SECTION 024119 - SELECTIVE DEMOLITION

PART 1 - GENERAL

1.1 SUMMARY

A. The following provisions of Port of Stockton 'Division 01' General Provisions shall apply to the Work, unless specifically amended in any of the following Sections:
1. Section 01100 Summary
2. Section 01200 Measurement and Payment
3. Section 01250 Modification Procedures
4. Section 01315 Project Meetings
5. Section 01320 Progress Schedules and Reports
6. Section 01330 Submittal Procedures
7. Section 01340 Safety Submittals
8. Section 01410 Regulatory Requirements
9. Section 01420 References and Definitions
10. Section 01500 Temporary Facilities and Controls
11. Section 01540 Site Security and Safety
12. Section 01600 Product Requirements
13. Section 01740 Cleaning
14. Section 01770 Contract Closeout
15. Section 01780 Project Record Documents

B. Section Includes:
1. Demolition and removal of selected site elements.
2. Salvage of existing items to be reused or recycled.

C. Related Requirements:

1. Section 011000 "Summary" for restrictions on use of the premises, Owner-occupancy requirements, and phasing requirements.
2. Section 017300 "Execution" for cutting and patching procedures.
3. Section 311000 "Site Clearing" for site clearing and removal of above- and below-grade improvements not part of selective demolition.

1.2 DEFINITIONS

A. See Port of Stockton Division 01 'General Provisions' Section 01420 for overall project definitions in addition to the sections below.

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B. Remove: Detach items from existing construction and dispose of them off-site unless indicated to be salvaged or reinstalled.

C. Remove and Salvage: Detach items from existing construction, in a manner to prevent damage, and deliver to Owner ready for reuse.

D. Remove and Reinstall: Detach items from existing construction, in a manner to prevent damage, prepare for reuse, and reinstall where indicated.

E. Existing to Remain: Leave existing items that are not to be removed and that are not otherwise indicated to be salvaged or reinstalled.

F. Dismantle: To remove by disassembling or detaching an item from a surface, using gentle methods and equipment to prevent damage to the item and surfaces; disposing of items unless indicated to be salvaged or reinstalled.

G. Owner: Port of Stockton.

H. Railroad: Central California Traction Company.

1.3 MATERIALS OWNERSHIP

A. Unless otherwise indicated, demolition waste becomes the property of the Contractor.

B. Historic items, relics, antiques, and similar objects including, but not limited to, cornerstones and their contents, commemorative plaques and tablets, and other items of interest or value to the Owner that may be uncovered during demolition remain the property of the Owner.

1. Carefully salvage in a manner to prevent damage and promptly return to the Owner.

1.4 DESCRIPTION

A. Demolition as follows:

1. Rails, rail ties, other track material, ballast, subballast, asphalt pavement, concrete pavement chain link fence, gates, and appurtenances shall be completely removed as indicated on the contract plans.

1.5 PREINSTALLATION MEETINGS

A. Predemolition Conference: In addition to the requirements laid out in Port of Stockton Division 01 – Section 01315 – ‘Project Meetings’, conduct conference at Project site.

1. Inspect and discuss the condition of construction to be selectively demolished.
2. Review and finalize the selective demolition schedule and verify availability of materials, demolition personnel, equipment, and facilities needed to make progress and avoid delays.
3. Review requirements of work performed by other trades that rely on substrates exposed by selective demolition operations.

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4. Review areas where existing construction is to remain and require protection.
5. Develop a phasing plan for the proposed work and discuss work windows with the Owner and Railroad.

1.6 IINFORMATIONAL SUBMITTALS

A. Comply with Port of Stockton Division 01 'General Provisions' Sections 01330 and 01340 in addition to the following sections.

B. Proposed Protection Measures: Submit a report, including Drawings, that indicate the measures proposed for protecting individuals and property, for environmental protection, for dust control, and, for noise control. Indicate proposed locations and construction of barriers.

C. Schedule of Selective Demolition Activities: Indicate the following:

1. Detailed sequence of selective demolition and removal work, with starting and ending dates for each activity. Ensure the Owner's and other tenants' on-site operations are uninterrupted.
2. Interruption of utility services. Indicate how long utility services will be interrupted.
3. Coordination for shutoff, capping, and continuation of utility services.

D. Predemolition Photographs or Video: Show existing conditions of adjoining construction, including finish surfaces, that might be misconstrued as damage caused by salvage and demolition operations. Submit before Work begins.

E. Inventory: Submit a list of items that have been removed and salvaged.

1.7 QUALITY ASSURANCE

A. Regulatory Requirements: Comply with governing EPA notification regulations before beginning demolition. Comply with hauling and disposal regulations of authorities having jurisdiction.

B. Standards: Comply with ANSI A10.6 and NFPA 241.

1.8 FIELD CONDITIONS

A. Railroad and several tenants will occupy portions of building immediately adjacent to selective demolition area. Conduct selective demolition to minimize disruptions to the railroad and tenants.

1. Provide not less than 72 hours' notice of activities that will affect operations of adjacent occupants.
2. Maintain access to existing walkways, exits, and other facilities used by occupants.
   a. Do not close or obstruct walkways, exits, or other facilities used by occupants of adjacent buildings without written permission from authorities having jurisdiction.

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B. Conditions existing at time of inspection for bidding purpose will be maintained by Owner as far as practical.

C. Notify Engineer of discrepancies between existing conditions and Drawings before proceeding with selective demolition.

D. Hazardous Materials: Existing rail ties are considered hazardous materials. Rail ties shall be separated, stored, and disposed of according to local regulations by the Contractor.
   1. If suspected hazardous materials are encountered, including potential hydrocarbons in ballast from locomotive leaks, do not disturb; immediately notify Engineer and Owner. Hazardous materials other than rail ties will be removed by Owner under a separate contract.
   2. Refer to Section 312000 – Earth Moving for hauling and disposal of hazardous soil excavation.

E. Storage or sale of removed items or materials on-site is not permitted.

F. Utility Service: Maintain existing utilities indicated to remain in service and protect them against damage during selective demolition operations.

   1. Maintain fire-protection facilities in service during selective demolition operations.

1.9 COORDINATION

A. Arrange selective demolition schedule so as not to interfere with Owner's operations.

PART 2 - PRODUCTS

2.1 MATERIALS, EQUIPMENT, AND FACILITIES

A. The Contractor shall furnish all materials, tools, equipment, devices, appurtenances, facilities, and services as required for performing the demolition and removal work.

B. Materials used for backfill shall conform to the requirements for backfill of Section 312000, Earth Moving.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Verify that utilities have been disconnected and capped before starting selective demolition operations.

B. Review Project Record Documents of existing construction or other existing condition and hazardous material information provided by Owner. Owner does not guarantee that existing conditions are same as those indicated in Project Record Documents.

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C. Survey of Existing Conditions: Record existing conditions by use of measured drawings, and preconstruction photographs or video.

1. Inventory and record the condition of items to be removed and salvaged.

3.2 PREPARATION

A. Salvaged Items:
1. Clean salvaged items of dirt and demolition debris.
2. Pack or crate items after cleaning. Identify contents of containers.
3. Store items in a secure area until delivery to Owner.
4. Transport items to storage area designated by Owner.
5. Protect items from damage during transport and storage.

B. Removed and Reinstalled Items:

1. Clean and repair items to functional condition adequate for intended reuse.
2. Pack or crate items after cleaning and repairing. Identify contents of containers.
3. Protect items from damage during transport and storage.
4. Reinstall items in locations indicated. Comply with installation requirements for new materials and equipment. Provide connections, supports, and miscellaneous materials necessary to make item functional for use indicated.

3.3 UTILITY SERVICES

A. Existing Services/Systems to Remain: Maintain services/systems indicated to remain and protect them against damage.

B. Existing Services/Systems to Be Removed, Relocated, or Abandoned: Locate, identify, disconnect, and seal or cap off utility services to be selectively demolished.

1. Owner will arrange to shut off indicated services/systems when requested by Contractor.
2. If services/systems are required to be removed, relocated, or abandoned, provide temporary services/systems that bypass area of selective demolition and that maintain continuity of services/systems to other parts of building.

3.4 PROTECTION

A. Temporary Protection: Provide temporary barricades and other protection required to prevent injury to people and damage to adjacent buildings and facilities to remain.

1. Provide protection to ensure safe passage of people around selective demolition area and to and from occupied portions of building.
2. Provide temporary weather protection, during interval between selective demolition of existing construction on exterior surfaces and new construction, to prevent water leakage and damage to structure and interior areas.

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3. Cover and protect furniture, furnishings, and equipment that have not been removed.

B. Temporary Shoring: Design, provide, and maintain shoring, bracing, and structural supports as required to preserve stability and prevent movement, settlement, or collapse of construction and finishes to remain, and to prevent unexpected or uncontrolled movement or collapse of construction being demolished.

1. Strengthen or add new supports when required during progress of selective demolition.

C. Remove temporary barricades and protections where hazards no longer exist.

3.5 SELECTIVE DEMOLITION

A. General: Demolish and remove existing construction only to the extent required by new construction and as indicated. Use methods required to complete the Work within limitations of governing regulations and as follows:
1. Neatly cut openings and holes plumb, square, and true to dimensions required. Use cutting methods least likely to damage construction to remain or adjoining construction. Use hand tools or small power tools designed for sawing or grinding, not hammering and chopping. Temporarily cover openings to remain.
2. Cut or drill from the exposed or finished side into concealed surfaces to avoid marring existing finished surfaces.
3. Do not use cutting torches until work area is cleared of flammable materials. At concealed spaces, such as duct and pipe interiors, verify condition and contents of hidden space before starting flame-cutting operations. Maintain portable fire-suppression devices during flame-cutting operations.
4. Maintain fire watch during and for at least two (2) hours after flame-cutting operations.
5. Maintain adequate ventilation when using cutting torches.
6. Remove decayed, vermin-infested, or otherwise dangerous or unsuitable materials and promptly dispose of off-site.
7. Dispose of demolished items and materials promptly.

B. Site Access and Temporary Controls: Conduct selective demolition and debris-removal operations to ensure minimum interference with roads, streets, walks, walkways, and other adjacent occupied and used facilities.

C. Site Grading: Uniformly rough grade area of demolished construction to a smooth surface, free from irregular surface changes. Provide a smooth transition between adjacent existing grades and new grades.

D. Explosives: Use of explosives is not permitted.

E. Pavement Demolition: Thickness of existing pavements are from pothole data, and do not imply the actual depth or thickness of the total pavement or base material, where it occurs. Remove pavement of whatever thickness as required.

F. Existing Items to Remain: Protect construction indicated to remain against damage and soiling during selective demolition. When permitted by Engineer, items may be removed to a suitable, protected storage location during selective demolition, and cleaned and reinstalled in their original locations after selective demolition operations are complete.

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3.6 DISPOSAL OF DEMOLISHED MATERIALS

A. Remove demolition waste materials and discuss with the Owner regarding disposal site within the project site from Project site and dispose of them in an EPA-approved construction and demolition waste landfill acceptable to authorities having jurisdiction.
   1. Remove and transport debris in a manner that will prevent spillage on adjacent surfaces and areas.

B. Burning: Do not burn demolished materials.

3.7 CLEANING

A. Clean adjacent structures and improvements of dust, dirt, and debris caused by selective demolition operations. Return adjacent areas to condition existing before selective demolition operations began.

END OF SECTION 024119

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SECTION 31130 – DECONTAMINATION

PART 1 - GENERAL

1.1 SUMMARY

A. The following provisions of Port of Stockton 'Division 01' General Provisions shall apply to the Work, unless specifically amended in any of the following Sections:

1. Section 01100 Summary
2. Section 01200 Measurement and Payment
3. Section 01250 Modification Procedures
4. Section 01315 Project Meetings
5. Section 01320 Progress Schedules and Reports
6. Section 01330 Submittal Procedures
7. Section 01340 Safety Submittals
8. Section 01410 Regulatory Requirements
9. Section 01420 References and Definitions
10. Section 01500 Temporary Facilities and Controls
11. Section 01540 Site Security and Safety
12. Section 01600 Product Requirements
13. Section 01740 Cleaning
14. Section 01770 Contract Closeout
15. Section 01780 Project Record Documents

B. This section covers the decontamination requirements for the CONTRACTOR's equipment.

C. Section Includes, but is not limited to the following:

1. Preparation of a Decontamination Plan.
2. Establishment of decontamination facilities.
3. Decontamination of all equipment and transport vehicles after exposure to impacted materials and prior to leaving the impacted area.
4. Containment, sampling and analysis, treatment, consolidation and/or disposal of decontamination wastes in accordance with all applicable laws, including obtaining all permits for such disposal.
5. Cleanup and removal of the decontamination facility.

D. Related Requirements:

1. Section 311000 – Site Clearing

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2. Section 312000 – Earth Moving

3. Section 315000 – Excavation Support and Protection

1.2 DEFINITION

A. See Port of Stockton Division 01 'General Provisions' Section 01420 for overall project definitions in addition to the sections below.

B. Decontamination: Process of using physical and/or chemical methods for the cleaning and complete removal of contaminated soils. For this project, decontamination will consist of removing solid waste, dust, debris, and soil contaminated with metals (arsenic).

1.3 SUBMITTALS

A. Comply with Port of Stockton Division 01 'General Provisions' Sections 01330 and 01340 in addition to the following sections.

B. The CONTRACTOR shall prepare a Decontamination Plan and submit the plan to the OWNER within seven (7) calendar days of contract execution. A complete (i.e., approved, approved with comments, or information only) Decontamination Plan is required prior to the CONTRACTOR's mobilization to the site. The Decontamination Plan shall address the following elements.

1. Location of the decontamination facility and/or area.

2. Estimates of decontamination waste quantities.

3. Methods for the analysis of decontamination wastes.

4. Methods for collection (i.e., storage tanks), treatment, and disposal of decontamination wastes.

5. Equipment, methods, and reagents to be used for decontamination.

6. Frequency of decontamination.

7. Contingency plans for incident/emergency situations.

8. Safety data sheets for chemicals used for decontamination.

C. The CONTRACTOR shall submit copies of all permits to OWNER no later than three (3) working days prior to anticipated start of construction activities.

D. The CONTRACTOR shall submit a register of the chemicals, GHS- (Globally Harmonized System of the Classification and Labeling of Chemicals) compliant safety data sheets, estimated maximum quantity of chemicals with container types, and storage locations to OWNER for approval no later than one (1) week prior to mobilization.

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PART 2 - PRODUCTS

2.1 GENERAL

A. Decontamination solutions and equipment shall be suitable to remove solid waste, debris, and soils containing metals (arsenic).

B. Provide high-pressure wash equipment and vacuums equipped with high-efficiency particulate air filters, or steam cleaning equipment.

C. Equipment for vacuuming shall be suitable to vacuum paved surfaces and shall also be suitable to initially remove dust from materials and equipment that will be subsequently decontaminated.

D. Soaps, degreasers, and other cleaning solutions shall be used as necessary and shall be non-hazardous.

2.2 DECONTAMINATION WASTES

A. Provide facilities for the complete containment of decontamination wastes. CONTRACTOR shall receive approval from OWNER on the selected facility before use.

B. Provide facilities for the separation of solid from liquid wastes such that all wastes must be disposed in compliance with the OWNER's requirements as well as applicable laws, regulations, and discharge requirements.

C. CONTRACTOR shall receive approval from OWNER for the use of liquids for decontamination prior to such use.

D. Decontamination wastes and wastewater will be temporarily stored in containers with secondary containment at the Site and shall be properly disposed of in accordance with the applicable local, state, and federal requirements.

PART 3 - EXECUTION

3.1 ESTABLISHMENT OF DECONTAMINATION FACILITIES

A. Prior to beginning work, establish and make ready for operation the decontamination facilities within a Decontamination Zone consistent with the OWNER's approved Decontamination Plan.

B. The decontamination facility shall include a containment area to collect waste generated from decontamination and to prevent waste from contacting and/or penetrating the ground outside the impacted area.

C. The decontamination facility shall allow OWNER or OWNER's representative to efficiently observe the decontamination of equipment and vehicles prior to leaving the impacted area, including efficient observation of the undercarriage and tarped cover of the transport vehicles and the undercarriage of equipment and vehicles.

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3.2 DECONTAMINATION

A. The decontamination process shall include the removal of accumulated soil material, and other contamination from equipment and materials while said equipment and materials are physically located in the decontamination facility. CONTRACTOR shall decontaminate equipment and materials at the frequency stated in the Decontamination Plan.

B. Methods shall conform to the Decontamination Plan and, at a minimum, shall consist of brushing, scrubbing, vacuuming, steam cleaning, or high-pressure washing, or combinations of these. Cleaning solutions shall be used as needed to thoroughly remove contamination.

C. The CONTRACTOR shall decontaminate the following materials and equipment.

1. Every item to be used by the CONTRACTOR at the site, prior to mobilization to the site.
2. Equipment used during onsite activities prior to leaving the site.
3. Every item of any sort mobilized by the CONTRACTOR to the site, prior to leaving the site or to demobilization from the site.

D. The CONTRACTOR shall afford the ENGINEER the opportunity to observe each decontaminated transport vehicle prior to the vehicle's departure from the site.

E. To the extent practicable, the CONTRACTOR shall minimize generation of decontamination wastewater and other decontamination-derived residuals.

3.3 DECONTAMINATION WASTES

A. Wastes collected from decontamination of equipment and all other materials shall be collected and disposed of in accordance with the approved decontamination plan, OWNER's requirements, and all applicable laws.

B. The CONTRACTOR shall minimize the use of water to be used for decontamination activities to the extent reasonable.

C. Precautions shall be taken to prevent rainwater and surface runoff from entering the decontamination facility. If rainwater and surface runoff enter the decontamination facility, it shall be handled by the CONTRACTOR in the same manner as decontamination wastewater.

D. The CONTRACTOR shall be responsible for sampling and analysis, treatment, and disposal of all decontamination wastes in accordance with all applicable laws, including preparation of profiles and manifests in advance of transportation, if needed.

3.4 CONTAMINATION OF NON-CONTAMINATED AREAS

A. If the CONTRACTOR contaminates areas presently not contaminated or re-contaminates areas that have been remediated, the CONTRACTOR shall be solely responsible for all costs incurred in removing such contamination. This includes, but is not limited to, contamination caused by fugitive dust, wheel tracking, accidental spills, water runoff, water run-on, and erosion.

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B. Care shall be taken in the delivery, spreading, and compacting of backfill. Equipment that is placing and compacting the fill, which comes in contact with contaminated materials, shall be decontaminated before performing any further Work.

