FORM. SITE VISITS, OBSERVATION VISITS DO NOT RELIEVE THE CONTRACTOR(S) FROM THE RESPONSIBILITY TO COMPLY WITH THE INSPECTIONS REQUIRED IN THE SPECIAL INSPECTION PROGRAM.

CIVIL SUBMITTALS

- REVIEW OF SHOP DRAWINGS AND SUBMITTAL TO THE ENGINEER OF RECORD (EOR) IS FOR GENERAL COMPLIANCE WITH THE CONTRACT DOCUMENTS.
- FABRICATION NOT TO BEGIN UNTIL THE SUBMITTAL HAS BEEN REVIEWED BY THE EOR.
- SHOP DRAWINGS SHALL BE SUBMITTED TO THE EOR FOR REVIEW PRIOR TO FABRICATION. THE CONTRACTOR WILL REMAIN RESPONSIBLE FOR ALL ERRORS OF DETAILING, FABRICATION AND FOR CORRECT FITTING OF ALL ITEMS INCLUDING COORDINATION WITH OTHER TRADES.
 - SHOP DRAWINGS SHALL BE SUBMITTED TO THE EOR IN COMPLIANCE WITH THE APPROVED SPECIFICATIONS.
 - REPRODUCTION OF PLANS AND DETAILS FOR SHOP DRAWINGS IS PROHIBITED. SUBCONTRACTOR/FABRICATOR IS TO PROVIDE INDEPENDENTLY CREATED DRAWINGS BASED ON THE PLANS AND DETAILS.
- SHOP DRAWINGS AND SUBMITTALS DO NOT CONSTITUTE CHANGE ORDERS. ANY PROPOSED CHANGES TO THE DOCUMENTS MUST BE SUBMITTED IN WRITING AS A REQUEST FOR SUBSTITUTION TO THE EOR FOR APPROVAL. THE FOLLOWING LIST SUMMARIZES THE RELEVANT SUBMITTALS FOR THIS PROJECT. REFER TO THE SPECIFICATIONS FOR A COMPLETE LIST AND ADDITIONAL REQUIREMENTS.
 - GENERAL
 - QUALIFICATION DATA FOR APPROVED INSTALLERS AND FABRICATORS.
 - PROVIDE PRODUCT DATA FOR ALL MANUFACTURER PRODUCTS AND ACCESSORIES USED.
 - DEFORMED BAR REINFORCEMENT
 - MANUFACTURER'S PRODUCT DATA, SPECIFICATIONS AND INSTALLATION PROCEDURES FOR PROPRIETARY MATERIALS AND REINFORCEMENT.
 - STEEL PRODUCER'S CERTIFICATES OF MILL ANALYSIS, TENSILE AND BEND TESTS.
 - SHOP DRAWINGS FOR FABRICATION, BENDING AND PLACEMENT
 - CAST-IN-PLACE CONCRETE (CIP)
 - DESIGN MIX FOR EACH CONCRETE MIX
 - MATERIAL TEST REPORTS
 - MATERIAL CERTIFICATES FOR CEMENT, AGGREGATES AND ADMIXTURES.
 - MANUFACTURER'S PRODUCT DATA FOR WATERSTOPS, BONDING AGENTS, VAPOR RETARDERS, JOINT FILLERS, CURING MATERIALS AND FLOOR TREATMENTS
 - SHOP DRAWINGS FOR PROPOSED LOCATION OF ADDITIONAL CONSTRUCTION, CONTROL JOINTS, SLIP CONTROL JOINTS AND WEAKENED PLANE JOINTS NOT SHOWN ON THE PLANS.
 - JOINT LAYOUT
 - SLAB WORK
 - ASPHALT
 - MIX
 - ROCK MATERIALS
 - CLASS 2 BASE (CLASS II AB)



CMD
California Military Department
Architecture & Engineering Section
State of California