END OF SECTION 31130

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SECTION 311000 - SITE CLEARING

PART 1 - GENERAL

1.1 SUMMARY

A. The following provisions of Port of Stockton 'Division 01' General Provisions shall apply to the Work, unless specifically amended in any of the following Sections:

1. Section 01100 Summary
2. Section 01200 Measurement and Payment
3. Section 01250 Modification Procedures
4. Section 01315 Project Meetings
5. Section 01320 Progress Schedules and Reports
6. Section 01330 Submittal Procedures
7. Section 01340 Safety Submittals
8. Section 01410 Regulatory Requirements
9. Section 01420 References and Definitions
10. Section 01500 Temporary Facilities and Controls
11. Section 01540 Site Security and Safety
12. Section 01600 Product Requirements
13. Section 01740 Cleaning
14. Section 01770 Contract Closeout
15. Section 01780 Project Record Documents

B. Section Includes:

1. Protecting existing vegetation to remain.
2. Removing existing vegetation.
3. Clearing and grubbing.
4. Stripping and stockpiling topsoil.
5. Removing above- and below-grade site improvements.
6. Disconnecting, capping or site utilities.
7. Temporary erosion and sedimentation-control measures.

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1.2 DEFINITIONS

A. See Port of Stockton Division 01 'General Provisions' Section 01420 for overall project definitions in addition to the sections below.

B. Subsoil: Soil beneath the level of subgrade; soil beneath the topsoil layers of a naturally occurring soil profile, typified by less than 1 percent organic matter and few soil organisms.

C. Surface Soil: Soil that is present at the top layer of the existing soil profile. In undisturbed areas, surface soil is typically called "topsoil," but in disturbed areas such as urban environments, the surface soil can be subsoil.

D. Topsoil: Top layer of the soil profile consisting of existing native surface topsoil or existing in-place surface soil; the zone where plant roots grow.

E. Vegetation: Trees, shrubs, groundcovers, grass, and other plants.

F. Owner: Port of Stockton.

1.3 MATERIAL OWNERSHIP

A. Except for materials indicated to be stockpiled or otherwise remain Owner's property, cleared materials shall become Contractor's property and shall be removed from Project site.

1.4 INFORMATIONAL SUBMITTALS

A. Comply with Port of Stockton Division 01 'General Provisions' Sections 01330 and 01340 in addition to the following sections.

B. Existing Conditions: Documentation of existing trees and plantings, adjoining construction, and site improvements that establish preconstruction conditions that might be misconstrued as damage caused by site clearing.

1. Use sufficiently detailed photographs or video recordings.

C. Record Drawings: Identifying and accurately showing locations of capped utilities and other subsurface structural, electrical, and mechanical conditions.

1.5 QUALITY ASSURANCE

A. Topsoil Stripping and Stockpiling Program: Prepare a written program to systematically demonstrate the ability of personnel to properly follow procedures and handle materials and equipment during the Work. Include dimensioned diagrams for placement and protection of stockpiles.

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1.6 FIELD CONDITIONS

A. Traffic: Minimize interference with adjoining roads, streets, walks, and other adjacent occupied or used facilities during site-clearing operations.

1. Do not close or obstruct streets, walks, or other adjacent occupied or used facilities without permission from the Owner and authorities having jurisdiction.
2. Provide alternate routes around closed or obstructed trafficways if required by the Owner or authorities having jurisdiction.

B. Improvements on Adjoining Property: Authority for performing site clearing indicated on property adjoining the Owner's property will be obtained by Owner before award of Contract.

1. Do not proceed with work on adjoining property until directed by the Owner.

C. Salvageable Improvements: Carefully remove items indicated to be salvaged and store them on Owner's premises.

D. Utility Locator Service: Notify ‘Call Before You Dig’ for area where Project is located before site clearing.

E. Do not commence site clearing operations until temporary erosion- and sedimentation-control measures are in place.

F. Soil Stripping, Handling, and Stockpiling: Perform only when the soil is dry or slightly moist.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Satisfactory Soil Material: Requirements for satisfactory soil material are specified in Section 312000 "Earth Moving."

1. Obtain approved borrow soil material off-site when satisfactory soil material is not available on-site.

PART 3 - EXECUTION

3.1 PREPARATION

A. Protect and maintain benchmarks and survey control points from disturbance during construction.

B. Protect groundwater monitoring wells in place. Construct 10-foot square area delineated with cones or other visible barriers to create a buffer zone around each well.

C. Protect existing site improvements to remain from damage during construction.

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1. Restore damaged improvements to their original condition, as acceptable to Owner.

3.2 TEMPORARY EROSION AND SEDIMENTATION CONTROL

A. Provide temporary erosion- and sedimentation-control measures to prevent soil erosion and discharge of soil-bearing water runoff or airborne dust to adjacent properties and walkways, according to erosion- and sedimentation-control drawings and requirements of the Owner's latest Development Standards Plan.

B. Verify that flows of water redirected from construction areas or generated by construction activity do not enter or cross protection zones.

C. Inspect, maintain, and repair erosion- and sedimentation-control measures during construction until permanent vegetation has been established.

D. Remove erosion and sedimentation controls and restore and stabilize areas disturbed during removal.

3.3 EXISTING UTILITIES

A. Owner will arrange for disconnecting and sealing indicated utilities that serve existing structures before site clearing, when requested by Contractor.

1. Verify that utilities have been disconnected and capped before proceeding with site clearing.

2. Owner will arrange to shut off indicated utilities when requested by Contractor.

B. Interrupting Existing Utilities: Do not interrupt utilities serving facilities occupied by Owner or others, unless permitted under the following conditions and then only after arranging to provide temporary utility services according to the requirements indicated:

1. Notify Owner or tenant not less than 3 days in advance of proposed utility interruptions.
2. Do not proceed with utility interruptions without Owner's written permission.

C. Excavate for and remove underground utilities indicated to be removed.

D. Protect groundwater monitoring wells in place.

3.4 CLEARING AND GRUBBING

A. Remove obstructions, trees, shrubs, and other vegetation to permit installation of new construction.

1. Do not remove trees, shrubs, and other vegetation indicated to remain or to be relocated.
2. Grind down stumps and remove roots larger than 2 inches in diameter, obstructions, and debris to a depth of 18 inches below the exposed subgrade.
3. Use only hand methods or air spade for grubbing within protection zones.
4. Chip removed tree branches and stockpile in areas approved by Owner.

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B. Fill depressions caused by clearing and grubbing operations with satisfactory soil material unless further excavation or earthwork is indicated.

1. Place fill material in horizontal layers not exceeding a loose depth of 8 inches, and compact each layer to a density equal to adjacent original ground.

3.5 TOPSOIL STRIPPING

A. Remove sod and grass before stripping topsoil.

B. Strip topsoil to depth of 6 inches in a manner to prevent intermingling with underlying subsoil or other waste materials.

1. Remove subsoil and non-soil materials from topsoil, including clay lumps, gravel, and other objects larger than 2 inches in diameter; trash, debris, weeds, roots, and other waste materials.

C. Stockpile topsoil away from edge of excavations without intermixing with subsoil or other materials. Grade and shape stockpiles to drain surface water. Cover to prevent windblown dust and erosion by water.

1. Limit height of topsoil stockpiles to 72 inches.
2. Do not stockpile topsoil within protection zones.
3. Stockpile surplus topsoil to allow for respreading deeper topsoil.

3.6 SITE IMPROVEMENTS

A. Remove existing above- and below-grade improvements as indicated and necessary to facilitate new construction.

3.7 DISPOSAL OF SURPLUS AND WASTE MATERIALS

A. Remove surplus soil material, unsuitable topsoil, obstructions, demolished materials, and waste materials including trash and debris, and coordinate with Owner on either dispose of them off Owner's property or stockpiling at a designated site within Owner’s property.

B. Separate recyclable materials produced during site clearing from other nonrecyclable materials. Store or stockpile without intermixing with other materials and transport them to recycling facilities. Do not interfere with other Project work.

END OF SECTION 311000

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SECTION 312000 - EARTH MOVING

PART 1 - GENERAL

1.1 SUMMARY

A. The following provisions of Port of Stockton 'Division 01' General Provisions shall apply to the Work, unless specifically amended in any of the following Sections:

1. Section 01100 Summary
2. Section 01200 Measurement and Payment
3. Section 01250 Modification Procedures
4. Section 01315 Project Meetings
5. Section 01320 Progress Schedules and Reports
6. Section 01330 Submittal Procedures
7. Section 01340 Safety Submittals
8. Section 01410 Regulatory Requirements
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10. Section 01500 Temporary Facilities and Controls
11. Section 01540 Site Security and Safety
12. Section 01600 Product Requirements
13. Section 01740 Cleaning
14. Section 01770 Contract Closeout
15. Section 01780 Project Record Documents

B. Section Includes:

1. Excavating and filling for rough grading the Site.
2. Preparing subgrades track roadbed, pavements, and retention ponds.
3. Subbase course for asphalt paving.
4. Subsurface drainage backfill for trenches.
5. Excavating and backfilling trenches for utilities.
6. Installing Geotextile.
7. Hydroseeding.

C. Related Requirements:

1. Section 31 10 00 "Site Clearing" for site stripping, grubbing, stripping and stockpiling topsoil, and removal of above- and below-grade improvements and utilities.

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2. Section 31130 “Decontamination” for remedial work to be performed within Sites 19 and 47 under Department of Toxic Substances Control regulation.
3. Section 32 11 23 – Aggregate Base Courses
4. Section 34 11 00 – Trackwork Construction
5. Section 34 11 05 – Subballast

1.2 DEFINITIONS

A. See Port of Stockton Division 01 ‘General Provisions’ Section 01420 for overall project definitions in addition to the sections below.

B. Backfill: Soil material or controlled low-strength material used to fill an excavation.

1. Initial Backfill: Backfill placed beside and over pipe in a trench, including haunches to support sides of pipe.
2. Final Backfill: Backfill placed over initial backfill to fill a trench.

C. Base Course: Aggregate layer placed between the subbase course and hot-mix asphalt paving.

D. Bedding Course: Aggregate layer placed over the excavated subgrade in a trench before laying pipe.

E. Borrow Soil: Satisfactory soil imported from off-site for use as fill or backfill.

F. Cover Soil: Upper 2 feet of fill soils above the demarcation layer that will function as the cover over impacted soil.

G. Drainage Course: Aggregate layer supporting the slab-on-grade that also minimizes upward capillary flow of pore water.

H. Excavation: Removal of material encountered above subgrade elevations and to lines and dimensions indicated.

1. Authorized Additional Excavation: Excavation below subgrade elevations or beyond indicated lines and dimensions as directed by the Engineer. Authorized additional excavation and replacement material will be paid for according to Contract provisions for changes in the Work.
2. Bulk Excavation: Excavation more than 10 feet in width and more than 30 feet in length.
3. Unauthorized Excavation: Excavation below subgrade elevations or beyond indicated lines and dimensions without direction by the Engineer. Unauthorized excavation, as well as remedial work directed by the Engineer, will be without additional compensation.

I. Embankment fill (Fill): Soil materials used to raise existing grades.

J. Impacted Soil: All soil material excavated from within Site 47 are considered impacted soil. This material may contain concentrations of metals (Arsenic) above the background threshold

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value due to former onsite operations. Impacted soil will be maintained within Site 47 and covered.

K. Manufacturer: Responsible for the production of materials used for construction.

L. Site 19: Restricted site within Port of Stockton west of Humphreys Street and south of Fyffe Street with presence of contaminated stockpiles under environmental jurisdiction of the State Department of Toxic Substances Control (DTSC).

M. Site 47: Restricted site within Port of Stockton bound by Port Expressway (east), McCloy Avenue (north), and Daggett Road (west) under environmental jurisdiction of the State Department of Toxic Substances Control (DTSC).

N. Structures: Buildings, footings, foundations, retaining walls, slabs, tanks, curbs, mechanical and electrical appurtenances, or other fabricated stationary features constructed above or below the ground surface.

O. Subbase Course: An aggregate layer placed between the subgrade and base course for hot-mix asphalt pavement or an aggregate layer placed between the subgrade and a cement concrete pavement or a cement concrete or hot-mix asphalt walk.

P. Subgrade: Uppermost surface of an excavation or the top surface of a fill or backfill immediately below subbase, drainage fill, drainage course, or topsoil materials.

Q. Utilities: On-site underground pipes, conduits, ducts, and cables, as well as underground services within buildings.

1.3 ACTION SUBMITTALS

A. Comply with Port of Stockton Division 01 ‘General Provisions’ Sections 01330 and 01340 in addition to the following sections.

B. Product Data: For each type of the following manufactured products required:

1. Geotextiles.
2. Controlled low-strength material, including design mixture.

C. Samples for Verification: For the following products, in sizes indicated below:

1. Geotextile: 12 by 12 inches.
2. Soil Sample from Site 47 as per Department of Toxic Substances Control (DTSC) Remedial Action Plan

D. Submit the following to OWNER, prior to confirmation of OWNER-CONTRACTOR Agreement, samples and complete description of geotextile fabric proposed for use that meets or exceeds requirements of this section. Include certified minimum property values and test methods used to obtain property values. Also include production capacity available and projected delivery dates.

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E. Submit, 10 days prior to installation, written instructions for storage, handling installation, repair, and seaming of proposed geotextile.

F. Submit, 10 days prior to delivery, MANUFACTURER's certificates of compliance with specified product requirements. This submittal includes MANUFACTURER's Quality Control (MQC) testing certificates notarized by responsible party. Include lot, batch, and roll numbers, sampling procedures, test procedures, and test results.

G. Warranty: Submit to OWNER, 10 days prior to installation, MANUFACTURER's and CONTRACTOR's written warranty against product and installation defects. Limits of liability must be accepted by OWNER.

1.4 INFORMATIONAL SUBMITTALS

A. Comply with Port of Stockton Division 01 'General Provisions' Sections 01330 and 01340 in addition to the following sections.

B. Qualification Data: For qualified testing agency.

C. Material Test Reports: For each on-site and borrow soil material proposed for fill and backfill as follows:

1. Classification according to ASTM D2487.

2. Gradation according to ASTM D422.

3. Plasticity data in accordance with ASTM D4318
4. Laboratory compaction curve according to ASTM D1557.

1.5 QUALITY ASSURANCE

A. Geotechnical Testing Agency Qualifications: Qualified according to ASTM E329 and ASTM D3740 for testing indicated.

1.6 FIELD CONDITIONS

A. Traffic: Minimize interference with adjoining roads, streets, walks, and other adjacent occupied or used facilities during earth-moving operations.

1. Do not close or obstruct streets, walks, or other adjacent occupied or used facilities without permission from Owner and/or their tenants.
2. Provide alternate routes around closed or obstructed traffic ways if required by the Owner or their tenants.

B. Improvements on Adjoining Property/Lease: Authority for performing earth moving indicated on property adjoining Owner's property will be obtained by Owner before award of Contract.

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1. Do not proceed with work on adjoining property/lease until directed by Owner.

C. Do not commence earth-moving operations until temporary site fencing and erosion and sedimentation-control measures specified in Section 311000 "Site Clearing" are in place.

D. Existing Utility Data: The location, size, and depth or invert elevation of existing utilities as shown on the drawings are based on information provided by various sources, the accuracy of which has not been verified. Such information serves only as an approximation and should be verified prior to construction.

E. Do not direct vehicle or equipment exhaust towards protection zones.

F. Prohibit heat sources, flames, ignition sources, and smoking within or near protection zones.

PART 2 - PRODUCTS

2.1 SOIL MATERIALS

A. General: Provide borrow soil materials when sufficient satisfactory soil materials are unavailable from excavations.

B. Satisfactory Soils: Soil Classification Groups GW, GP, GM, SW, SP, and SM according to ASTM D2487, or a combination of these groups; free of rock or gravel larger than 3 inches in any dimension, debris, waste, frozen materials, vegetation, and other deleterious matter.

1. Liquid Limit: Less than 30 per ASTM D4318 or Caltrans Test Method 204.
2. Plasticity Index: Less than 12 per ASTM D4318 or Caltrans Test Method 204.

C. Unsatisfactory Soils: Soil Classification Groups GC, SC, CL, ML, OL, CH, MH, OH, and PT according to ASTM D2487, or a combination of these groups.

1. Unsatisfactory soils also include satisfactory soils not maintained within 2 percent of optimum moisture content at time of compaction.

2. Unsatisfactory soils also include satisfactory soils that may have one or more tested contaminants.

D. Subbase Material: Naturally or artificially graded mixture of natural or crushed gravel, crushed stone, and natural or crushed sand; ASTM D2940; with at least 90 percent passing a 1-1/2-inch sieve and not more than 12 percent passing a No. 200 sieve.

E. Base Course: Naturally or artificially graded mixture of natural or crushed gravel, crushed stone, and natural or crushed sand; ASTM D2940; with at least 95 percent passing a 1-1/2-inch sieve and not more than 8 percent passing a No. 200 sieve.

F. Engineered Fill: Naturally or artificially graded mixture of natural or crushed gravel, crushed stone, and natural or crushed sand, non-plastic silt; ASTM D2940; nearly free of organic materials, debris or other deleterious material; maximum particle size less than 3 inches in maximum dimension with not more than 30 percent passing a No. 200 sieve.

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Fill Requirement		Test Procedures	
		ASTM	Caltrans
Gradation			
Sieve Size	Percent Passing		
3"	100	D422	202
3/4"	70-100	D422	202
No. 200	15-30	D422	202
Plasticity			
Liquid Limit	Plasticity Index		
Less than 30	Less than 12	D4318	204
Organic Content			
No visible organics		-	-
Expansion Potential			
20 or less		D4829	-
Soluble Sulfates			
Less than 2,000 ppm		-	417
Soluble Chloride			
Less than 300 ppm		-	422
Resistivity			
Greater than 2,000 ohm-cm		-	643

1. Soil Cover: Soil material imported from the RRI Dredge Material Placement Site is intended to construct the 2-foot-thick soil cover and shall meet the requirements of the Site 47 Soil Management Plan and DTSC Information Advisory Clean Imported Fill Material Fact Sheet (DTSC, 2001.

G. Utility Trench Bedding: Bedding Sand shall have a minimum sand equivalent of 50 conforming to ASTM C33. Ninety to one hundred percent (90-100%) shall pass the #4 sieve and a maximum of fifteen percent (15%) shall pass the #200 sieve. Sand material shall be of a good quality with a minimum resistivity of 5,000 ohm-cm., a minimum pH of 6.0, a maximum chloride concentration of 300 ppm and a maximum sulfate concentration of 1,000 ppm.