10601 BEAR HOLLOW DRIVE
RANCHO CORDOVA, 95670

Issue		
No.	Date	Description
1	8.13.26	REVISED BID SET

Project
JFTB LEXINGTON DRIVE ENTRY

ADDRESS, CITY, ZIP JFTB LOS ALAMITOS 90720

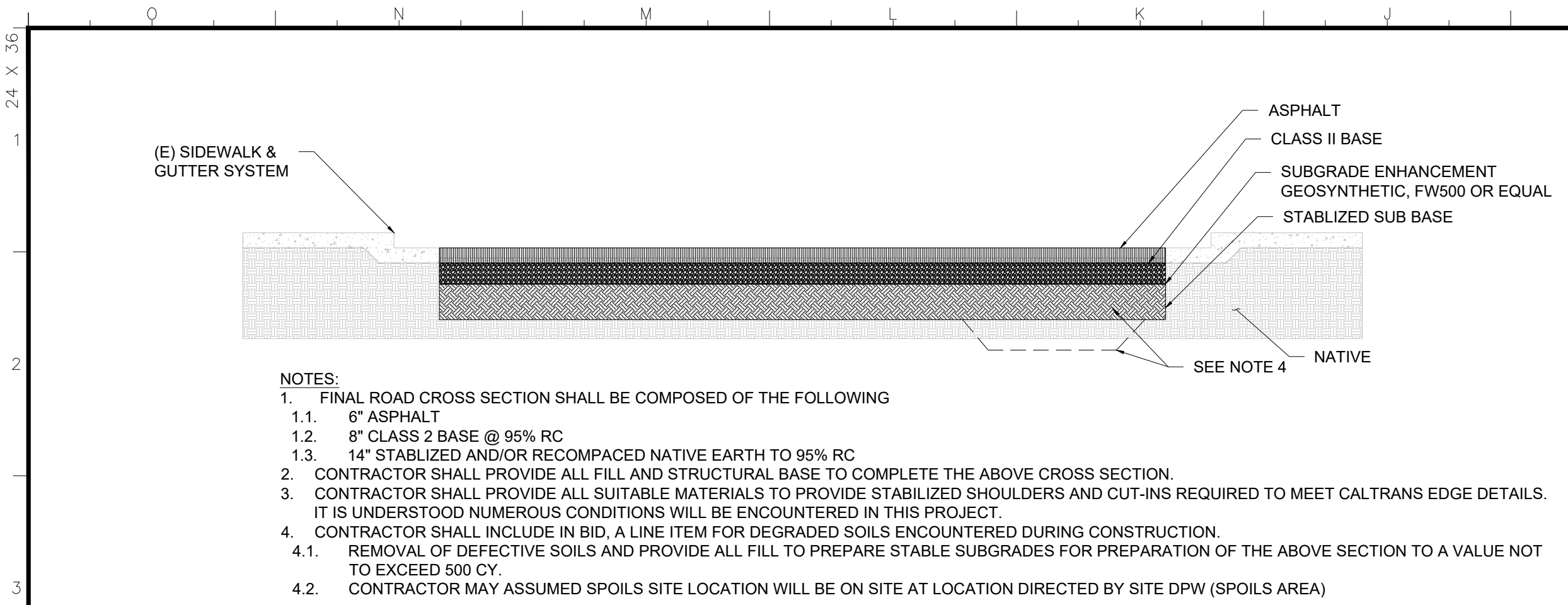
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DSA App No. N/A SFM Permit No. N/A

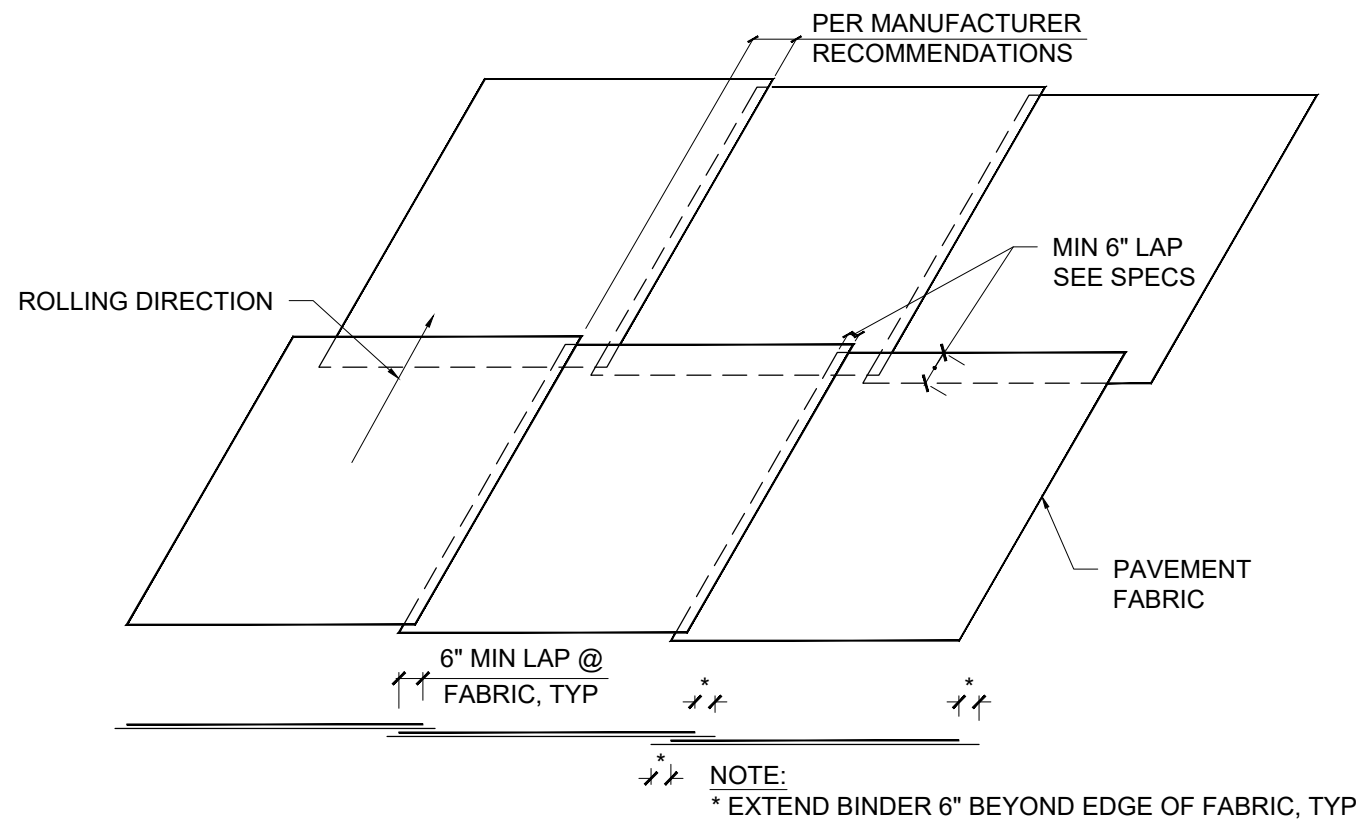
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Project Number
06L2409