Chemical Analysis	ASTM Method
Conductivity	D 1125
Sulfate	D516A (SM 4500)
PH	D2976/D4972/G51
Chlorides	D512C

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H. Drainage Course: Narrowly graded mixture of crushed stone or crushed or uncrushed gravel; ASTM D448; sand equivalent of not less than 75; clean, ½- to ¾-inch maximum size crushed rock or gravel or as per table below.

Sieve Size	Percent Passing
1"	100
3/4"	90-100
3/8"	40-100
No. 4	25-40
No. 8	18-33
No. 30	5 to 15
No. 50	0-7
No. 200	0-3

I. Filter Material: Narrowly graded mixture of natural or crushed gravel, or crushed stone and natural sand; ASTM D448; coarse-aggregate grading Size 67; with 100 percent passing a 1-inch sieve and zero to 5 percent passing a No. 4 sieve.

J. Sand: ASTM C33; fine aggregate.

K. Impervious Fill: Clayey gravel and sand mixture capable of compacting to a dense state.

2.2 GEOTEXTILES

A. Subsurface Drainage Geotextile: Nonwoven needle-punched geotextile, manufactured for subsurface drainage applications, made from polyolefins or polyesters; with elongation greater than 50 percent; complying with AASHTO M 288 and the following, measured per test methods referenced:

1. Survivability:

   a. Class 2; AASHTO M 288.

   b. Apparent Opening Size: No. 40 sieve, maximum; ASTM D4751.

   c. Permittivity: 0.5 per second, minimum; ASTM D4491.

   d. UV Stability: 50 percent after 500 hours' exposure; ASTM D4355.

B. Orange Delineation (Demarcation) Nonwoven Fabric: A Mirafi® 180N/O orange delineation nonwoven geotextile, or similar product approved by ENGINEER, shall be used as demarcation fabric.

1. Comprised of non woven, needle punched polypropylene or polyester fabric; oriented into a stable network that maintains its structure during handling, placement, and long-term service.

2. Not be heat burnished.

3. Resistant to soil chemicals at the site such as petroleum hydrocarbons including Bunker
4. C constituents and benzene, toluene, ethylbenzene, and xylenes (collectively BTEX).

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5. New product made from virgin materials.

2.3 ACCESSORIES

A. Detectable Warning Tape: Acid- and alkali-resistant, polyethylene film warning tape manufactured for marking and identifying underground utilities, a minimum of 6 inches wide and 4 mils thick, continuously inscribed with a description of the utility, with metallic core encased in a protective jacket for corrosion protection, detectable by the metal detector when the tape is buried up to 30 inches deep; colored as follows:

1. Red: Electric.
2. Yellow: Gas, oil, steam, and dangerous materials.
3. Orange: Telephone and other communications.
4. Blue: Water systems.
5. Green: Sewer systems.

2.4 SOIL STABILIZERS

A. Lime Treatment: Lime quality, spreading, mixing, and compaction operations must comply with ASTM C977 and Caltrans Standard Specification Section 24. Lime must have a uniform consistency and be free from contaminants.

B. Application rate shall be 4.5% high calcium quick lime by dry weight of soil with a dry unit weight of 115 pcf.

2.5 HYDROSEED

A. Green to Gold seed mix from Pacific Coast Seed, Inc. shall be used to hydroseed cover soil areas after placement.

PART 3 - EXECUTION

3.1 PREPARATION

A. Verify location of existing underground utilities, overhead utilities, benchmarks, monuments, monitoring wells, and property and ROW markers.

B. Protect structures, utilities, pavements, and other facilities from damage caused by settlement, lateral movement, undermining, washout, and other hazards created by earth-moving operations.

C. Protect and maintain erosion and sedimentation controls during earth-moving operations.

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3.2 DEWATERING

A. The CONTRACTOR shall prepare a Dewatering Plan and submit the plan to the OWNER within seven (7) calendar days of contract execution. A complete (i.e., approved, approved with comments, or information only) Dewatering Plan is required prior to the CONTRACTOR's mobilization to the site. The Dewatering Plan shall address the following elements:

1. Location of the water storage facility and/or area.

2. Methods for the sampling and analysis of dewatering water.

3. Methods for collection, storage, and discharge of dewatering water.

4. Methods for decontamination of pumps and equipment that come into contact with potentially contaminated water.

5. Contingency plans for incident/emergency situations.

B. Comply with the following minimum requirements for dewatering:

1. Draw down the static water level in excavations, as required, to minimize free water in excavated soils and maintain stability of the excavation limits until backfill is placed and compacted to its required density.

2. Provide pumping system with filters to prevent loss of fine materials. Pass pump water through a sediment control system and treatment system, if necessary, before temporary storage in one or more baker tanks at a location to be approved by the OWNER. No discharge of water to approved areas outside the excavation will be allowed without filtering. Once the water has been tested and appropriately treated it will be discharged into an acceptable location to be identified by OWNER.

3. Do not cause settlement damage to adjacent structures. Carry out work using methods which will not endanger adjacent structures. Correct as necessary, any adverse effects dewatering may have on existing structures, wells, utilities, and water courses, at no additional cost to the OWNER.

4. Adhere to all requirements identified in permits and approvals associated with construction dewatering and temporary surface water control. Permits and approvals to be obtained by OWNER.

C. Prevent surface water and groundwater from entering excavations, from ponding on prepared subgrades, and from flooding the Project site and surrounding area.

D. Test any groundwater encountered for potential contaminants and adhere to all applicable health and safety protocols while excavating.

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E. Protect subgrades from softening, undermining, washout, and damage by rain or water accumulation.

1. Reroute surface water runoff away from excavated areas. Do not allow water to accumulate in excavations. Do not use excavated trenches as temporary drainage ditches.

F. Dispose of water removed by dewatering to avoid endangering public health, property, and portions of work under construction or completed. Dispose of water and sediment in a manner that avoids inconvenience to others.

3.3 EXCAVATION, GENERAL

A. Unclassified Excavation: Excavate to subgrade elevations regardless of the character of surface and subsurface conditions encountered. Unclassified excavated materials may include rock, soil materials, and obstructions. No changes in the Contract Sum or the Contract Time will be authorized for rock excavation or removal of obstructions.

1. If excavated materials intended for fill and backfill include unsatisfactory soil materials and rock, replace with satisfactory soil materials.

3.4 EXCAVATION, GENERAL (WITHIN SITE 47)

A. Impacted soil exists along a portion of the project site west of Port Expressway with arsenic concentrations above the background threshold value where soil excavation is required. At a minimum, Contractor shall perform the following in addition to adhering to the appropriate guidelines of permitting and regulatory bodies, including Department of Toxic Substances Control (DTSC):

1. Develop and Health and Safety Plan to address potential hazards with remedy implementation
2. Contractor shall provide dust control to mitigate fugitive dust produced during excavation and shall comply with the approved Dust Control and Community Air Monitoring Plan (DCCAMP).
3. Air monitoring shall be conducted by Owner’s representative during impacted soil excavation in accordance with the approved DCCAMP. Contractor shall implement mitigation measures and, if action levels are exceeded, corrective actions as described in approved DCCAMP.
4. Contractor shall provide equipment and materials or establish procedures to prevent impacted material from leaving the work area by wind or precipitation erosion. Surface water run-off from excavated areas shall be controlled so that impacted surface water does not flow onto non-impacted areas.
5. Adhere to the approved C-SWPPP that addresses the management and sampling of stormwater, which may occur during remedy implementation activities.
6. Impacted soil will be consolidated and covered within the boundary of Site 47 in accordance with the Construction Drawings and Remedial Design Implementation Plan

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7. Implement appropriate controls (fencing and signs) to restrict access of unauthorized personnel to the work area.

B. OWNER will procure necessary approvals for impacted soil management as required to comply with federal, state, and local regulations (e.g., Remedial Design Implementation Plan approval from DTSC, etc.)

C. CONTRACTOR will procure grading permit with the City of Stockton, if needed.

3.5 EXCAVATION FOR TRACK, WALKS AND PAVEMENTS

A. Excavate surfaces under tracks, walks and pavements to indicated lines, cross sections, elevations, and subgrades.

B. Test all excavated soil for potential contamination.

3.6 EXCAVATION FOR CULVERT AND UTILITY TRENCHES

A. Excavate trenches to indicated gradients, lines, depths, and elevations.

B. Excavate trenches to uniform widths to provide the following clearance on each side of pipe or conduit. Excavate trench walls vertically from trench bottom to 12 inches higher than top of pipe or conduit unless otherwise indicated.

C. Culvert and Utility trenches excavated through the lime-treated soil shall be backfilled within the lime-treated section with a control density fill or low-strength material with a minimum compressive strength of 200 psi.

D. Trench Bottoms:

1. Excavate trenches 4 inches deeper than bottom of pipe and conduit elevations to allow for bedding course. Hand-excavate deeper for bells of pipe.

   a. Excavate trenches 6 inches deeper than the required elevation in rock or other unyielding bearing material to allow for a bedding course.

E. Maintain and trim excavated materials in such a manner to be as little inconvenience as possible to public and adjoining property owners.

F. Support existing buried utilities where proposed work crosses beneath. Repair any damaged to existing utilities to the utility Owner's standards at no additional cost to the Owner.

3.7 SUBGRADE INSPECTION AND PREPARATION

A. The design and construction of the new roadbeds should conform to the guidelines in AREMA guidelines, Chapter 1-Part 1, Roadbed.

B. Notify the Owner and Engineer when excavations have reached the required subgrade.

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C. Unstable Subgrade
   1. Notify the Owner and Engineer when unstable soils are encountered.
   2. Remove to extents directed by Engineer and backfill as required for over-excavations.

D. If the Geotechnical Engineer determines that unsatisfactory soil is present, continue excavation and replace with compacted backfill or fill material as directed.

E. Authorized additional excavation and replacement material will be paid for according to Contract provisions for changes in the Work.

F. Field test compaction of subgrade for 95% relative compaction.

G. Reconstruct subgrades damaged by freezing temperatures, frost, rain, accumulated water, or construction activities, as directed by Geotechnical Engineer, without additional compensation.

H. The top of the subgrade should be graded so that there is at least a 2 percent cross slope towards adjacent ditches, drainage systems, or embankment slopes, unless noted otherwise on plans.

I. Areas to receive engineered fill shall be scarified to a depth of 8 inches, uniformly moisture conditioned to between about 2 and 4 percent above the optimum moisture content, and compacted to at least 95 percent relative compaction, as determined by ASTM D1557. Areas within 100 feet of the bridge abutments should be compacted to 100 percent relative compaction.

J. Remove clay materials below the roadway/railroad and replace them with non-expansive fill. This procedure consists of placing at least 18 inches of non-expansive fill directly below the railroad sub-ballast or roadway base course. The non-expansive fill should be moisture-conditioned to a moisture content ranging from 1 to 3 percentage points above its optimum moisture content and compacted to at least 90 percent relative compaction.

K. Material encountered during grading that complies with the satisfactory soil properties listed in Section 2.1 of this document may be reused as embankment fill.

L. The zone of non-expansive soil should extend laterally at least 3 feet outside the perimeter of the railroad or roadway prism. Prior to placement of the non-expansive fill, the exposed clay subgrade soil should be scarified to a minimum depth of 12 inches, uniformly moisture conditioned to a moisture content 2 % above the optimum moisture content and be compacted to at least 88 percent but not greater than 92 percent relative compaction. The moisture content of the clay should be maintained until placement of the non-expansive fill over it.

M. Lime Treatment:
   1. At least two to three days prior to spreading or mixing the lime, the moisture content of the underlying, untreated clay soil should be checked. If the soil moisture content is found to be dry of optimum, the soil moisture content should be raised using liberal sprinkling, flooding or another suitable method.
   2. Following lime treatment, the treated soil should be properly cured by continual sprinkling with water to keep the surface damp, combined with light rolling to keep the surface knitted together. The subgrade soils should be covered with at least two inches of sub-ballast or roadway base course within two to three days of lime treatment in an effort to reduce drying.

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3.8 UNAUTHORIZED EXCAVATION

A. Fill unauthorized excavation under foundations or wall footings by extending bottom elevation of concrete foundation or footing to excavation bottom, without altering top elevation. Lean concrete fill, with 28-day compressive strength of 2,500 psi, may be used when approved by Engineer.

1. Fill unauthorized excavations under other construction, pipe, or conduit as directed by Engineer.

3.9 STORAGE OF SOIL MATERIALS

A. Stockpile borrow soil materials and excavated satisfactory soil materials without intermixing. Place, grade, and shape stockpiles to drain surface water. Cover to prevent windblown dust.

1. Stockpile soil materials away from the edge of excavations. Do not store within drip line of remaining trees.

B. Locations of temporary stockpiles for material to be used as soil cover shall be selected by the CONTRACTOR and approved by OWNER.

C. CONTRACTOR is responsible for maintaining stockpiles to a maximum slope of 2.5H:1V and a maximum height of 15 ft.

D. Stockpiles that will remain beyond the end of the project that contain impacted material excavated from areas within Site 47 shall be covered with a demarcation geotextile layer and a minimum 24-inch-thick layer of cover soil in accordance with the Site 47 Remedial Design and Implementation Plan.

E. Sheetflow runoff shall be directed to ditches/pipes and surfaces shall be graded to drain throughout construction of stockpiles. Details and locations shall be shown on the Construction Drawings.

F. Provide quality control during operations to verify that materials go to appropriate stockpiles.

G. Provide separation between stockpiles to allow equipment access.

H. Place in layers not greater than 1 foot and compact by track walking with dozers.

I. Shape each stockpile to uniform lines and grades.

J. Apply/place interim cover material on stockpiles when not being actively managed (e.g., visqueen, etc.) to minimize dust and erosion. Spray foams and water can be utilized for temporary conditions.

K. Construct access roads to top of stockpile no steeper than 6% in slope.

L. Water or cover stockpiles as necessary to control dust, prevent erosion, and control sediment.

M. Monitor organic stockpiles to detect and control fires.

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N. Stockpile slopes, erosion control, and drainage of slopes are CONTRACTOR'S responsibility. CONTRACTOR shall install best management practices (BMPs) for the stockpiles as required by the approved Construction Stormwater Pollution Prevention Plan (C-SWPPP).

3.10 BACKFILL

A. Backfill should be constructed using engineered fill.

B. Place and compact backfill in excavations promptly, but not before completing the following:

1. Construction below finish grade including, where applicable, subdrainage, dampproofing, waterproofing, and perimeter insulation.
2. Surveying locations of underground utilities for Record Documents.
3. Testing and inspecting underground utilities.
4. Removing concrete formwork.
5. Removing trash and debris.
6. Removing temporary shoring, bracing, and sheeting.
7. Installing permanent or temporary horizontal bracing on horizontally supported walls.

C. Place backfill on subgrades free of mud, frost, snow, or ice.

3.11 UTILITY TRENCH BACKFILL

A. Place backfill on subgrades free of mud, frost, snow, or ice.

B. Place and compact bedding course on trench bottoms and where indicated. Shape bedding course to provide continuous support for bells, joints, and barrels of pipes and for joints, fittings, and bodies of conduits.

C. Trenches under Roadways: Provide 4-inch thick, concrete-base slab support for piping or conduit less than 30 inches below surface of roadways. After installing and testing, completely encase piping or conduit in a minimum of 4 inches of concrete before backfilling or placing roadway subbase course.

D. Backfill voids with satisfactory soil while removing shoring and bracing.

E. Initial Backfill:

1. Soil Backfill: Place and compact initial backfill of satisfactory soil, free of particles larger than 1 inch in any dimension, to a height of 12 inches over the pipe or conduit.

   a. Carefully compact initial backfill under pipe haunches and compact evenly up on both sides and along the full length of piping or conduit to avoid damage or displacement of piping or conduit. Coordinate backfilling with utilities testing.

F. Final Backfill:

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1. Soil Backfill: Place and compact final backfill of satisfactory soil to final subgrade elevation.

G. Warning Tape: Install warning tape directly above utilities, 12 inches below finished grade, except 6 inches below subgrade under pavements and slabs.

3.12 SOIL FILL

A. Plow, scarify, bench, or break up sloped surfaces steeper than 1 vertical to 4 horizontal so fill material will bond with existing material where geosynthetics are not present at the surface.

B. If fill is to be placed on ground with a gradient steeper than 5:1 (H:V), an equipment width bench should be constructed at the toe of the fill. As the fill is brought up, small benches or notches (maximum height of 2 feet) should be cut into approved native soil.

C. Place and compact fill material in layers to required elevations as follows:

1. Under grass and planted areas, use satisfactory soil material.
2. Under walks and pavements, use satisfactory soil material.
3. Under tracks, use engineered fill.
4. Under building slabs, use engineered fill.

D. Place soil fill on subgrades free of mud, frost, snow, or ice.

3.13 SOIL MOISTURE CONTROL

A. Uniformly moisten or aerate subgrade and each subsequent fill or backfill soil layer before compaction to within 2 to 4 percent above optimum moisture content.

1. Do not place backfill or fill soil material on surfaces that are muddy, frozen, or contain frost or ice.
2. Remove and replace, or scarify and air dry, otherwise satisfactory soil material that exceeds optimum moisture content by 2 percent and is too wet to compact to specified dry unit weight.

B. On-site or imported soils that are to be used for engineered fill should be uniformly moisture conditioned in a range between 1 to 3 percent above the optimum moisture content.

C. Moisture condition soil cover to within 3 percent of optimum moisture content.

3.14 COMPACTION OF SOIL BACKFILLS AND FILLS

A. Place backfill and fill soil materials in layers not more than 8 inches in loose depth for material compacted by heavy compaction equipment and not more than 4 inches in loose depth for material compacted by hand-operated tampers.

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B. Place backfill and fill soil materials evenly on all sides of structures to required elevations and uniformly along the full length of each structure.

C. Compact soil materials to not less than the following percentages of maximum dry unit weight according to ASTM D1557:

1. Under areas requiring placement of fill, scarify and recompact top 8 inches of existing subgrade and each layer of backfill or fill soil material at 95 percent.
2. Areas within 100 feet of the bridge abutments should be compacted to 100 percent relative compaction.
3. Under walkways, scarify and recompact top 6 inches below subgrade and compact each layer of backfill or fill soil material at 90 percent.
4. Under tracks, scarify and recompact top 12 inches below subgrade and compact each layer of backfill or fill soil material to between 88 and 92 percent.
5. For non-expansive fill, compact each layer of initial and final backfill soil material at 90 percent.
6. For utility trenches, compact each layer of initial and final backfill soil material at 85 percent.