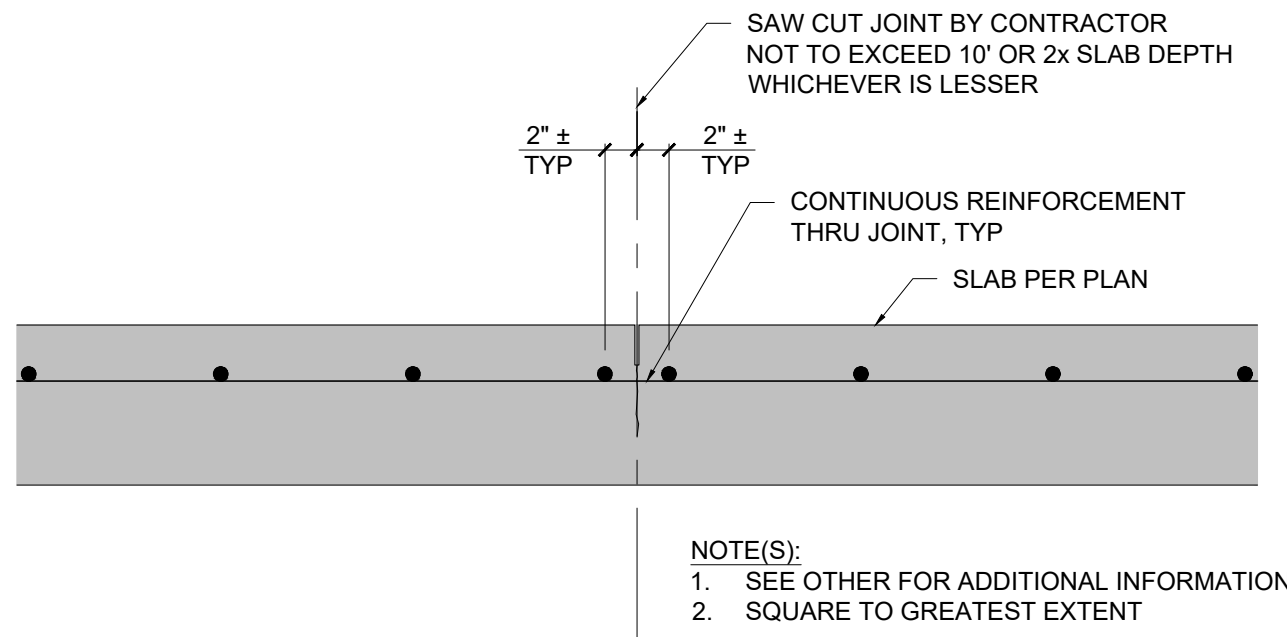
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Sheet Number
C1
2 OF 5



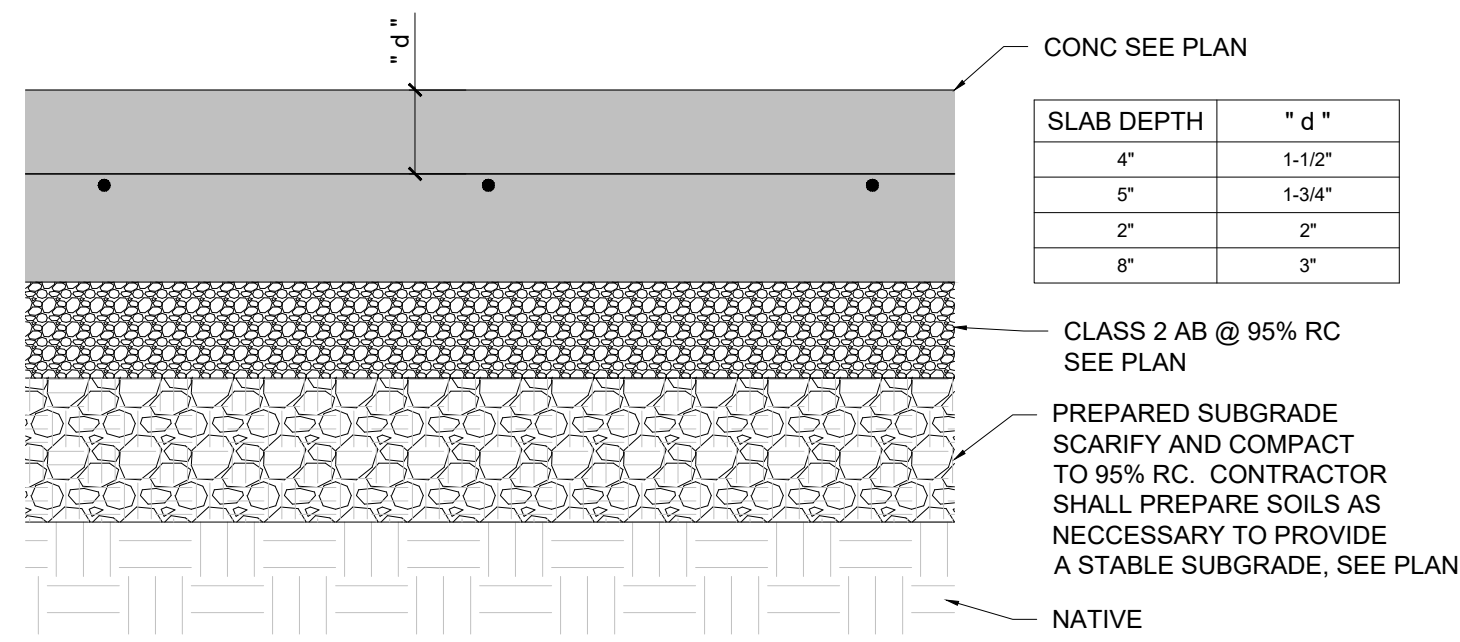
1 ASPH - ROAD SECTION
1/4" = 1'-0"