D. Compact soil cover to 90 percent relative compacted in 8-inch thick loose lifts.

3.15 GRADING

A. General: Uniformly grade areas to a smooth surface, free of irregular surface changes. Comply with compaction requirements and grade to cross sections, lines, and elevations indicated.

1. Provide a smooth transition between adjacent existing grades and new grades.
2. Cut out soft spots, fill low spots, and trim high spots to comply with required surface tolerances.

B. Site Rough Grading: Slope grades to direct water away from buildings and to prevent ponding. Finish subgrades to elevations required to achieve indicated finish elevations, within the following subgrade tolerances:

1. Turf or Unpaved Areas: Plus or minus 1 inch.
2. Walks: Plus or minus 1 inch.
3. Pavements: Plus or minus 1/2 inch.

3.16 SUBSURFACE DRAINAGE

A. Subsurface Drain: Place subsurface drainage geotextile around perimeter of subdrainage trench. Place a 6-inch course of filter material on subsurface drainage geotextile to support subdrainage pipe. Encase subdrainage pipe in a minimum of 12 inches of filter material, placed in

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compacted layers 6 inches thick, and wrap in subsurface drainage geotextile, overlapping sides and ends at least 6 inches.

1. Compact each filter material layer to 85 percent of maximum dry unit weight according to ASTM D698.

3.17 SUBBASE AND BASE COURSES UNDER PAVEMENTS AND WALKS

A. Place subbase course and base course on subgrades free of mud, frost, snow, or ice.

B. On prepared subgrade, place subbase course and base course under pavements and walks as follows:
   1. Shape subbase course and base course to required crown elevations and cross-slope grades.
   2. Place subbase course and base course 6 inches or less in compacted thickness in a single layer.
   3. Place subbase course and base course that exceeds 6 inches in compacted thickness in layers of equal thickness, with no compacted layer more than 6 inches thick or less than 3 inches thick.
   4. Compact subbase course and base course at optimum moisture content to required grades, lines, cross sections, and thickness to not less than 95 percent of maximum dry unit weight according to ASTM D1557.

C. Following lime treatment, the treated soil should be properly cured by continual sprinkling with water to keep the surface damp, combined with light rolling to keep the surface knitted together. Periodic sprinkling is still required to keep the surface damp. As an alternative, the treated soil could be cured as discussed in Section 24 of the Caltrans Standard Specifications.

D. Contractor will consult with the project geotechnical engineer prior to earthwork operations to review Contractor's proposed treatment procedures. Laboratory tests should be performed at least two weeks prior to earthwork operation in order to assess or revise the required lime application rate.

E. A geotechnical representative shall be on site during lime treatment operations to document spreading, mixing and compaction operations and provide supplemental/revised recommendations, if warranted, based on the soil conditions observed.

3.18 GEOTEXTILES

A. Prior to installation of geotextile, examine underlying construction for conformance with specifications.

B. When placing soil materials over geotextile ensure the following:
   1. No damage to geotextile.
   2. No slippage of geotextile on underlying layers.
   3. No excessive tensile stresses in the geotextile.

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C. Ensure that geotextiles are covered within 15 days of deployment. CONTRACTOR needs to account for this in planning the work and construction sequencing.

D. Follow Manufacturer's recommendations, standards, and guidelines.

E. Roll geotextile down slope keeping the geotextile sheet in sufficient tension to prevent folds and wrinkles.

F. Weight geotextile with sandbags, or equivalent, to ballast during deployment. Leave ballast in place until geotextile is covered with succeeding construction layer.

G. Cut geotextile using approved cutter only. Take care to protect other in place geosynthetic materials when cutting geotextile.

H. Do not trap excessive dust, stones, or moisture in geotextile that could damage or clog drains or filters or hamper subsequent seaming.

I. Examine installed geotextile over entire completed surface to ensure that no potentially harmful foreign objects, such as needles, are present. Remove any foreign objects.

J. Geotextile Overlaps:

1. Overlap geotextiles a minimum of 24 inches to create a continuous layer.

2. Ensure that no soil materials are inadvertently inserted beneath the seams of geotextiles.

K. Geotextile Repairs:

1. Repair holes or tears in geotextiles with a patch from the same geotextile material with a minimum overlap of 24 inches on all sides.
2. Remove any soil or other material which may have penetrated the torn geotextile.
3. Notify OWNER of all repairs.

3.19 FIELD QUALITY CONTROL

A. Testing Agency: Owner will engage a qualified geotechnical engineering testing agency to perform tests and inspections.

B. Allow testing agency to inspect and test subgrades and each fill or backfill layer. Allow oversight during geotextile placement and cover soil mining, transportation, and placement. Proceed with subsequent earth moving only after test results for previously completed work comply with requirements.

C. Testing agency will test compaction of soils in place according to ASTM D1556, ASTM D2167, ASTM D2937, and ASTM D6938, as applicable. Tests will be performed at the following locations and frequencies:

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1. Paved Areas: At subgrade and at each compacted fill and backfill layer, at least one test for every 2,000 sq. ft. or less of paved area or building slab but in no case fewer than three tests.
2. Track Roadbed and Trench Backfill: At each compacted initial and final backfill layer, at least one test for every 150 feet or less of trench length but no fewer than two tests.

D. When testing agency reports that subgrades, fills, or backfills have not achieved degree of compaction specified, scarify and moisten or aerate, or remove and replace soil materials to depth required; recompact and retest until specified compaction is obtained.

E. OWNER or OWNER's representative will perform conformance testing and inspections in accordance with the CQA Plan

F. CONTRACTOR shall cooperate fully with OWNER or OWNER's representative in scheduling and performing field quality assurance tests.

3.20 PROTECTION

A. Protecting Graded Areas: Protect newly graded areas from traffic, freezing, and erosion. Keep free of trash and debris.

B. Repair and reestablish grades to specified tolerances where completed or partially completed surfaces become eroded, rutted, settled, or where they lose compaction due to subsequent construction operations or weather conditions.

1. Scarify or remove and replace soil material to depth as directed by Geotechnical Engineer; reshape and recompact.

C. Where settling occurs before Project correction period elapses, remove finished surfacing, backfill with additional soil material, compact, and reconstruct surfacing.

1. Restore appearance, quality, and condition of finished surfacing to match adjacent work, and eliminate evidence of restoration to greatest extent possible.

D. Hydroseed areas with cover soil after placement.

3.21 DISPOSAL OF SURPLUS AND WASTE MATERIALS

A. Transport surplus satisfactory soil to designated storage areas on Owner's property. Stockpile or spread soil as directed by Owner.

1. Remove waste materials, including unsatisfactory soil, trash, and debris, and legally dispose of them off Owner's property.

END OF SECTION 312000

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SECTION 312319 - DEWATERING

PART 1 - GENERAL

1.1 SUMMARY

A. The following provisions of Port of Stockton 'Division 01' General Provisions shall apply to the Work, unless specifically amended in any of the following Sections:

1. Section 01100 Summary
2. Section 01200 Measurement and Payment
3. Section 01250 Modification Procedures
4. Section 01315 Project Meetings
5. Section 01320 Progress Schedules and Reports
6. Section 01330 Submittal Procedures
7. Section 01340 Safety Submittals
8. Section 01410 Regulatory Requirements
9. Section 01420 References and Definitions
10. Section 01500 Temporary Facilities and Controls
11. Section 01540 Site Security and Safety
12. Section 01600 Product Requirements
13. Section 01740 Cleaning
14. Section 01770 Contract Closeout
15. Section 01780 Project Record Documents

B. Section Includes:

1. Construction dewatering.

1.2 PREINSTALLATION MEETINGS

A. Preinstallation Conference: In addition to the requirements laid out in Port of Stockton Division 01 – Section 01315 – 'Project Meetings', conduct conference at Project site.

1.3 ACTION SUBMITTALS

A. Shop Drawings: For dewatering system, prepared by or under the supervision of a qualified professional engineer.

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B. Delegated Design Submittals: For dewatering system, including analysis data signed and sealed by the qualified professional engineer responsible for their preparation.

1.4 INFORMATIONAL SUBMITTALS

A. Comply with Port of Stockton Division 01 'General Provisions' Sections 01330 and 01340 in addition to the following sections.

B. Field Quality-Control Submittals:

1. Field quality-control reports.

1.5 QUALITY ASSURANCE

A. Qualifications:

1. Installer: An experienced installer that has specialized in design of dewatering systems and dewatering work.
2. Delegated Design Engineer: A professional engineer who is legally qualified to practice in the jurisdiction where Project is located and who is experienced in providing engineering services of the type indicated.
3. Land Surveyor: A professional land surveyor who is legally qualified to practice in the jurisdiction where Project is located.

1.6 FIELD CONDITIONS

A. Survey Work: Engage a qualified land surveyor or professional engineer to survey adjacent existing buildings, structures, and site improvements; establish exact elevations at fixed points to act as benchmarks. Clearly identify benchmarks and record existing elevations.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. Delegated Design: Engage a qualified professional engineer, as defined in Section 014000 "Quality Requirements," to design dewatering system.

B. Dewatering Performance: Design, furnish, install, test, operate, monitor, and maintain dewatering system of sufficient scope, size, and capacity to control hydrostatic pressures and to lower, control, remove, and dispose of groundwater and permit excavation and construction to proceed on dry, stable subgrades.

C. Regulatory Requirements: Comply with governing EPA notification regulations before beginning dewatering. Comply with water- and debris-disposal regulations of authorities having jurisdiction.

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PART 3 - EXECUTION

3.1 PREPARATION

A. Provide temporary grading to facilitate dewatering and control of surface water.

B. Protect and maintain temporary erosion and sedimentation controls, which are specified in Section 311000 "Site Clearing," during dewatering operations.

3.2 INSTALLATION

A. Install dewatering system utilizing wells, well points, or similar methods complete with pump equipment, standby power and pumps, filter material gradation, valves, appurtenances, water disposal, and surface-water controls.

1. Space well points or wells at intervals required to provide sufficient dewatering.
2. Use filters or other means to prevent pumping of fine sands or silts from the subsurface.

B. Place dewatering system into operation to lower water to specified levels before excavating below groundwater level.

C. Provide sumps, sedimentation tanks, and other flow-control devices as required by authorities having jurisdiction.

D. Provide standby equipment on-site, installed and available for immediate operation, to maintain dewatering on continuous basis if any part of system becomes inadequate or fails.

3.3 OPERATION

A. Operate system continuously until drains, sewers, and structures have been constructed and fill materials have been placed or until dewatering is no longer required.

B. Operate system to lower and control groundwater to permit excavation, construction of structures, and placement of fill materials on dry subgrades. Drain water-bearing strata above and below bottom of foundations, drains, sewers, and other excavations.

1. Do not permit open-sump pumping that leads to loss of fines, soil piping, subgrade softening, and slope instability.
2. Reduce hydrostatic head in water-bearing strata below subgrade elevations of foundations, drains, sewers, and other excavations.

C. Remove dewatering system from Project site on completion of dewatering. Plug or fill well holes with sand or cut off and cap wells a minimum of 36 inches (900 mm) below overlying construction.

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3.4 FIELD QUALITY CONTROL

A. Survey-Work Benchmarks: Resurvey benchmarks regularly during dewatering and maintain an accurate log of surveyed elevations for comparison with original elevations. Promptly notify Owner and Engineer if changes in elevations occur or if cracks, sags, or other damage is evident in adjacent construction.

END OF SECTION 312319

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SECTION 313700 – RIP RAP

PART 1 - GENERAL

1.1 SUMMARY

A. The following provisions of Port of Stockton 'Division 01' General Provisions shall apply to the Work, unless specifically amended in any of the following Sections:

1. Section 01100 Summary
2. Section 01200 Measurement and Payment
3. Section 01250 Modification Procedures
4. Section 01315 Project Meetings
5. Section 01320 Progress Schedules and Reports
6. Section 01330 Submittal Procedures
7. Section 01340 Safety Submittals
8. Section 01410 Regulatory Requirements
9. Section 01420 References and Definitions
10. Section 01500 Temporary Facilities and Controls
11. Section 01540 Site Security and Safety
12. Section 01600 Product Requirements
13. Section 01740 Cleaning
14. Section 01770 Contract Closeout
15. Section 01780 Project Record Documents

B. Section Includes:

1. Riprap furnished, hauled, and placed by the Contractor to the locations and of the types shown on the drawings and as directed by the Engineer.

C. Related Sections include but are not necessarily limited to:

1. Section 31 12 00 – Earth Moving
2. Section 33 42 00 – Stormwater Conveyance

PART 2 - PRODUCTS

2.1 MATERIAL REQUIREMENTS

A. Material:

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1. Riprap shall be hard, durable, angular in shape, resistant to weathering and shall be free of cracks, seams, expansive materials or other defects that would cause accumulated deterioration from exposure to climatic conditions.

B. The material shall meet, in addition to the Specifications, the following quality requirements:
1. The approval of some riprap from a particular source shall not be construed as constituting the approval of all riprap taken from that source.
2. The Engineer shall be the sole judge of riprap quality and sources of material.
3. Rip rap may be rejected on the basis of visual examination, regardless of laboratory tests and/or service records.
4. Tests to which the materials may be subjected include specific gravity, abrasion, absorption, soundness, freezing and thawing and such other tests as may be considered necessary.

TEST	REQUIREMENT
Specific Gravity (ASTM Designation C127)	2.65 Minimum
Absorption (ASTM Designation C127)	8.0% Maximum
Soundness, 5 cycles Mg S04 (ASTM Designation C88)	2.0% Minimum 15% Maximum

C. Requirements:
1. All riprap to be loaded and quarried shall conform to the following limitations unless otherwise specified or as shown on the plans:

RIP RAP CLASS	AVERAGE PER STONE (LBS)	DIMENSION (IN)	TYPICAL VELOCITIES (FT/S)
1	50 to 200	9 to 14	6-8

D. Requirements, Limitations, and Allowances:
1. The riprap class required shall be well distributed and the entire mass of stone shall conform to the limitations specified. However, the following allowances shall be acceptable to produce the required riprap protection:
   a. Riprap Class II - 15 percent of Riprap Class I.

E. The above allowances may be adjusted in the field where at the discretion of the engineer a greater or lesser percentage would be required. Individual pieces, larger than the maximum specified size may be toed in at the bottom of the riprap toe.

PART 3 - EXECUTION

3.1 CONSTRUCTION METHODS

A. Riprap shall be placed in such a manner as:

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1. To produce a compact mass of rock which shall provide adequate embankment protection and erosion control.
2. To avoid segregation of the various sizes of rock.

B. Placement of Stones:
1. Individual stones shall be tightly in contact with other stones in order to produce the least possible amount of void spaces.
2. All material going into riprap protection shall be so placed and distributed that there will be no large accumulations of either the larger or smaller sizes of stone.
3. Installation of riprap along ditch bottoms shall be performed in a manner that preserves the sections and profile grades as depicted in the drawings. Additional grading, excavation, removal, and/or haul away of subgrade material not shown on cross sections may be needed to have the top of riprap meet proposed grade lines.
4. Rearranging individual stones by mechanical equipment or by hand may be required to the extent necessary to obtain a reasonably well graded distribution of stone sizes.
5. The Contractor shall maintain the riprap protection until accepted. Material displaced by any cause shall be replaced at no additional cost to the Owner.

C. Sources:
1. The sources proposed for use by the Contractor shall be selected in advance, and approval of a source by the Engineer may depend upon laboratory test data, visual examination and service records.
2. If such records are not available, such as in the case of newly opened quarries, the materials shall be subject to tests considered necessary by the Engineer.
3. Riprap removed as part of this project may be used for placement at other locations if the riprap meets the material requirements in Part 2.

END OF SECTION

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SECTION 315000 - EXCAVATION SUPPORT AND PROTECTION

PART 1 - GENERAL

1.1 SUMMARY

A. The following provisions of Port of Stockton 'Division 01' General Provisions shall apply to the Work, unless specifically amended in any of the following Sections:

1. Section 01100 Summary
2. Section 01200 Measurement and Payment
3. Section 01250 Modification Procedures
4. Section 01315 Project Meetings
5. Section 01320 Progress Schedules and Reports
6. Section 01330 Submittal Procedures
7. Section 01340 Safety Submittals
8. Section 01410 Regulatory Requirements
9. Section 01420 References and Definitions
10. Section 01500 Temporary Facilities and Controls
11. Section 01540 Site Security and Safety
12. Section 01600 Product Requirements
13. Section 01740 Cleaning
14. Section 01770 Contract Closeout
15. Section 01780 Project Record Documents

B. Section includes temporary excavation support and protection systems.

C. Related Requirements:

1. Section 312000 "Earth Moving" for excavating and backfilling, for controlling surface-water runoff and ponding, and for dewatering excavations.

1.2 PREINSTALLATION MEETINGS

A. Preinstallation Conference: Conduct conference at Project site.

1. Review geotechnical report.
2. Review existing utilities and subsurface conditions.
3. Review coordination for interruption, shutoff, capping, and continuation of utility services.
4. Review proposed excavations.

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5. Review proposed equipment.
6. Review monitoring of excavation support and protection system.

1.3 ACTION SUBMITTALS

A. Comply with Port of Stockton Division 01 'General Provisions' Sections 01330 and 01340 in addition to the following sections.

B. Product Data: For each type of product.

1. Include construction details, material descriptions, performance properties, and dimensions of individual components and profiles, and structural calculations for excavation support and protection system.

1.4 INFORMATIONAL SUBMITTALS

A. Comply with Port of Stockton Division 01 'General Provisions' Sections 01330 and 01340 in addition to the following sections.

B. Qualification Data: For the following:

1. Land surveyor.
2. Professional Engineer: Experience with providing delegated-design engineering services of the type indicated, including documentation that engineer is licensed in the State in which Project is located.

C. Contractor Calculations: For excavation support and protection system. Include analysis data signed and sealed by the qualified professional engineer responsible for their preparation.

D. Existing Conditions: Using photographs show existing conditions of adjacent construction and site improvements that might be misconstrued as damage caused by inadequate performance of excavation support and protection systems. Submit before Work begins.

1.5 CLOSEOUT SUBMITTALS

A. Comply with Port of Stockton Division 01 'General Provisions' Sections 01780 – Project Record Documents.

B. Record Drawings: Identify locations and depths of capped utilities, abandoned-in-place support and protection systems, and other subsurface structural, electrical, or mechanical conditions.