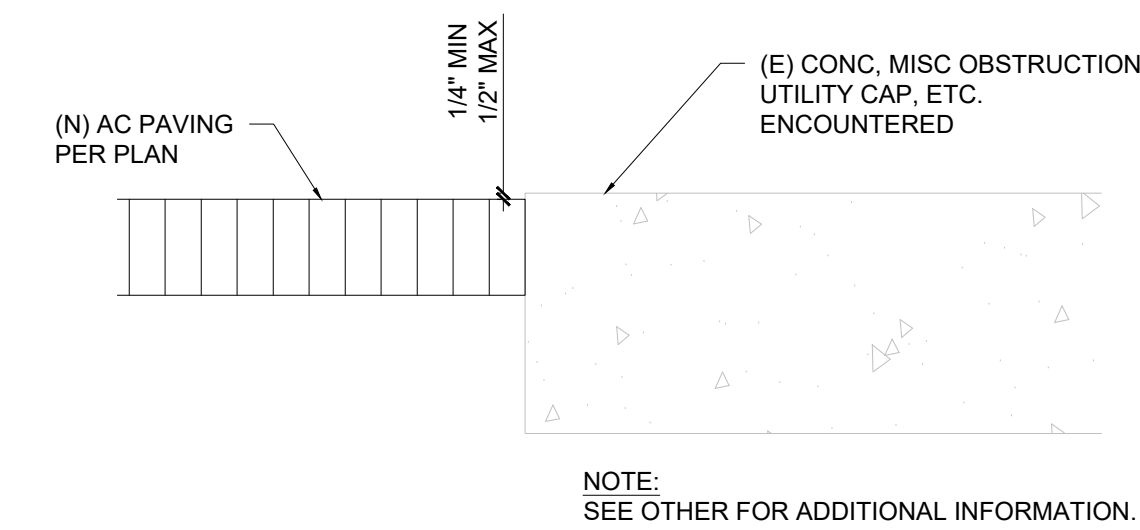
6 ASPH - GEOSYNTHETIC (SEPARATING FABRIC)
1/4" = 1'-0"



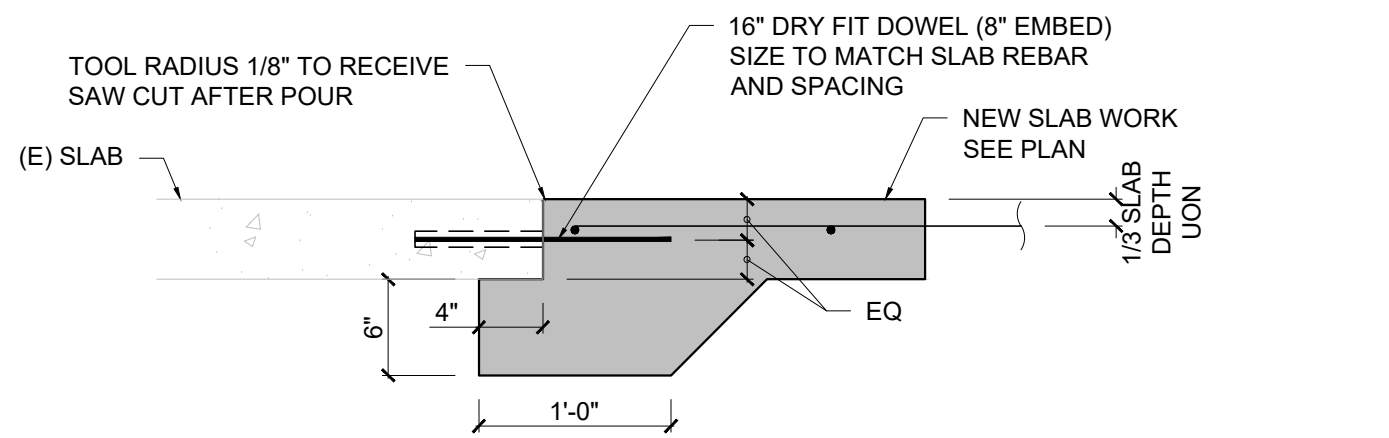
7 CONC - JOINT
1" = 1'-0"



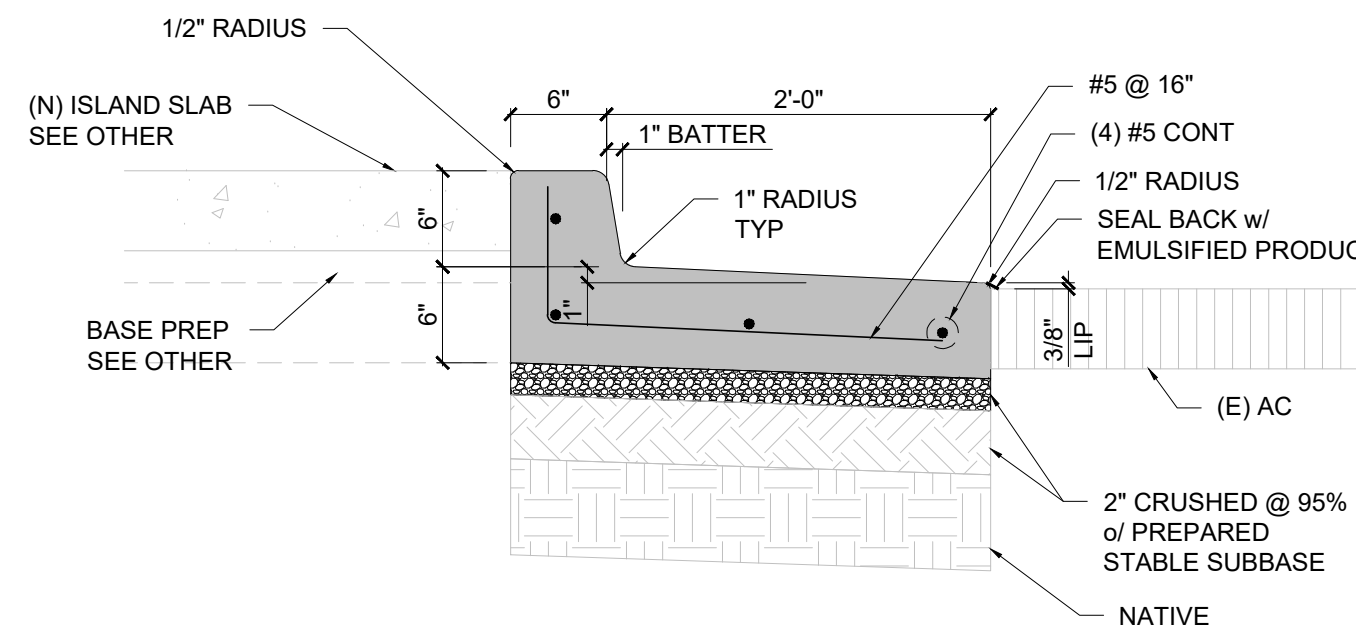
2 CONC SLAB SECTION - VEHICLE USE
1 1/2" = 1'-0"



3 FINISH WORK AT OBSTACLES
1 1/2" = 1'-0"



4 SLAB REPAIR
1" = 1'-0"



5 CONC - GUTTER
1" = 1'-0"



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Project
JFTB LEXINGTON DRIVE
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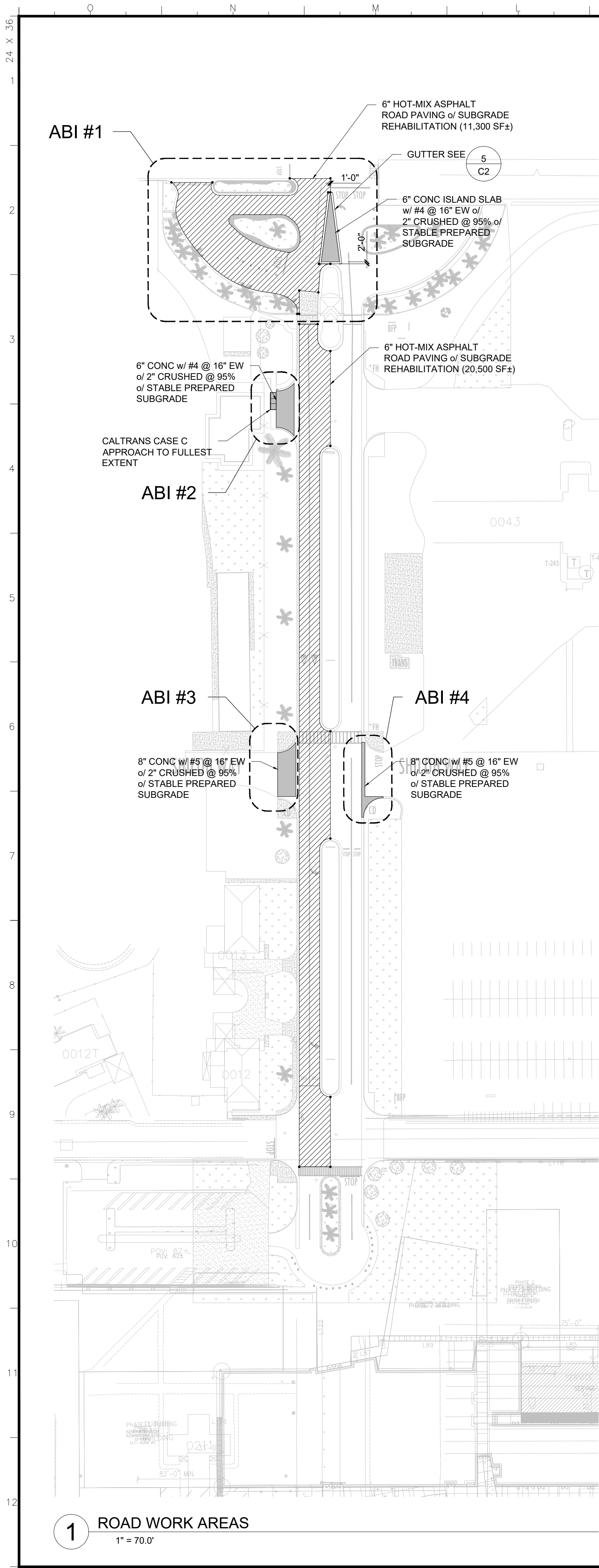
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90720