1.6 FIELD CONDITIONS

A. Interruption of Existing Utilities: Do not interrupt any utility-serving facilities occupied by Owner or others unless permitted under the following conditions and then only after arranging to provide temporary utility according to requirements indicated:

1. Notify Owner no fewer than 3 days in advance of proposed interruption of utility.

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2. Do not proceed with interruption of utility without Owner's written permission.

B. Survey Work: Engage a qualified land surveyor or professional engineer to survey adjacent existing buildings, structures, and site improvements; establish exact elevations at fixed points to act as benchmarks. Clearly identify benchmarks and record existing elevations.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. Delegated Design: Engage a qualified professional engineer to design excavation support and protection systems to resist all lateral loading and surcharge, including but not limited to, retained soil, groundwater pressure, adjacent building loads, adjacent railroad loads, construction traffic loads, material stockpile loads, and seismic loads, based on the following:

1. Compliance with OSHA Standards and interpretations, 29 CFR 1926, Subpart P.
2. Compliance with AASHTO Standard Specification for Highway Bridges or AASHTO LRFD Bridge Design Specification, Customary U.S. Units.
3. Compliance with requirements of authorities having jurisdiction.
4. Compliance with utility company requirements.
5. Compliance with UPRR and BNSF Joint Guidelines for Temporary Shoring

2.2 MATERIALS

A. Steel Sheet Piling: ASTM A328/A328M, ASTM A572/A572M, or ASTM A690/A690M; with continuous interlocks.

1. Corners: Site-fabricated mechanical interlock

PART 3 - EXECUTION

3.1 PREPARATION

A. Protect structures, utilities, sidewalks, pavements, and other facilities from damage caused by settlement, lateral movement, undermining, washout, and other hazards that could develop during excavation support and protection system operations.

1. Shore, support, and protect utilities encountered.

3.2 INSTALLATION - GENERAL

A. Locate excavation support and protection systems clear of permanent construction, so that construction and finishing of other work is not impeded.

B. Install excavation support and protection systems to ensure minimum interference with roads, streets, walks, and other adjacent occupied and used facilities.

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1. Do not close or obstruct streets, walks, or other adjacent occupied or used facilities without permission from Owner and authorities having jurisdiction.
2. Provide alternate routes around closed or obstructed traffic ways if required by authorities having jurisdiction.

C. Install excavation support and protection systems without damaging existing buildings, structures, and site improvements adjacent to excavation.

3.3 SHEET PILING

A. Before starting excavation, install one-piece sheet piling lengths and tightly interlock vertical edges to form a continuous barrier.

B. Accurately place the piling using templates and guide frames unless otherwise recommended in writing by the sheet piling manufacturer.

1. Limit vertical offset of adjacent sheet piling to 60 inches.
2. Accurately align exposed faces of sheet piling to vary not more than 2 inches from a horizontal line and not more than 1:120 out of vertical alignment.

C. Cut tops of sheet piling to uniform elevation at top of excavation.

3.4 MAINTENANCE

A. Monitor and maintain excavation support and protection system.

B. Prevent surface water from entering excavations by grading, dikes, or other means.

C. Continuously monitor vibrations, settlements, and movements to ensure stability of excavations and constructed slopes and to ensure that damage to permanent structures is prevented.

3.5 FIELD QUALITY CONTROL

A. Survey-Work Benchmarks: Resurvey benchmarks weekly during installation of excavation support and protection systems, excavation progress, and for as long as excavation remains open.

1. Maintain an accurate log of surveyed elevations and positions for comparison with original elevations and positions.
2. Promptly notify Architect if changes in elevations or positions occur or if cracks, sags, or other damage is evident in adjacent construction.

B. Promptly correct detected bulges, breakage, or other evidence of movement to ensure that excavation support and protection system remains stable.

C. Promptly repair damages to adjacent facilities caused by installation or faulty performance of excavation support and protection systems.

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3.6 REMOVAL AND REPAIRS

A. Leave excavation support and protection systems permanently in place.

END OF SECTION 315000

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SECTION 321123 - AGGREGATE BASE COURSES

PART 1 - GENERAL

1.1 DESCRIPTION

A. The following provisions of Port of Stockton 'Division 01' General Provisions shall apply to the Work, unless specifically amended in any of the following Sections:

1. Section 01100 Summary
2. Section 01200 Measurement and Payment
3. Section 01250 Modification Procedures
4. Section 01315 Project Meetings
5. Section 01320 Progress Schedules and Reports
6. Section 01330 Submittal Procedures
7. Section 01340 Safety Submittals
8. Section 01410 Regulatory Requirements
9. Section 01420 References and Definitions
10. Section 01500 Temporary Facilities and Controls
11. Section 01540 Site Security and Safety
12. Section 01600 Product Requirements
13. Section 01740 Cleaning
14. Section 01770 Contract Closeout
15. Section 01780 Project Record Documents

B. This work consists of furnishing, spreading, and compacting aggregate base in accordance with Section 26 of Caltrans Standard Specifications with modifications as outlined below. Place and compact aggregate paving shall be at the locations, and to the dimensions as shown on the plans.

C. Related Sections include but are not necessarily limited to:

1. Section 31 12 00 – Earth Moving
2. Section 32 12 16 – Asphalt Paving

1.02 DEFINITIONS

A. See Port of Stockton Division 01 'General Provisions' Section 01420 for overall project definitions in addition to the sections below.

B. Railroad:

1. Central California Traction Company

C. Owner: Port of Stockton.

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1.2 SUBMITTALS

A. Comply with Port of Stockton Division 01 'General Provisions' Sections 01330 and 01340 in addition to the following sections.

B. Certificate of compliance from aggregate base supplier or other approved proof of compliance with contract requirements for aggregate base material.

PART 2 - PRODUCTS

2.1 AGGREGATE BASE

A. Class 2, 3/4-inch maximum and shall conform to the provisions in Section 26, "Aggregate Base", of the Caltrans Standards Specifications.

2.2 QUALITY ASSURANCE

B. The contractor shall install an 80 sq/ft test section for Owner approval prior to order, delivery and installation of additional aggregate base material. Test section shall be installed and compacted per this Section and 31 20 00 Earth Moving. Test section shall be completed for viewing within 60 – 90 days of the project start date.

PART 3 - EXECUTION

3.1 SUBGRADE PREPARATION

A. Prior to installing the aggregate paving, areas to receive aggregate shall be shaped to reflect the same linear grade and cross slopes as the desired finished surface.

B. Subgrade surface shall be graded to within 0.05 foot of finish grade minus paving thickness.

C. The subgrade shall be uniformly smooth and compacted to meet or exceed 95% relative compaction.

D. Fill and compact any depressions and remove loose material to finish true to line and grade, presenting a smooth, compacted and unyielding surface except where indicated otherwise.

E. Remove debris, loose dirt, and other extraneous materials.

F. If the subsurface soils have insufficient strength and cohesion to provide a stable base for the aggregate then a layer of non- woven geotextile fabric may be applied to the prepared area prior to the installation of the aggregate paving.

3.2 PLACING

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A. If the required compacted thickness of the base or subbase course exceeds 6 inches, place course in two or more layers of approximately equal thickness. The maximum compacted of any one layer shall not exceed 3-inch lifts, unless otherwise shown on the drawings.

3.3 ADDING WATER

A. At the time base or subbase is spread, it shall have a moisture content sufficient to obtain the required compaction. Such moisture shall be uniformly distributed throughout the material.

3.4 COMPACTION

A. Compact each layer to a density of no less than 95 percent relative compaction. The Owner reserves the right to require Contractor to make random compaction tests during the progress of the work at the Contractor's expense if the Owner feels there is a need for testing. Tests for compaction will be made in accordance with the test procedures outlined in ASTM D1557 as applicable. Field testing for compaction in place shall conform to the applicable requirements of STAM D2992. If any fill that does not meet the specification requirements shall be removed and/or re-compacted until the requirements are satisfied.

3.5 BASE SURFACE FINISHING

A. Compacted base course surface shall be smooth and free from waves and other irregularities. Unsatisfactory portion of base course shall be torn up, reworked, re-laid, and re-rolled, at no additional expense to the Owner.

3.6 MAINTENANCE

A. Maintain base and subbase course in a satisfactory condition until final surface is placed or until final acceptance.

3.7 FIELD QUALITY CONTROL

A. Testing Agency: The Contractor shall engage a qualified geotechnical engineering testing firm to preform, subgrade, moisture, and compaction tests related to this work at Contractor's expense.

B. Allow the testing firm to inspect and test subgrades and each fill layer. Proceed with subsequent base placement only after test results for previously completed work comply with requirements.

C. When testing firm reports subgrades or fills have not achieved degree of compaction specified; repair, moisten, scarify, and replace material to the depth required; recompact and retest until specified compaction is obtained.

END OF SECTION 32 11 23

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SECTION 321216 - ASPHALT PAVING

PART 1 - GENERAL

1.1 SUMMARY

A. The following provisions of Port of Stockton 'Division 01' General Provisions shall apply to the Work, unless specifically amended in any of the following Sections:

1. Section 01100 Summary
2. Section 01200 Measurement and Payment
3. Section 01250 Modification Procedures
4. Section 01315 Project Meetings
5. Section 01320 Progress Schedules and Reports
6. Section 01330 Submittal Procedures
7. Section 01340 Safety Submittals
8. Section 01410 Regulatory Requirements
9. Section 01420 References and Definitions
10. Section 01500 Temporary Facilities and Controls
11. Section 01540 Site Security and Safety
12. Section 01600 Product Requirements
13. Section 01740 Cleaning
14. Section 01770 Contract Closeout
15. Section 01780 Project Record Documents

B. Section Includes:

1. Hot-mix asphalt paving.
2. Hot-mix asphalt overlay.
3. Hot-mix asphalt patching.
4. Asphalt surface treatments.

C. Related Requirements:

1. Section 024119 "Selective Demolition" for demolition and removal of existing asphalt pavement.
2. Section 312000 "Earth Moving" for subgrade preparation, fill material, separation geotextiles, unbound-aggregate subbase and base courses, and aggregate pavement shoulders.
3. Section 32 11 23 Aggregate Base Courses.
4. Section 34 11 00 Trackwork Construction.

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1.2 ACTION SUBMITTALS

A. Comply with Port of Stockton Division 01 'General Provisions' Sections 01330 and 01340 in addition to the following sections.

B. Product Data: Include technical data and tested physical and performance properties.

C. Hot-Mix Asphalt Designs:

1. Certification, by authorities having jurisdiction, of approval of each hot-mix asphalt design proposed for the Work.
2. For each hot-mix asphalt design proposed for the Work.

1.3 INFORMATIONAL SUBMITTALS

A. Comply with Port of Stockton Division 01 'General Provisions' Sections 01330 and 01340 in addition to the following sections.

B. Qualification Data: For paving-mix manufacturer and testing agency.

C. Material Certificates**:** For each paving material

D. Material Certificates: For each paving material, by a qualified testing agency.

E. Field quality-control reports.

1.4 QUALITY ASSURANCE

A. Manufacturer Qualifications: The Contractor shall furnish asphalt in conformance with Caltrans' "Asphalt Supplier Certification Program". Caltrans maintains the program requirements, procedures, and a list of approved suppliers at:

http://www.dot.ca.gov/hq/esc/Translab/fpmcoc.htm

B. Testing Agency Qualifications: Qualified in accordance with ASTM D3666 for testing indicated.

C. Regulatory Requirements: Comply with materials, workmanship, and other applicable requirements of Caltrans for asphalt paving work.

1.5 FIELD CONDITIONS

A. Environmental Limitations: Do not apply asphalt materials if subgrade is wet or excessively damp, if rain is imminent or expected before time required for adequate cure, or if the following conditions are not met:

1. Prime Coat: Minimum surface temperature of 60 deg F.
2. Tack Coat: Minimum surface temperature of 60 deg F.
3. Slurry Coat: Comply with weather limitations in ASTM D3910.

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4. Asphalt Base Course: Minimum surface temperature of 40 deg F and rising at time of placement.
5. Asphalt Surface Course: Minimum surface temperature of 60 deg F at time of placement.

B. The Contractor shall provide, erect, remove, relocate, clean, replace and maintain, if required, suitable signs, barricades, fences or other necessary traffic control devices as may be required or directed by the Engineer. Requirements of local, city, state or federal agencies shall be complied with, including all necessary permits. The Contractor will be required to coordinate his activities with the activities of the Railroad as well as others not party to the Contract.

PART 2 - PRODUCTS

2.1 AGGREGATES

A. Aggregates shall conform to the ½-inch maximum, medium grading, Type A, specified in Section 39-2.02 of the Caltrans Standard Specification.

B. Coarse Aggregate: ASTM D692/D692M, sound; angular crushed stone, crushed gravel, or cured, crushed blast-furnace slag.

C. Fine Aggregate: ASTM D1073, sharp-edged natural sand or sand prepared from stone, gravel, cured blast-furnace slag, or combinations thereof.

1. For hot-mix asphalt, limit natural sand to a maximum of 10 percent by weight of the total aggregate mass.

2.2 ASPHALT MATERIALS

A. Asphalt Binder: Grade asphalt binder, in accordance with Section 92 of the Caltrans Standard Specifications.

B. Emulsified Asphalt Prime Coat: ASTM D977 or AASHTO M 140 emulsified asphalt, or ASTM D2397 or AASHTO M 208 cationic emulsified asphalt, slow setting, diluted in water, of suitable grade and consistency for application.

C. D2397 or AASHTO M 208 cationic emulsified asphalt, slow setting, diluted in water, of suitable grade and consistency for application.

D. Water: Potable.

2.3 AUXILIARY MATERIALS

A. Paving Geotextile: AASHTO M 288 paving fabric; nonwoven polypropylene; resistant to chemical attack, rot, and mildew; and specifically designed for paving applications.

B. Joint Sealant: ASTM D6690, Type II or III, hot-applied, single-component, polymer-modified bituminous sealant.

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2.4 MIXES

A. Hot-Mix Asphalt: Dense-graded, hot-laid, hot-mix asphalt plant mixes approved by authorities having jurisdiction and complying with the following requirements:

1. Provide mixes with a history of satisfactory performance in the geographical area where Project is located.

B. Emulsified-Asphalt Slurry: ASTM D3910, Type 2.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Verify that subgrade is dry and in suitable condition to begin paving.

B. Proceed with paving only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Protection: Provide protective materials, procedures, and worker training to prevent asphalt materials from spilling, coating, or building up on curbs, driveway aprons, manholes, and other surfaces adjacent to the Work.

B. Proof-roll subgrade below pavements with heavy pneumatic-tired equipment to identify soft pockets and areas of excess yielding. Do not proof-roll wet or saturated subgrades.

1. Completely proof-roll subgrade in one direction, repeating proof-rolling in direction perpendicular to first direction. Limit vehicle speed to 3 mph.
2. Proof-roll with a loaded 10-wheel, tandem-axle dump truck weighing not less than 15 tons.
3. Excavate soft spots, unsatisfactory soils, and areas of excessive pumping or rutting, as determined by Architect, and replace with compacted backfill or fill as directed.

C. Notify Engineer of unsatisfactory conditions. Do not begin paving work until deficient subgrade areas have been corrected and are ready to receive aggregate and paving.

D. When the surface is constructed on an existing bituminous surface, it shall be cleaned of all foreign material and broomed free of dust before tack coat is applied.

E. All waste material as a result of Contractor's operations and site preparation shall be disposed of by the Contractor in an approved manner.

3.3 COLD MILLING

A. Clean existing pavement surface of loose and deleterious material immediately before cold milling. Remove existing asphalt pavement by cold milling to grades and cross sections indicated.

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1. Mill to a depth of 3 inches.
2. Mill to a uniform finished surface free of excessive gouges, grooves, and ridges.
3. Control rate of milling to prevent tearing of existing asphalt course.
4. Excavate and trim unbound-aggregate base course, if encountered, and keep material separate from milled hot-mix asphalt.
5. Patch surface depressions deeper than 1 inch after milling, before wearing course is laid.
6. Keep milled pavement surface free of loose material and dust.
7. Do not allow milled materials to accumulate on-site.

3.4 PATCHING

A. Asphalt Pavement: Saw cut perimeter of patch and excavate existing pavement section to sound base. Excavate rectangular or trapezoidal patches, extending 12 inches into perimeter of adjacent sound pavement, unless otherwise indicated. Cut excavation faces vertically. Remove excavated material. Recompact existing unbound-aggregate base course to form new subgrade.

B. Placing Single-Course Patch Material: Fill excavated pavement areas with hot-mix asphalt base mix for full thickness of patch and, while still hot, compact flush with adjacent surface.

3.5 REPAIRS

A. Leveling Course: Install and compact leveling course consisting of hot-mix asphalt surface course to level sags and fill depressions deeper than 1 inch in existing pavements.

1. Install leveling wedges in compacted lifts not exceeding 3 inches thick.

B. Crack and Joint Filling: Remove existing joint filler material from cracks or joints to a depth of 1/4 inch:

1. Clean cracks and joints in existing hot-mix asphalt pavement.
2. Use emulsified-asphalt slurry to seal cracks and joints less than 1/4 inch wide. Fill flush with surface of existing pavement and remove excess.
3. Use hot-applied joint sealant to seal cracks and joints more than 1/4 inch wide. Fill flush with surface of existing pavement and remove excess.

3.6 SURFACE PREPARATION

A. Ensure that prepared subgrade has been proof-rolled and is ready to receive paving. Immediately before placing asphalt materials, remove loose and deleterious material from substrate surfaces.

B. Emulsified Asphalt Prime Coat: Apply uniformly over surface of compacted unbound-aggregate base course at a rate of 0.10 to 0.30 gal./sq. yd. per inch depth. Apply enough material to penetrate and seal, but not flood, surface. Allow prime coat to cure.

1. If prime coat is not entirely absorbed within 24 hours after application, spread sand over surface to blot excess asphalt. Use enough sand to prevent pickup under traffic. Remove loose sand by sweeping before pavement is placed and after volatiles have evaporated.

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2. Protect primed substrate from damage until ready to receive paving.

C. Tack Coat: Apply uniformly to surfaces of existing pavement at a rate of 0.05 to 0.15 gal./sq. yd.

1. Allow tack coat to cure undisturbed before applying hot-mix asphalt paving.
2. Avoid smearing or staining adjoining surfaces, appurtenances, and surroundings. Remove spillages and clean affected surfaces.

3.7 HOT-MIX ASPHALT PLACEMENT

A. Machine place hot-mix asphalt on prepared surface, spread uniformly, and strike off. Place asphalt mix by hand in areas inaccessible to equipment in a manner that prevents segregation of mix. Place each course to required grade, cross section, and thickness when compacted.

1. Place hot-mix asphalt base course in number of lifts and thicknesses indicated.
2. 6” AC new surface, place in 2” lifts.
3. Spread mix at a minimum temperature of 250 deg F.
4. Begin applying mix along centerline of crown for crowned sections and on high side of one-way slopes unless otherwise indicated.
5. Regulate paver machine speed to obtain smooth, continuous surface free of pulls and tears in asphalt-paving mat.

B. Place paving in consecutive strips not less than 10 feet wide unless infill edge strips of a lesser width are required.

1. After first strip has been placed and rolled, place succeeding strips and extend rolling to overlap previous strips. Overlap mix placement about 1 to 1-1/2 inches from strip to strip to ensure proper compaction of mix along longitudinal joints.
2. Complete a section of asphalt base course before placing asphalt surface course.

C. Promptly correct surface irregularities in paving course behind paver. Use suitable hand tools to remove excess material forming high spots. Fill depressions with hot-mix asphalt to prevent segregation of mix; use suitable hand tools to smooth surface.

3.8 WORK ADJACENT TO TRACKS

A. When working adjacent to tracks, Contractor shall use flange fillers on rail as specified in Section 34 11 00 Trackwork Construction and install filter fabric over ties and ballast as shown on drawings before commencing asphalt work.

3.9 JOINTS

A. Construct joints to ensure a continuous bond between adjoining paving sections. Construct joints free of depressions, with same texture and smoothness as other sections of hot-mix asphalt course.

1. Clean contact surfaces and apply tack coat to joints.

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2. Offset longitudinal joints, in successive courses, a minimum of 6 inches.
3. Offset transverse joints, in successive courses, a minimum of 24 inches.
4. Construct transverse joints at each point where paver ends a day's work and resumes work at a subsequent time. Construct these joints using either "bulkhead" or "papered" method in accordance with AI MS-22, for both "Ending a Lane" and "Resumption of Paving Operations.
5. Compact joints as soon as hot-mix asphalt will bear roller weight without excessive displacement.
6. Compact asphalt at joints to a density within 2 percent of specified course density.

3.10 COMPACTION

A. General: Begin compaction as soon as placed hot-mix paving will bear roller weight without excessive displacement. Compact hot-mix paving with hot hand tampers or with vibratory-plate compactors in areas inaccessible to rollers.

1. Complete compaction before mix temperature cools to 185 deg F.

B. Breakdown Rolling: Complete breakdown or initial rolling immediately after rolling joints and outside edge. Examine surface immediately after breakdown rolling for indicated crown, grade, and smoothness. Correct laydown and rolling operations to comply with requirements.

C. Intermediate Rolling: Begin intermediate rolling immediately after breakdown rolling while hot-mix asphalt is still hot enough to achieve specified density. Continue rolling until hot-mix asphalt course has been uniformly compacted to the following density:

1. Average Density, Marshall Test Method: 96 percent of reference laboratory density in accordance with ASTM D6927 or AASHTO T 245, but not less than 94 percent or greater than 100 percent.

D. Finish Rolling: Finish roll paved surfaces to remove roller marks while hot-mix asphalt is still warm.

E. Edge Shaping: While surface is being compacted and finished, trim edges of pavement to proper alignment. Bevel edges while asphalt is still hot; compact thoroughly.

F. Repairs: Remove paved areas that are defective or contaminated with foreign materials and replace with fresh, hot-mix asphalt. Compact by rolling to specified density and surface smoothness.

G. Protection: After final rolling, do not permit vehicular traffic on pavement until it has cooled and hardened.

H. Erect barricades to protect paving from traffic until mixture has cooled enough not to become marked.

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3.11 INSTALLATION TOLERANCES

A. Pavement Thickness: Compact each course to produce thickness indicated within the following tolerances:

1. Base Course: Plus or minus 1/2 inch.
2. Surface Course: Plus 1/4 inch, no minus.

B. Pavement Surface Smoothness: Compact each course to produce surface smoothness within the following tolerances as determined by using a 10-foot straightedge applied transversely or longitudinally to paved areas:

1. Base Course: 1/4 inch .
2. Surface Course: 1/8 inch.
3. Crowned Surfaces: Test with crowned template centered and at right angle to crown. Maximum allowable variance from template is 1/4 inch.

3.12 FIELD QUALITY CONTROL

A. Testing Agency: Contractor will engage a qualified testing agency to perform tests and inspections.

B. Thickness: In-place compacted thickness of hot-mix asphalt courses will be determined in accordance with ASTM D3549.

C. Surface Smoothness: Finished surface of each hot-mix asphalt course will be tested for compliance with smoothness tolerances.

D. In-Place Density: Testing agency will take samples of uncompacted paving mixtures and compacted pavement in accordance with ASTM D979 or AASHTO T 168.

1. Reference maximum theoretical density will be determined by averaging results from four samples of hot-mix asphalt-paving mixture delivered daily to site, prepared in accordance with ASTM D2041, and compacted in accordance with job-mix specifications.
2. In-place density of compacted pavement will be determined by testing core samples in accordance with ASTM D1188 or ASTM D2726.

   a. One core sample will be taken for every 1,000 sq. yd. or less of installed pavement, with no fewer than three cores taken.
   b. Field density of in-place compacted pavement may also be determined by nuclear method in accordance with ASTM D2950 and coordinated with ASTM D1188 or ASTM D2726.

E. Replace and compact hot-mix asphalt where core tests were taken.

F. Remove and replace or install additional hot-mix asphalt where test results or measurements indicate that it does not comply with specified requirements.

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G. Compaction: Rolling shall be continued until all roller marks are eliminated and a minimum density of 96 percent has been obtained.

H. Prior to the seal coat, perform a flood test, if required by, and in the presence of the Engineer:

1. Flood the entire paved area with water.
2. If a depression is found where water ponds to a depth of 1/8 IN in 6 FT, fill and correct.
3. Feather and smooth the edges of fill so that the joint between fill and surface isn't visible.

END OF SECTION 321216

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SECTION 321723 - PAVEMENT MARKINGS

PART 1 - GENERAL

1.1 SUMMARY

A. The following provisions of Port of Stockton 'Division 01' General Provisions shall apply to the Work, unless specifically amended in any of the following Sections:
1. Section 01100 Summary
2. Section 01200 Measurement and Payment
3. Section 01250 Modification Procedures
4. Section 01315 Project Meetings
5. Section 01320 Progress Schedules and Reports
6. Section 01330 Submittal Procedures
7. Section 01340 Safety Submittals
8. Section 01410 Regulatory Requirements
9. Section 01420 References and Definitions
10. Section 01500 Temporary Facilities and Controls
11. Section 01540 Site Security and Safety
12. Section 01600 Product Requirements
13. Section 01740 Cleaning
14. Section 01770 Contract Closeout
15. Section 01780 Project Record Documents

B. Section includes:
1. Installing traffic markings, including lines, and symbols, on pavements using paint or preformed thermoplastic materials.
2. Removal of existing markings.

C. Related Sections include but are not necessarily limited to:
1. Section 32 12 16 – Asphalt Paving

1.2 REFERENCED STANDARDS

A. American Association of State Highway and Transportation Officials (AASHTO).

B. Manual on Uniform Traffic Control Devices (MUTCD).

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1.3 PREINSTALLATION MEETINGS

A. Comply with the requirements laid out in Port of Stockton Division 01 – Section 01315 – 'Project Meetings'.

1.4 ACTION SUBMITTALS

A. Product Data: For each type of product.

B. Samples: For each exposed product and for each color and texture specified.

PART 2 - PRODUCTS

2.1 THERMOPLASTIC

A. Thermoplastic striping shall be white and Alkyd type for extrusion application and shall produce an adherent reflectorized strip capable of resisting deformation by traffic. and meets the requirements of the current edition of the Manual on Uniform Traffic Control Devices for Streets and Highways.

B. The thermoplastics material conforms to AASHTO designation M249, with the exception of the relevant differences due to the material being supplied in a preformed state.

C. The material must be resistant to deterioration due to exposure to sunlight, water, salt or adverse weather conditions and impervious to oil and gasoline.

D. Graded Glass Beads:
1. The material must contain a minimum of thirty percent (30%) intermixed graded glass beads by weight. The intermixed beads shall be conforming to AASHTO designation M247, with minimum 80% true spheres and minimum refractive index of 1.50.
2. The material must have factory applied coated surface beads in addition to the intermixed beads at a rate of 1 lb. (± 10%) per 10 sq. ft. The factory applied coated surface beads shall have a minimum of 90% true spheres, minimum refractive index of 1.50, and meet the following gradation.

US Standard Sieve No.	Percent Passing
12	98 – 100
14	96.5 – 100
16	75 – 98
18	37 – 72
20	28 – 37
30	23 – 33
50	5 – 11
80	0 – 3

E. Pigments:

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1. White: The material shall be manufactured with sufficient titanium dioxide pigment to meet FHWA Docket No. FHWA-99-6190 Table 5 and Table 6 as revised and corrected.
2. Red, Blue, and Yellow: The material shall be manufactured with sufficient pigment to meet FHWA Docket No. FHWA-99-6190 Table 5 and Table 6 as revised and corrected. The yellow pigments must be organic and must be heavy-metal free.
3. Other colors: The pigments must be heavy-metal free

PART 3 - EXECUTION

3.1 EXAMINATION

A. Verify that pavement is dry and in suitable condition to begin pavement marking according to manufacturer's written instructions.

B. Proceed with the pavement marking only after unsatisfactory conditions have been corrected.

3.2 EXISTING PAVEMENT MARKINGS

A. Existing pavement markings which are in alignment with approximately the same location as proposed new pavement markings must be removed to the extent necessary to prepare the roadway surface for the installation of the new pavement marking material in accordance with these Specifications and the materials manufacturer’s recommendations.

B. Existing traffic pavement marking that is not in alignment with the proposed new pavement marking, normally because of a change in pavement marking design or layout, must be removed to avoid conflicting marking. This type of marking will not be removed by the preparation of the roadway surface at the location of the proposed new marking.

C. The removal method used should not significantly damage the pavement surface and should be determined after consideration of the type of marking material to be removed and the type of pavement surface.

D. Any residue remaining after the removal of the marking shall be collected and removed from the project by the Contractor.

3.3 PAVEMENT MARKING

A. The thermoplastic material shall be applied by extrusion methods in a single uniform layer.

B. The pavement surface to which thermoplastic material is applied shall be completely coated by the material and the voids of the pavement surface shall be filled. Surface must be dry before application. Contractor may use artificial methods to dry the pavement surface.

C. The thermoplastic material for traffic stripes shall be applied at a minimum thickness of 0.075-inch.

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D. Glass beads shall be applied immediately to the surface of the molten thermoplastic material, at a rate of not less than 8 lbs. per 100 sq. ft. The amount of glass beads applied shall be measured by stabbing the glass beads tank with a calibrated rod.

E. The contractor shall apply all traffic stripes and markings on new asphalt surface in accordance with the manufacturer's recommendations.

3.4 APPLICATION

A. General
1. Markings shall be applied at locations and to the dimensions and spacing shown on plans.
2. Markings shall not be applied until the layout and condition of the surface has been approved by the Engineer.

B. Thermoplastic Application.
1. The materials shall be applied using the propane torch method recommended by the manufacturer.
2. The material must be able to be applied without minimum requirements for ambient and road temperatures and without any preheating of the pavement to a specific temperature. The material must be able to be applied without the use of a thermometer.

3.5 TOLERANCES AND APPEARANCE

A. Completed traffic stripes and markings shall have clean and well-defined edges without deformation and shall be free of tears or other disfigurements. Improperly placed, defective, or disfigured traffic stripes and markings shall be immediately removed from the pavement surface by methods approved by the Owner or Engineer. All removal work shall be at Contractor's expense.

B. Completed traffic stripes shall be uniform, shall be straight on tangent alignment, and shall be on a true arc on curved alignment. On tangent alignment, when a 100' string line is stretched taught and placed directly on the outer edge of the completed traffic stripe, the distance between the string and the edge of the traffic stripe shall not exceed three-fourths of one inch (3/4") when measured anywhere along any 100' interval of the tangent alignment. On curved alignment, the outer edge of the traffic stripe shall not deviate more than three fourths of one inch (3/4") from the true arc. The lengths of the gaps and individual stripes that form broken traffic stripes shall not deviate more than 2" from the lengths required to produce a uniformly repeating, broken-stripe pattern

3.6 PROTECTING AND CLEANING

A. Protect pavement markings from damage and wear during remainder of construction period.

1. Clean spillage and soiling from adjacent construction using cleaning agents and procedures recommended by manufacturer of affected construction.

END OF SECTION 321723

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SECTION 323113 - CHAIN LINK FENCES AND GATES

PART 1 - GENERAL

1.1 SUMMARY

A. The following provisions of Port of Stockton 'Division 01' General Provisions shall apply to the Work, unless specifically amended in any of the following Sections:

1. Section 01100 Summary
2. Section 01200 Measurement and Payment
3. Section 01250 Modification Procedures
4. Section 01315 Project Meetings
5. Section 01320 Progress Schedules and Reports
6. Section 01330 Submittal Procedures
7. Section 01340 Safety Submittals
8. Section 01410 Regulatory Requirements
9. Section 01420 References and Definitions
10. Section 01500 Temporary Facilities and Controls
11. Section 01540 Site Security and Safety
12. Section 01600 Product Requirements
13. Section 01740 Cleaning
14. Section 01770 Contract Closeout
15. Section 01780 Project Record Documents

B. Section Includes:

1. Chain-link fences.
2. Horizontal-slide, motor-operated gates.
3. Swinging, manually-operated gates.

1.2 PREINSTALLATION MEETINGS

A. Preinstallation Conference: In addition to the requirements laid out in Port of Stockton Division 01 – Section 01315 – 'Project Meetings', conduct conference at Project site, conduct conference at Project site**.**

1. Meet and coordinate with Contractor in charge of providing power, lighting, and communications service to the new automatic TWIC access gate on Humphreys Street.
2. Review coordination of interlocked equipment specified in this Section and elsewhere.
3. Review required testing, inspecting, and certifying procedures.

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1.3 ACTION SUBMITTALS

A. Comply with Port of Stockton Division 01 'General Provisions' Sections 01330 and 01340 in addition to the following sections.

B. Product Data: For each type of product.

1. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes for the following:

   a. Fence and gate posts, rails, and fittings.
   b. Chain-link fabric, reinforcements, and attachments.
   c. Accessories: Barbed wire.
   d. Gates and hardware.
   e. Gate operators, including operating instructions and motor characteristics.

C. Shop Drawings: For each type of fence and gate assembly.

1. Include plans, elevations, sections, details, and attachments to other work.
2. Include accessories, hardware, gate operation, and operational clearances.
3. Gate Operator: Show locations and details for installing operator components, switches, and controls. Indicate motor size, electrical characteristics, drive arrangement, mounting, and grounding provisions.
4. Wiring Diagrams: For power, signal, and control wiring.

D. Submit manufacturer's technical data and installation instructions for all fence material. Submit data early enough to permit review and approval by the Engineer before ordering material.

1.4 WORK UNDER OTHER CONTRACTS

A. Power, Lighting, and Communication Services to new TWIC Access gate on Humphreys Street.

1.5 QUALITY ASSURANCE

A. Provide chain link fence and gates, including all erection accessories, fittings, and fastenings as complete units, which are called for in the specifications and approved by the Engineer.

1.6 FIELD CONDITIONS

A. Field Measurements: Verify layout information for chain-link fences and gates shown on Drawings in relation to property survey, existing structures, and adjacent track. Verify dimensions by field measurements.

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PART 2 - PRODUCTS

2.1 MANUFACTURER

A. Subject to compliance with requirements, provide products of one of the following:

1. Allied Tube and Conduit Corp.
2. American Fence Corp.
3. Anchor Fence, Inc.
4. Cyclone Fence - A Div. of U.S. Diversified Group or other approved source
5. Stephens Pipe and Steel, LLC
6. Merchants Metal

2.2 CHAIN-LINK FENCE FABRIC

A. General: Provide fabric in one-piece heights measured between top and bottom of outer edge of selvage knuckle or twist according to "CLFMI Product Manual" and requirements indicated below:

1. Fabric Height: As indicated on Drawings.
2. Fabric: No. 9-gauge or 0.148" coated steel wire size, 2" mesh fabric 60" and under knuckled both selvages, for fabric 72" or over, bottom selvage knuckled and the top selvage twisted and barbed.
3. Fabric Finish must be one of the following:
   a. Galvanized, ASTM A 392, Class II, with not less than 2.0 oz. zinc per square foot of surface.
   b. Aluminum-Coated Steel, ASTM A491 Aluminum-Coated Steel Chain Link Fabric, American Association of State Highway Transportation Officials M-181 Chain Link Fence, Type H.

2.3 FENCE FRAMEWORK

A. Posts and Rails: ASTM A 120 or KA 123, with not less than 1.8 oz. zinc per square foot of surface. for framework, including rails, braces, and line; terminal; and corner posts. Provide members with minimum dimensions and wall thickness according to ASTM F1043 based on the following:
1. Fence Height: 96 inches.

2. Heavy-Industrial-Strength Material: Group IA, round steel pipe, Schedule 40.
   a. Line Post: Space 10' o.c. maximum, unless otherwise indicated, of following minimum size and weight:
      1) 2.375" O.D. steel pipe, 3.65 lbs. per lin. ft.
      2) 2.25" x 1.70" H Section line posts, 3.26 lbs. P.L.F.
   b. End, Corner, and Pull Posts: 2.875” O.D. steel pipes, 5.79 lbs. per lin. Ft.

3. Horizontal Framework Members: Top and bottom rails according to ASTM F1043.

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a. Top and Brace Rails: 1.626" O.D. pipe as top rail for brace, and truss to line post.

4. Metallic Coating for Steel Framework:

a. Type A: Not less than minimum 2.0-oz./sq. ft. average zinc coating according to ASTM A123/A123M or 4.0-oz./sq. ft. zinc coating according to ASTM A653/A653M.
b. Type B: Zinc with organic overcoat, consisting of a minimum of 0.9 oz./sq. ft. of zinc after welding, a chromate conversion coating, and a clear, verifiable polymer film.
c. External, Type B: Zinc with organic overcoat, consisting of a minimum of 0.9 oz./sq. ft. of zinc after welding, a chromate conversion coating, and a clear, verifiable polymer film. Internal, Type D, consisting of 81 percent, not less than 0.3-mil-thick, zinc-pigmented coating.
d. Type C: Zn-5-Al-MM alloy, consisting of not less than 1.8-oz./sq. ft coating.
e. Coatings: Any coating above.