Supervisor NG	Designed AR	Drawn AR
DSA App. No. N/A	SFM Permit No. N/A	

Sheet Title
DETAILS

Project Number 06L2409	
Reference North 	Sheet Scale AS_SHOWN
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RELATIVE BORDER SCALE IN INCHES



- SITE NOTES**
- NO GRADING PLANS HAS BEEN ISSUED. CONTRACTOR IS EXPECTED TO MATCH EXISTING ELEVATIONS TO FULLEST EXTENT
 - ESTABLISH STRAIGHT LINE ELEVATIONS BETWEEN LOCATIONS, EDGE OF ROAD UON.

- GRADING AND EROSION CONTROL NOTES**
- CONTRACTOR SHALL ASSUME SOLE AND COMPLETE RESPONSIBILITY FOR PROTECTION OF PROPERTY ADJACENT TO WORK AND THAT CONTRACTOR AT THEIR EXPENSE, AGREES TO REPAIR OR REPLACE TO ORIGINAL CONDITION ALL EXISTING ITEMS DAMAGED AS A RESULT OF THEIR OPERATIONS
 - THE PAVEMENT SUBGRADE SHALL BE OVEREXCAVATED TO AT LEAST 14" BELOW THE FINISHED SUBGRADE ELEVATION.
 - CONTRACTOR SHALL DESIGNATE A PERSON OR PERSONS TO MONITOR THE DUST CONTROL PROGRAM AND TO ORDER INCREASED WATERING, AS NECESSARY, TO PREVENT TRANSPORT OF DUST OFF SITE. THEIR DUTIES SHALL INCLUDE HOLIDAY AND WEEKEND PERIODS WHEN WORK MAY NOT BE IN PROGRESS. THE NAME AND TELEPHONE NUMBER OF SUCH PERSONS SHALL BE PROVIDED TO THE CMD PROJECT MANAGER PRIOR TO COMMENCEMENT OF CONSTRUCTION.
 - REDUCE THE AMOUNT OF DISTURBED AREA WHERE POSSIBLE.
 - USE OF WATER TRUCKS OR SPRINKLER SYSTEMS IN SUFFICIENT QUANTITIES TO PREVENT AIRBORNE DUST FROM LEAVING THE SITE. INCREASED WATERING FREQUENCY WOULD BE REQUIRED WHENEVER WIND SPEEDS EXCEED 15 MPH. RECLAIMED (NONPOTABLE) WATER SHOULD BE USED WHENEVER POSSIBLE.
 - ALL DIRT STOCK-PILE AREAS SHOULD BE SPRAYED DAILY AS NEEDED.

- CONSTRUCTION NOTES**
- NO CONSTRUCTION SHALL BE STARTED WITHOUT PLANS APPROVED BY THE CMD PROJECT MANAGER. THE CMD PROJECT MANAGER SHALL BE NOTIFIED AT LEAST 48 HOURS PRIOR TO STARTING OF CONSTRUCTION AND OF THE TIME LOCATION OF THE PRECONSTRUCTION CONFERENCE. ANY CONSTRUCTION DONE WITHOUT APPROVED PLANS OR PRIOR NOTIFICATION TO THE CMD PROJECT MANAGER WILL BE REJECTED AND WILL BE AT THE CONTRACTOR'S RISK.
 - CONTRACTOR SHALL SUBMIT A TRAFFIC AND PEDESTRIAN CONTROL PLAN TO THE CMD PROJECT MANAGER FOR REVIEW AND APPROVAL.
 - TESTING: SOILS MATERIAL TESTING IS REQUIRED. SUBMIT TO INSPECTOR OF RECORD
 - COMPACTION TESTS SHALL BE MADE ON SUBGRADE MATERIAL AND MATERIAL. SAID TESTS SHALL BE MADE PRIOR TO THE PLACING OF THE NEXT MATERIAL
 - THE CMD PROJECT MANAGER MAY REQUIRE REVISIONS IN THE PLANS TO SOLVE UNFORESEEN PROBLEMS THAT MAY ARISE IN THE FIELD. ALL REVISIONS SHALL BE SUBJECT TO THE APPROVAL OF THE ENGINEER.
 - IF PERMANENT EROSION CONTROL HAS NOT BEEN ESTABLISHED BY THE ONSET OF THE RAINY SEASON OR IF CONSTRUCTION OCCURS DURING A RAINY PERIOD, THEN EROSION CONTROL DEVICES SHALL BE PROVIDED AND AVAILABLE ON THE SITE.

- NOTICE TO CONTRACTORS**
- CONSTRUCTION CONTRACTOR AGREES THAT IN ACCORDANCE WITH GENERALLY ACCEPTED CONSTRUCTION PRACTICES, CONSTRUCTION CONTRACTOR WILL BE REQUIRED TO ASSUME SOLE AND COMPLETE RESPONSIBILITY FOR JOB SITE CONDITIONS DURING THE COURSE OF CONSTRUCTION OF THE PROJECT, INCLUDING SAFETY OF ALL PERSONS AND PROPERTY; THAT THIS REQUIREMENT SHALL BE MADE TO APPLY CONTINUOUSLY AND NOT LIMITED TO NORMAL WORKING HOURS.
 - THE CONTRACTOR SHALL NOTIFY UNDERGROUND SERVICE ALERT AT LEAST 48 HOURS PRIOR TO COMMENCEMENT OF EXCAVATION TO ARRANGE FOR FIELD LOCATIONS OF UTILITY LINES. CALL 1-800-422-4133 FOR THIS SERVICE. ANY UTILITY NOT SUBSCRIBING TO THIS SERVICE SHALL BE CONTACTED DIRECTLY. IT SHALL BE THE CONTRACTOR'S RESPONSIBILITY TO DETERMINE WHETHER ALL UTILITIES HAVE BEEN NOTIFIED.
 - ALL TRAFFIC CONTROL, BARRICADING, AND CONSTRUCTION SIGNING SHALL BE IN CONFORMANCE WITH THE SDDCTEA PAMPHLET 55-17 (2016).
 - NO WATER SHALL BE TAKEN FROM FIRE HYDRANTS WITHOUT APPROVAL FROM THE CONTRACTING OFFICER.
 - DUST SHALL BE CONTROLLED BY SWEEPING AND WATERING.
 - ALL NON-STORMWATER DISCHARGES FROM THE CONSTRUCTION PHASE ACTIVITIES AT THE PROJECT SITE (I.E. MIXING AND CLEANING OF CONSTRUCTION MATERIALS, CONCRETE AND PLASTER WASHOUT, DISPOSAL OF PAINTS, ADHESIVES, SOLVENTS, AND LANDSCAPE PRODUCTS) SHALL BE PROHIBITED FROM ENTERING THE STORM DRAINAGE SYSTEM (INCLUDING CATCH BASINS, CURBS, GUTTERS, DITCHES, MAN-MADE CHANNELS, OR UNDERGROUND STORM DRAINS).
 - ANY SURVEY MONUMENTS FOUND SHALL BE REPLACED BY THE CONTRACTOR.
 - CONTRACTOR IS RESPONSIBLE FOR UNDERGROUND UTILITY EXPLORATION. DAMAGED UTILITIES ARE TO BE PAID FOR AT THE CONTRACTOR'S EXPENSE.
 - SIGN TYPE DESIGNATIONS ON PLANS ARE PER THE CA MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES (CA MUTCD), 2014.