5. Polymer coating over metallic coating.

a. Color: Match chain-link fabric according to ASTM F934.

2.4 TENSION WIRE

A. 7-gauge, coated coil spring wire, metal and finish to match fabric.

2.5 HORIZONTAL-SLIDE GATES

A. General: ASTM A120 or KA 123 for gate posts and double sliding gate types.

1. Classification: Type II Cantilever Slide, Class 1 with external roller assemblies.

a. Gate Frame Width and Height: As indicated on Plans.

B. Pipe and Tubing:

1. Aluminium: Protective coating and finish to match fence framework.
2. Gate Posts: ASTM F1184. Provide round tubular steel posts for supporting 12’-6” nominal gate leaf, as follows:
   a. 4" O.D. pipe post, 18.97 lbs. per lin. Ft.
3. Gate Frames and Bracing: Round tubular steel.
4. Latch: Permitting operation from both sides of gate with provision for padlocking accessible from both sides of gate.
5. Lock: Manufacturer's standard internal device.

2.6 SWING GATES

A. General: ASTM F900 for gate posts and double swing gate types.

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1. Gate Leaf Width: As indicated.
2. Framework Member Sizes and Strength: Based on gate fabric height of more than 72 inches (1830 mm).

B. Pipe and Tubing:

1. Zinc-Coated Steel: ASTM F1043 and ASTM F1083; protective coating and finish to match fence framework.
2. Gate Posts: Round tubular steel.
3. Gate Frames and Bracing: Round tubular steel.

C. Frame Corner Construction: Welded or assembled with corner fittings.

D. Extended Gate Posts and Frame Members: Fabricate gate posts and frame end members to extend 12 inches (300 mm) above top of chain-link fabric at both ends of gate frame to attach barbed wire assemblies.

E. Hardware:

1. Hinges: 360-degree inward and outward swing.
2. Latch: Permitting operation from both sides of gate with provision for padlocking accessible from both sides of gate.
3. Closer: Manufacturer's standard.

2.7 FITTINGS AND ACCESSORIES

A. Provide fittings of galvanized, ASTM A 153, with zinc weights per Table I.

B. Post Caps: Provide for each post.

1. Provide line post caps with loop to receive tension wire or top rail.

C. Rail and Brace Ends: For each gate, corner, pull, and end post.

D. Rail Fittings: Provide the following:

1. Top Rail Sleeves: Pressed-steel or round-steel tubing not less than 6 inches long.
2. Rail Clamps: Line and corner boulevard clamps for connecting bottom rails to posts.

E. Tension and Brace Bands: Space not over 15" o.c. to secure stretcher bars to end, corner, pull and gate posts.

F. Tension Bars: One-piece lengths equal to full height of fabric, with minimum cross section of 3/16" x 3/4". Provide one bar for each gate and end post, and two for each corner and pull post, unless fabric is integrally woven into post.

G. Truss Rod Assemblies: Steel, hot-dip galvanized after threading rod and turnbuckle or other means of adjustment.
1. Use 0.375" diameter rod and adjustable tightener.

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H. Barbed Wire Arms: Pressed steel or cast iron, with clips, slots, or other means for attaching strands of barbed wire, and means for attaching to posts, integral with post cap, for each post unless otherwise indicated, and as follows:

1. Provide line posts with arms that accommodate top rail or tension wire.
2. Provide corner arms at fence corner posts unless extended posts are indicated.
3. Capable of withstanding 250 lbs. of downward pull at the outermost end.
4. Single-Arm Type: Type I, slanted arm.

I. Tie Wires, Clips, and Fasteners:

1. Standard Round Wire Ties: For attaching chain-link fabric to posts, rails, and frames, according to the following:

a. Hot-Dip Galvanized Steel ASTM A153: 0.148-inch-diameter wire; galvanized coating thickness matching coating thickness of chain-link fence fabric.

2.8 BARBED WIRE

A. Steel Barbed Wire: Three-strand, 12-1/2 gauge wire, with 14 gauge 4 point barbs spaced not more than 5" o.c.; metal and finish to match fabric, if required.
1. Zinc Coating: Type Z, Class 3.

2.9 GATE OPERATORS

A. This scope of Work is not covered under this Contract and will be performed as specified in Section 1.4 of this document.

2.10 GROUT AND CONCRETE

A. Nonshrink, Nonmetallic Grout: Factory-packaged, nonstaining, noncorrosive, nongaseous grout complying with ASTM C1107/C1107M. Provide grout, recommended in writing by manufacturer, for exterior applications.

B. Provide concrete consisting of Portland cement, ASTM C 150, aggregates ASTM C 33, and clean water. Mix materials to obtain concrete with a minimum 28-day compressive strength of 3,000 psi, using a min. of 5 sack cement per C.Y. 1" maximum size aggregate, maximum 3" slump and 2% to 4% entrained air.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine areas and conditions, with Installer present, for compliance with requirements for a certified survey of property lines and legal boundaries, site clearing, earthwork, pavement work, and other conditions affecting performance of the Work.

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1. Do not begin installation before final grading is completed unless otherwise permitted by Architect.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

C. Do not begin installation and erection before asphalt paving under fence area is completed. If fence is not on asphalt, the area along the fence line shall be cleared to permit proper construction.

3.2 PREPARATION

A. Obtain 811 utility locate prior to construction activities.

B. Stake locations of fence lines, gates, and terminal posts. Do not exceed intervals of 500 feet or line of sight between stakes. Indicate locations of utilities, lawn sprinkler system, underground structures, benchmarks, and property monuments.

C. Drill or hand-excavate (using post-hole digger) holes for posts to diameters and spacing indicated, in firm, undisturbed, and/or compacted soil. Excavate holes for each post to minimum diameter of not less than four times largest cross-section of post.

3.3 CHAIN-LINK FENCE INSTALLATION

A. Install chain-link fencing according to ASTM F567 and more stringent requirements specified.

B. Post Excavation: Drill or hand-excavate holes for posts to diameters and spacings indicated, in firm, undisturbed soil.

C. Post Setting: Set posts in concrete at indicated spacing into firm, undisturbed soil.

1. Verify that posts are set plumb, aligned, and at correct height and spacing, and hold in position during setting with concrete or mechanical devices.
2. Concrete Fill: Place concrete around posts to dimensions indicated and vibrate or tamp for consolidation. Protect aboveground portion of posts from concrete splatter.

    a. Exposed Concrete: Extend 2 inches above grade; shape and smooth to shed water.
    b. Center and align post 3' above bottom of excavation. Place concrete around posts and vibrate or tamp for consolidation. Check each post for vertical and top alignment and hold in position during placement and finishing operations. Unless otherwise indicated, extend concrete footings 2" above grade, and trowel to a crown to shed water.

D. Terminal Posts: Install terminal end, corner, and gate posts according to ASTM F567 and terminal pull posts at changes in horizontal or vertical alignment of 30 degrees or more. For runs exceeding 500 feet, space pull posts an equal distance between corner or end posts.

E. Line Posts: Space line posts uniformly at 10 feet o.c.

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F. Post Bracing and Intermediate Rails: Install according to ASTM F567, maintaining plumb position and alignment of fence posts. Diagonally brace terminal posts to adjacent line posts with truss rods and turnbuckles. Install braces at end and gate posts and at both sides of corner and pull posts.

1. Locate horizontal braces at midheight of fabric 72 inches or higher, on fences with top rail, and at two-third fabric height on fences without top rail. Install so posts are plumb when diagonal rod is under proper tension.

G. Tension Wire: Install tension wires through post cap loops before stretching fabric and tie each post cap with not less than 6-gauge galvanized wire. Fasten fabric to tension wire using 11 - gauge galvanized steel hog rings, spaced 24" o.c. Install tension wire at top and bottom of fence fabric. Provide horizontal tension wire at the following locations:

1. Extended along top of fence fabric. Install top tension wire through post cap loops. Install bottom tension wire within 6 inches of bottom of fabric and tie to each post with not less than same diameter and type of wire.
2. Extended along top of barbed wire arms and top of fence fabric to support barbed tape.

H. Top Rail: Install according to ASTM F567, maintaining plumb position and alignment of fence posts. Run rail continuously through line post caps, bending to radius for curved runs and terminating into rail end attached to posts or post caps fabricated to receive rail at terminal posts. Provide expansion couplings as recommended in writing by fencing manufacturer.

I. Bottom Rails: Secure to posts with fittings.

J. Chain-Link Fabric: Apply fabric to outside of enclosing framework. Leave 1-inch bottom clearance between finish grade or surface and bottom selvage unless otherwise indicated. Pull fabric taut and tie to posts, rails, and tension wires. Anchor to framework so fabric remains under tension after pulling force is released.

K. Tension or Stretcher Bars: Thread through or clamp to fabric 4" o.c., and secure to posts with metal bands spaced 15" o.c. Provide one stretcher bar for each gate and end post, and two for each corner and pull post, except where fabric is integrally woven into post..

L. Tie Wires: Use U-shaped wire, conforming to diameter of pipe to which attached, clasping pipe and fabric firmly with ends twisted at least two full turns. Bend ends of wire to minimize hazard to persons or clothing.

1. Maximum Spacing: Tie fabric to line posts at 12 inches o.c. and to rails and braces at 24 inches o.c. Tie fabric to tension wires, with hog rings spaced 24" o.c.

M. Fasteners: Install nuts for tension bands and carriage bolts on the side of fence opposite the fabric side. Peen ends of bolts or score threads to prevent removal of nuts.

N. Barbed Wire: Install barbed wire uniformly spaced, angled toward security side of fence. Pull wire taut, install securely to extension arms, and secure to end post or terminal arms.

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3.4 GATE INSTALLATION

A. Install gates according to manufacturer's written instructions, level, plumb, and secure for full opening without interference. Attach fabric as for fencing. Attach hardware using tamper-resistant or concealed means. Install ground-set items in concrete for anchorage. Adjust hardware for smooth operation.

3.5 GATE-OPERATOR INSTALLATION

A. This scope of Work is not covered under this Contract and will be performed as specified in Section 1.4 of this document.

B. FIELD QUALITY CONTROL

C. Testing Agency: Owner will engage a qualified testing agency to perform tests.

D. Grounding Tests: Comply with requirements in Section 264113 "Lightning Protection for Structures."

E. Prepare test reports.

3.6 ADJUSTING

A. Gates: Adjust gates to operate smoothly, easily, and quietly, free of binding, warp, excessive deflection, distortion, nonalignment, misplacement, disruption, or malfunction, throughout entire operational range. Confirm that latches and locks engage accurately and securely without forcing or binding.

B. Automatic Gate Operator: This scope of Work is not covered under this Contract and will be performed as specified in Section 1.4 of this document.

C. Lubricate hardware and other moving parts.

3.7 DEMONSTRATION

A. Engage a factory-authorized service representative to train Owner's maintenance personnel to adjust, operate, and maintain chain-link fences and gates.

END OF SECTION 323113

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SECTION 330520 – UTILITY ABANDONMENT

PART 1 - GENERAL

1.1 SUMMARY

A. The following provisions of Port of Stockton 'Division 01' General Provisions shall apply to the Work, unless specifically amended in any of the following Sections:

1. Section 01100 Summary
2. Section 01200 Measurement and Payment
3. Section 01250 Modification Procedures
4. Section 01315 Project Meetings
5. Section 01320 Progress Schedules and Reports
6. Section 01330 Submittal Procedures
7. Section 01340 Safety Submittals
8. Section 01410 Regulatory Requirements
9. Section 01420 References and Definitions
10. Section 01500 Temporary Facilities and Controls
11. Section 01540 Site Security and Safety
12. Section 01600 Product Requirements
13. Section 01740 Cleaning
14. Section 01770 Contract Closeout
15. Section 01780 Project Record Documents

B. Section Includes: Removal and abandonment of piping and appurtenances, wholly or in part, as required to complete Work as shown on the Drawings and specified in this Section.

1.2 SUBMITTALS

A. Comply with Port of Stockton Division 01 'General Provisions' Sections 01330 and 01340 in addition to the following sections.

B. Submit the following:

1. Proposed methods for pipe removal and abandonment, including operational procedures such as projected injection rate, grout pressure, bulkhead and vent design;
2. Equipment proposed to be used to do pipe removal and abandonment work;
3. Resume of pipe grouting subcontractor;
4. Pipe Removal and abandonment schedule/sequence
5. Mix design report for flowable fill including aggregate gradation, fill mix constituents and proportions, shrinkage and compressive strength.

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1.3 DELIVERY, STORAGE, AND HANDLING

A. Deliver pipes and tubes with factory-applied end caps. Maintain end caps through shipping, storage, and handling to prevent pipe end damage and to prevent entrance of dirt, debris, and moisture.

B. Store plastic pipes protected from direct sunlight. Support to prevent sagging and bending.

1.4 WORK UNDER OTHER CONTRACTS

A. Port Overhead Power and AT&T Overhead Communication Relocation and Undergrounding east of Gillis Avenue – Daggett Road intersection.

1.5 SITE CONDITIONS

A. Execute pipe removal and abandonment so that there is no injury to persons or damage to adjacent structures, equipment, materials, piping, wiring, pavement, fences, trees, and other adjacent improvements. Execute demolition and abandonment so that access to facilities that are in operation and to residences and businesses is free and safe.

B. Execute pipe removal and abandonment so that interference to vehicular traffic and personnel traffic does not exceed scheduled interference. Do not place rubble, excavation, piping or other materials removed on roadways, drives or sidewalks that are to remain in service.

PART 2 - PRODUCTS

2.1 FLOWABLE FILL

A. Description: Low-strength-concrete, flowable-slurry mix.

B. Design Mix Criteria: Provide design of one or more mixes to meet design criteria and conditions for placement. Mix shall include the following:

1. Cement: ASTM C 150, Type I, Portland.
2. Density: 115- to 145-lb/cu. ft.
3. Aggregates: ASTM C 33, natural sand, fine and crushed gravel or stone, coarse.

Retain subparagraph above or first two subparagraphs below.

4. Aggregates: ASTM C 33, natural sand, fine.
5. Admixture: Use admixtures meeting ASTM C494 and ASTM C1017 as needed to improve pumpability, to control time of set and to reduce bleeding.
6. Water: Comply with ASTM C 94/C 94M.
7. Strength: 75 to 150 psig at 28 days.
8. Shrinkage characteristics: non-shrink.

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PART 3 - EXECUTION

3.1 GENERAL

A. Conduct pipe removal and abandonment as shown and specified in the Contract Documents.

B. Conduct pipe removal and abandonment so that existing equipment, piping, wiring, structures, and other improvements to remain are not damaged. Repair or replace equipment, piping, wiring, structures, and other improvements damaged at no additional cost to the Owner.

C. Do not remove equipment, piping, wiring, structures, or other improvements not shown or specified to be removed. If equipment, piping, wiring, structures, or other improvements not shown or specified to be removed is removed, replace equipment, piping, wiring, structures, or other improvements at no additional cost to the Owner.

3.2 DISCONNECTIONS

A. Prior to starting pipe removal or abandonment, check underground and exposed existing utilities, piping, and equipment within the limits of pipe removal or abandonment. Prior to starting, check underground and exposed existing utilities, piping connected to and associated with existing pipe to be removed or abandoned.

Verify the following:

1. Piping is inactive (abandoned);
2. Other utilities which may be in conflict have been permanently or temporarily disconnected, if required:

B. Do not proceed with salvage or demolition if piping is active or utilities have not been disconnected.

3.3 GENERAL

A. Conduct pipe removal and abandonment as shown and specified in the Contract Documents.

B. Conduct pipe removal and abandonment so that existing equipment, piping, wiring, structures, and other improvements to remain are not damaged. Repair or replace equipment, piping, wiring, structures, and other improvements damaged at no additional cost to the Owner.

C. Do not remove equipment, piping, wiring, structures, or other improvements not shown or specified to be removed. If equipment, piping, wiring, structures, or other improvements not shown or specified to be removed is removed, replace equipment, piping, wiring, structures, or other improvements at no additional cost to the Owner.

3.4 ABANDONMENT

A. The Contractor shall, as described on the Drawings and as may be directed by the Owner, abandon in place the following existing utility improvements:

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1. All water mains that are designated to be abandoned shall be filled with grout.
2. All sanitary sewer and storm drain piping, including force mains, laterals and services, as well as gas and compressed air piping that are designated to be abandoned shall be flushed clean and filled with grout. Prior to grout fill, sewer lines, force mains, laterals and services to be abandoned shall be flushed clean to remove. Contractor is responsible for securing and providing flushing water, collection of flush water/wastewater, and disposal. The cleaning of these piping systems shall comply with all local and DEP requirements.

B. Appurtenances: All water hydrants, ARV valves and other appurtenances on abandoned lines shall be removed to the main and the fitting at the main shall be capped or plugged. All valves shall have the valve box, pad and operator removed, with the valve left in the open position unless specifically noted otherwise.

C. Preparation:

1. The Owner shall be notified at least 72 hours in advance of grouting operations.
2. Bulkheads shall be spaced at intervals of not more than 1,000 feet. If the line to be abandoned is longer, bulkheads shall be inserted in the pipe to maintain the required maximum spacing between bulkheads.
3. Temporary vents shall be installed in the line to be filled at a maximum spacing of 150 ft. The vents shall be capable of being capped to allow further grouting operations.

D. Equipment:

1. The materials shall be mixed or delivered in equipment of sufficient size and capacity to provide the desired amount of grout material for each stage in a single operation. The equipment shall be capable of mixing the grout at densities required for the approved procedure and shall also be capable of changing density as dictated by field conditions any time during the grouting operation.
2. Mixers and Pumps - The grout shall be delivered to the injection point at a steady pressure with a non-pulsating centrifugal or triplex pump. Means shall be provided to increase or decrease the water-cement ratio. The system shall mix the grout to a homogeneous consistency. Means of accurately measuring grout component quantities, pumping pressures, and volumes pumped shall be provided.
3. Pressure Gauges - CONTRACTOR shall provide one pressure gauge at the point of injection and one pressure gauge at the grout pump. Grouting shall not proceed without appropriate calibrated gauges in place and in working order. Pressure gauges shall be equipped with diaphragm seals, have a working range between 1.5 to 2.0 times the design grout pressure, and have an accuracy within 0.5 percent of full range. Pressure gauges shall be instrument oil filled and attached to a saddle-type diaphragm seal to prevent clogging with grout.