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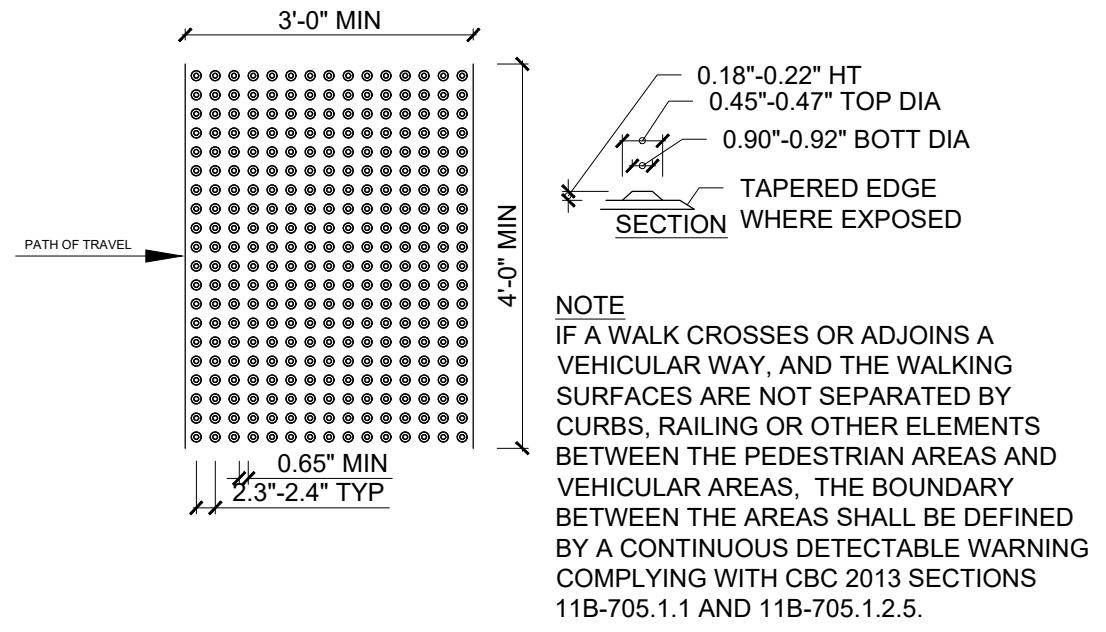
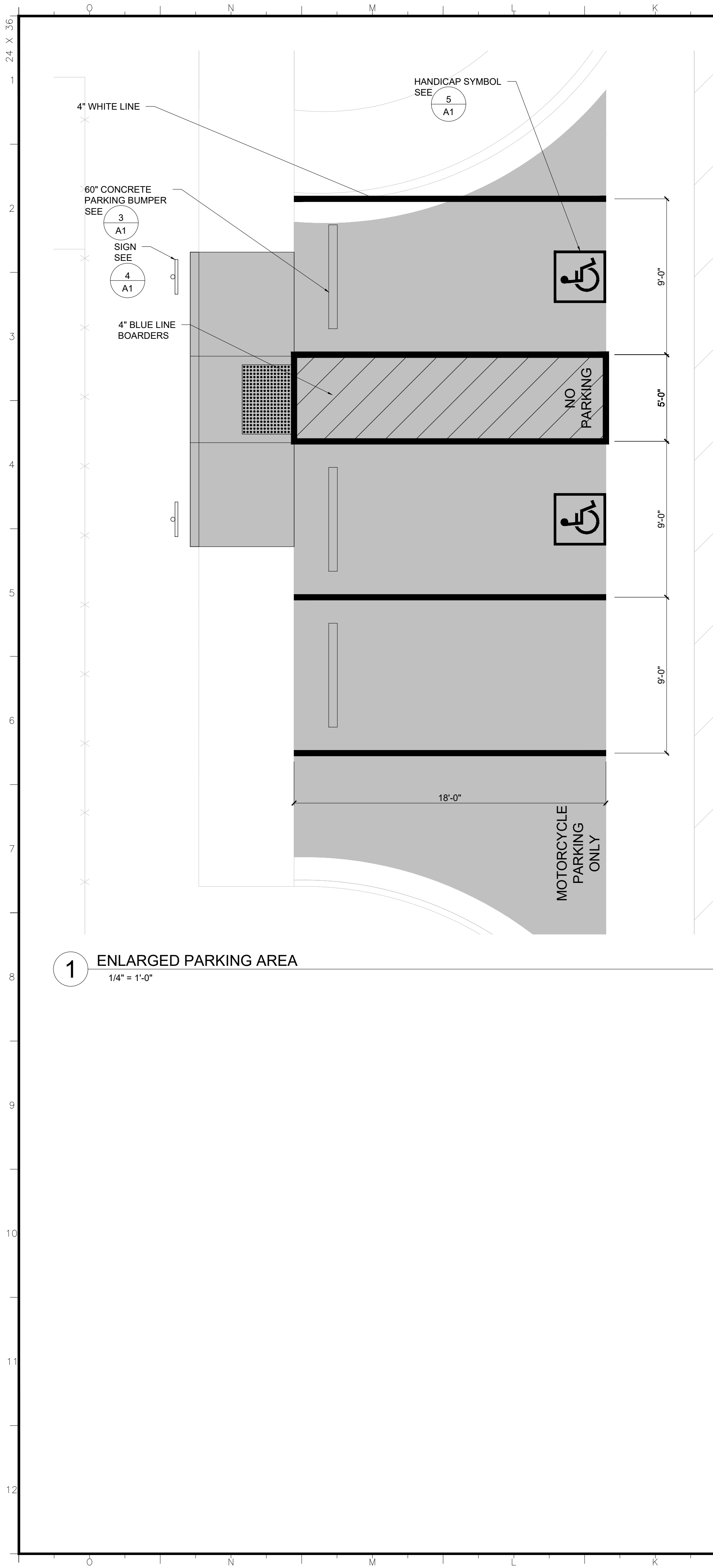
Project
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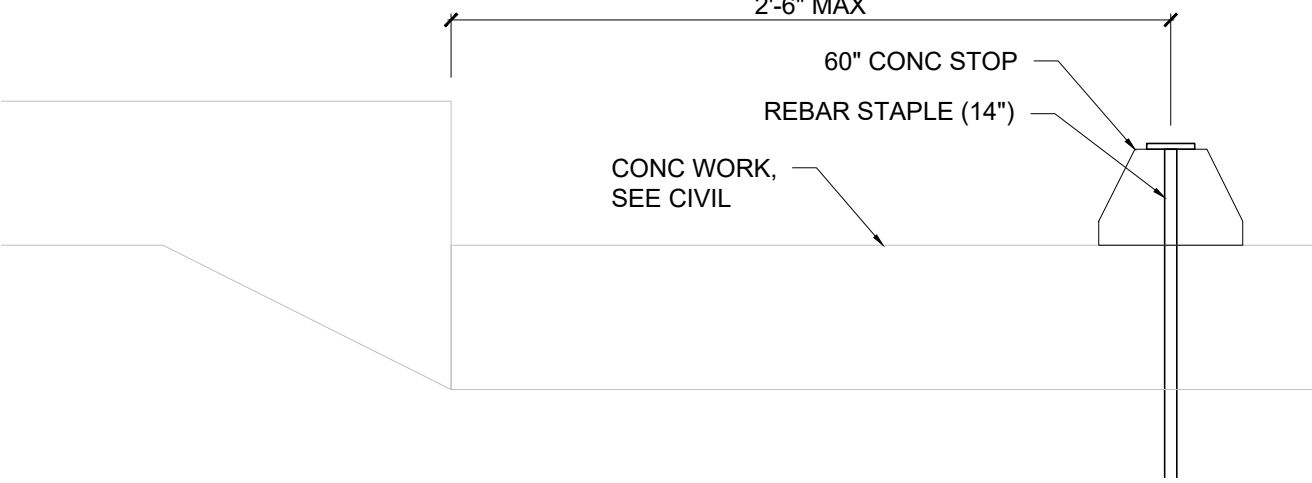
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DSA App. No. N/A	SFM Permit No. N/A	

Sheet Title
PLAN_SHEET

Project Number 06L2409	
Reference North 	Sheet Scale AS_SHOWN
Sheet Number C3	
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2 DETECTABLE WARNING SURFACE
1/2" = 1'-0"



3 PARKING BUMPER
1 1/2" = 1'-0"