E. Grouting:

1. Once grouting operations begin, grouting shall proceed uninterrupted from bulkhead to bulkhead. Grout placement shall not be terminated until both of the following conditions have been met, unless otherwise approved by the Owner: a) The estimated volume of grout to fill the line has been injected; and, b) grout has been expelled from the furthest vent or bulkhead. Bulkheads and temporary vents shall not be removed until the grout has set.

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F. Testing and Sampling:

1. Take four test specimens for each 50 cubic yards of grout or for each four hours of placing.
2. Test in accordance with ASTM C109 except:
   a. The specimens shall be 3 inch by 6 inch cylinders covered after casting to prevent damage and loss of moisture. Moist cure specimens for a period up to 7 days prior to a 28-day compressive strength test.
   b. Do not oven dry specimens that are load tested. Specimens may be tested at any age to monitor compressive strength. The material may require special handling and testing techniques.

G. The Contractor may remove the pipe in accordance with the Paragraph 3.04 in lieu of abandonment if acceptable to the Owner. Such removal, however, will be paid at the same price for pipe abandonment.

H. All work under this Section shall comply with City, Owner, State and Federal regulations.

3.5 REMOVAL AND DISPOSAL

A. The Contractor shall, as described on the Drawings and as may be directed by the Owner, remove the following existing utility improvements:

1. All water mains, reuse water mains and raw water mains are designated to be removed.

B. The pipe removal and disposal shall include all valves, fittings and appurtenances.

3.6 SALVAGE OF EQUIPMENT, PIPING, AND MATERIALS

A. Remove items identified on the drawings or specified to remain the property of the Owner. Do not damage equipment, piping, and materials to be salvaged.

B. Following removal or equipment, piping, and materials to be salvaged, place equipment, piping, and materials in a location within the Owner limits as designated by the Owner.

3.7 REPAIRS

A. Repair structural elements, equipment, piping, conduit, and other improvements to remain that are damaged during demolition. Use workers specifically qualified in trade, or trades, involved to repair damaged work.

3.8 DISPOSAL

A. Remove and dispose of all equipment, piping, and materials from the jobsite not specifically designated to be retained by the Owner.

B. Contractor shall not accumulate or store debris from demolition on the project site.

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C. The disposal of the piping, manholes and appurtenances shall be in accordance with Owner, State and Federal laws.

3.9 BACKFILLING

A. Backfill excavations, trenches, and pits resulting from abandonment and removal according to Section 312323 – Backfilling.

B. Backfill of the pipe trenches shall be according to the Owner details for pipe trench backfill. Pipe trenches for removed pipes that were within 3 horizontal feet of the edge of pavement shall be backfilled according to the detail for the type of roadway.

3.10 CLEANUP AND CLOSURE

A. Following pipe abandonment or removal, clean-up areas where other work is to be done as specified in this Section, or Sections applicable to work to be done.

B. Following pipe abandonment or removal, clean-up areas where no other work is to be done under this Contract. Remove debris and rubbish, temporary facilities, and equipment. Level surface irregularities to eliminate depressions. Leave work in a neat and presentable condition.

C. In locations where a pipe to be abandoned or removed connects to a pipe that remains in service, the Contractor shall install a suitable cap or plug on the end of the active pipe.

END OF SECTION 330520

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SECTION 334200 - STORMWATER CONVEYANCE

PART 1 - GENERAL

1.1 SUMMARY

A. The following provisions of Port of Stockton 'Division 01' General Provisions shall apply to the Work, unless specifically amended in any of the following Sections:

1. Section 01100 Summary
2. Section 01200 Measurement and Payment
3. Section 01250 Modification Procedures
4. Section 01315 Project Meetings
5. Section 01320 Progress Schedules and Reports
6. Section 01330 Submittal Procedures
7. Section 01340 Safety Submittals
8. Section 01410 Regulatory Requirements
9. Section 01420 References and Definitions
10. Section 01500 Temporary Facilities and Controls
11. Section 01540 Site Security and Safety
12. Section 01600 Product Requirements
13. Section 01740 Cleaning
14. Section 01770 Contract Closeout
15. Section 01780 Project Record Documents

B. Section Includes:

1. Corrugated steel culvert pipe and fittings.
2. Corrugated-steel pipe and fittings.
3. Concrete pipe and fittings.
4. PVC pipe and fittings.
5. Non-pressure transition couplings.
6. Cleanouts.
7. Encasement for piping.
8. Stormwater inlets.
9. Stormwater detention structures.
10. Pipe outlets.

C. Related Sections include but are not necessarily limited to:

1. Section 31 12 00 – Earth Moving
2. Section 33 46 00 – Subdrainage
3. Section 34 11 00 – Trackwork Construction

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1.2 DEFINITIONS

A. See Port of Stockton Division 01 'General Provisions' Section 01420 for overall project definitions in addition to the sections below.

B. Owner: Port of Stockton.

1.3 ACTION SUBMITTALS

A. Product Data: For each type of product.

B. Shop Drawings:
1. Catch basins and stormwater inlets: Include plans, elevations, sections, details, frames, covers, and grates.

1.4 INFORMATIONAL SUBMITTALS

A. Comply with Port of Stockton Division 01 'General Provisions' Sections 01330 and 01340 in addition to the following sections.

B. Coordination Drawings: Show pipe sizes, locations, and elevations. Show other piping in same trench and clearances from storm drainage system piping. Indicate interface and spatial relationship between manholes, piping, and proximate structures.

C. Product Certificates: For each type of cast-iron soil pipe and fitting, from manufacturer.

D. Field quality-control reports.

1.5 QUALITY ASSURANCE

A. Piping materials shall bear label, stamp, or other markings of specified testing agency.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Do not store plastic manholes, pipe, and fittings in direct sunlight.

B. Protect pipe, pipe fittings, and seals from dirt and damage.

C. Handle materials inlets in accordance with manufacturer's written rigging instructions.

1.7 FIELD CONDITIONS

A. Interruption of Existing Storm Drainage Service: Do not interrupt service to facilities occupied by Owner or others unless permitted under the following conditions and then only after arranging to provide temporary service in accordance with requirements indicated:

1. Notify Owner no fewer than two days in advance of proposed interruption of service.

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2. Do not proceed with interruption of service without Owner's written permission.

PART 2 - PRODUCTS

2.1 CORRUGATED STEEL CULVERT PIPE AND FITTINGS

A. Pipe: Pipe culvert material underneath railroad tracks must meet the standards for pipe culverts set forth in Chapter 1, Part 4 of the current AREMA Specifications and the Union Pacific Railroad Company's Engineering Culvert Pipe Standard Drawings 680000, 680010 and 680030 or as required and approved by the Engineer:
   1. All CMP culverts under the railroad shall be aluminized and double-riveted.

B. Pipe: Pipe culvert material underneath roadways must meet the standards for pipe culverts set forth in Section 66 of the current Caltrans Standard Specifications. Drawings, and as required and approved by the Engineer.

C. Corrugations:

   1. All pipe culverts will be furnished with annular corrugations.
   2. 2.67 IN x 0.5 IN annular corrugations shall be used for all CMP pipes to be used for this project.

D. Standard Fittings: AWWA C110/A21.10, ductile or gray iron, for push-on joints.
   1. Bolts and nuts for railroad culverts shall be per the current AREMA Specifications, chapter 41, part 4.
   2. Bolts and nuts for roadway culverts shall be per the current Caltrans Specifications.

E. Compact Fittings: AWWA C153/A21.53, for push-on joints.

F. Gaskets: AWWA C111/A21.11, rubber.

G. Flared end sections:
   1. All flared end sections for railroad culverts furnished by the Contractor must meet the standards for pipe culverts set forth in Chapter 1, Part 4 of the current AREMA Specifications. Flared end sections shall match the annular corrugations and gage of the adjacent pipe culvert. Any deviations of these Specifications are to be submitted to the Engineer for approval prior to starting construction.
   2. All flared end sections for railroad culverts furnished by the Contractor must meet the standards for pipe culverts set forth in Caltrans Specifications.

2.2 CORRUGATED-STEEL PIPE AND FITTINGS

A. Corrugated-Steel Pipe and Fittings: ASTM A760/A760M, Type I with fittings of similar form and construction as pipe.

   1. Special-Joint Bands: Corrugated steel with O-ring seals.
   2. Standard-Joint Bands: Corrugated steel.

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3. Coating: Zinc.

2.3 PVC PIPE AND FITTINGS

A. PVC Piping:

1. Pipe: Class 100, SDR 25 or 26 pipe conforming to AWWA C900, gravity sewer pipe with bell-and-spigot ends for gasketed joints providing a watertight seal.
2. Fittings: ASTM D3034, PVC with bell ends.
3. Gaskets: ASTM F477, elastomeric seals.

2.4 CONCRETE PIPE AND FITTINGS

A. Source Limitations: Obtain concrete pipe and fittings from single manufacturer.

B. Reinforced-Concrete Sewer Pipe and Fittings: ASTM C76.

1. Bell-and-spigot ends and gasketed joints with ASTM C443, rubber gaskets
2. Class V, Wall C.

2.5 NONPRESSURE TRANSITION COUPLINGS

A. Comply with ASTM C1173, elastomeric, sleeve-type, reducing or transition coupling, for joining underground nonpressure piping. Include ends of same sizes as piping to be joined, and corrosion-resistant-metal tension band and tightening mechanism on each end.

B. Sleeve Materials:

1. For Concrete Pipes: ASTM C443, rubber.
2. For Cast-Iron Soil Pipes: ASTM C564, rubber.
3. For Plastic Pipes: ASTM F477, elastomeric seal or ASTM D5926, PVC.
4. For Dissimilar Pipes: ASTM D5926, PVC or other material compatible with pipe materials being joined.

C. Unshielded, Flexible Couplings:
1. Description: Elastomeric sleeve with stainless-steel shear ring and corrosion-resistant-metal tension band and tightening mechanism on each end.

D. Shielded, Flexible Couplings:
1. Description: ASTM C1460, elastomeric or rubber sleeve with full-length, corrosion-resistant outer shield and corrosion-resistant-metal tension band and tightening mechanism on each end.

E. Ring-Type, Flexible Couplings:
1. Description: Elastomeric compression seal with dimensions to fit inside bell of larger pipe and for spigot of smaller pipe to fit inside ring.

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2.6 CLEANOUTS

A. Cast-Iron Cleanouts:
1. Description: ASME A112.36.2M, round, gray-iron housing with clamping device and round, secured, scoriated, gray-iron cover. Include gray-iron ferrule with inside caulk or spigot connection and countersunk, tapered-thread, brass closure plug.
2. Top-Loading Classification(s): Extra-Heavy Duty.
3. Sewer Pipe Fitting and Riser to Cleanout: ASTM A74, Service class, cast-iron soil pipe and fittings.

B. Plastic Cleanouts:
1. Description: PVC body with PVC threaded plug. Include PVC sewer pipe fitting and riser to cleanout of same material as sewer piping.

2.7 ENCASEMENT FOR PIPING

A. Standard: ASTM A674 or AWWA C105.

2.8 CATCH BASINS

A. Standard Precast Concrete Catch Basins:

1. Description: ASTM C478, precast, reinforced concrete, of depth indicated, with provision for sealant joints.
2. Base Section: 6-inch minimum thickness for floor slab and 4-inch minimum thickness for walls and base riser section, and separate base slab or base section with integral floor.
3. Riser Sections: 4-inch minimum thickness, 48-inch diameter, and lengths to provide depth indicated.
4. Top Section: Eccentric-cone type unless concentric-cone or flat-slab-top type is indicated. Top of cone of size that matches grade rings.
5. Joint Sealant: ASTM C990, bitumen or butyl rubber.
6. Adjusting Rings: Interlocking rings with level or sloped edge in thickness and shape matching catch basin frame and grate. Include sealant recommended by ring manufacturer.
7. Grade Rings: Include two or three reinforced-concrete rings, of 6- to 9-inch total thickness, that match 24-inch diameter frame and grate.
8. Pipe Connectors: ASTM C923, resilient, of size required, for each pipe connecting to base section.

B. Frames and Grates: ASTM A536, Grade 60-40-18, ductile iron designed for A-16 (AASHTO HS20-44), structural loading. Include flat grate with small square or short-slotted drainage openings.

1. Size: 48 by 48 inches minimum unless otherwise indicated.
2. Grate Free Area: Approximately 50 percent unless otherwise indicated.
3. Ballast Screen: Neenah R-7516 or approved equal.

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2.9 CONCRETE

A. General: Cast-in-place concrete in accordance with ACI 318, ACI 350, and the following:

1. Cement: ASTM C150/C150M, Type II.
2. Fine Aggregate: ASTM C33/C33M, sand.
3. Coarse Aggregate: ASTM C33/C33M, crushed gravel.
4. Water: Potable.

B. Portland Cement Design Mix: 4,000 psi minimum, with 0.45 maximum water/cementitious materials ratio.

1. Reinforcing Fabric: ASTM A1064/A1064M, steel, welded wire fabric, plain.
2. Reinforcing Bars: ASTM A615/A615M, Grade 60 (420 MPa) deformed steel.

C. Manhole Channels and Benches: Factory or field formed from concrete. Portland cement design mix, 4,000 psi minimum, with 0.45 maximum water/cementitious materials ratio. Include channels and benches in manholes.

1. Channels: Concrete invert, formed to same width as connected piping, with height of vertical sides to three-fourths of pipe diameter. Form curved channels with smooth, uniform radius and slope.

a. Invert Slope: 1 percent through manhole.

2. Benches: Concrete, sloped to drain into channel.

a. Slope: 4 percent.

D. Ballast and Pipe Supports: Portland cement design mix, 3,000 psi minimum, with 0.58 maximum water/cementitious materials ratio.

1. Reinforcing Fabric: ASTM A1064, steel, welded wire fabric, plain.
2. Reinforcing Bars: ASTM A615, Grade 60 deformed steel.

2.10 PIPE OUTLETS

A. Riprap Basins: Broken, irregularly sized and shaped, graded stone in accordance with NSSGA's "Quarried Stone for Erosion and Sediment Control."
1. Average Size: NSSGA No. R-5, screen opening 5 inches.

PART 3 - EXECUTION

3.1 EARTHWORK

A. Excavation, trenching, and backfilling are specified in Section 312000 "Earth Moving."

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3.2 PIPING INSTALLATION

A. General Locations and Arrangements: Drawing plans and details indicate general location and arrangement of underground storm drainage piping. Location and arrangement of piping layout take into account design considerations. Install piping as indicated, to extent practical. Where specific installation is not indicated, follow piping manufacturer's written instructions.

B. Install piping beginning at low point, true to grades and alignment indicated with unbroken continuity of invert. Place bell ends of piping facing upstream. Install gaskets, seals, sleeves, and couplings in accordance with manufacturer's written instructions for use of lubricants, cements, and other installation requirements.

C. Install catch basins for changes in direction unless fittings are indicated. Use fittings for branch connections unless direct tap into existing sewer is indicated.

D. Install proper size increasers, reducers, and couplings where different sizes or materials of pipes and fittings are connected. Reducing size of piping in direction of flow is prohibited.

E. Install gravity-flow, non-pressure drainage piping in accordance with the following:

1. Install piping pitched down in direction of flow.
2. Install piping NPS 6 and larger with restrained joints at tee fittings and at changes in direction. Use corrosion-resistant rods, pipe or fitting manufacturer's proprietary restraint system, or cast-in-place concrete supports or anchors.
3. Install piping with 36 inch minimum cover.
4. Install corrugated-steel piping in accordance with ASTM A798/A798M.
5. Install PVC sewer piping in accordance with ASTM D2321 and ASTM F1668.
6. Install PVC profile gravity sewer piping in accordance with ASTM D2321 and ASTM F1668.

3.3 PIPE JOINT CONSTRUCTION

A. Join gravity-flow, non-pressure drainage piping in accordance with the following:
1. Join corrugated steel culvert piping in accordance with ASTM A798/A798M.
2. Join PVC profile gravity sewer piping in accordance with ASTM D2321 for elastomeric-seal joints or ASTM F794 for gasketed joints.
3. Join dissimilar pipe materials with non-pressure-type flexible couplings.

3.4 CLEANOUT INSTALLATION

A. Install cleanouts and riser extensions from underdrains to cleanouts at grade. Use cast-iron soil pipe fittings in sewer pipes at branches for cleanouts and cast-iron soil pipe for riser extensions to cleanouts. Install piping so cleanouts open in direction of flow in sewer pipe.
1. Use Extra-Heavy-Duty, top-loading classification cleanouts in Track Paved Areas.

B. Set cleanout frames and covers in earth in cast-in-place concrete block, 18 by 18 by 12 inches deep. Set with tops 2 inches above surrounding earth grade.

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C. Set cleanout frames and covers in concrete pavement and roads with tops flush with pavement surface.

3.5 CONCRETE PLACEMENT

A. Place cast-in-place concrete in accordance with ACI 318.

3.6 CONNECTIONS

A. Pipe couplings, expansion joints, and deflection fittings with pressure ratings at least equal to piping rating may be used in applications below unless otherwise indicated.

1. Use non-pressure-type flexible couplings where required to join gravity-flow, non-pressure sewer piping unless otherwise indicated.

    a. Shielded flexible couplings for same or minor difference OD pipes.
    b. Unshielded, increaser/reducer-pattern, flexible couplings for pipes with different OD.
    c. Ring-type flexible couplings for piping of different sizes where annular space between smaller piping's OD and larger piping's ID permits installation.

3.7 IDENTIFICATION

A. Materials and their installation are specified in Section 312000 "Earth Moving." Arrange for installation of green warning tape directly over piping and at outside edge of underground structures.
1. Use detectable warning tape over nonferrous piping and over edges of underground structures.

3.8 FIELD QUALITY CONTROL

A. Inspect interior of piping to determine whether line displacement or other damage has occurred. Inspect after approximately 24 inches of backfill is in place, and again at completion of Project.

1. Submit separate reports for each system inspection.
2. Defects requiring correction include the following:

    a. Alignment: Less than full diameter of inside of pipe is visible between structures.
    b. Deflection: Flexible piping with deflection that prevents passage of ball or cylinder of size not less than 92.5 percent of piping diameter.
    c. Damage: Crushed, broken, cracked, or otherwise damaged piping.
    d. Infiltration: Water leakage into piping.
    e. Exfiltration: Water leakage from or around piping.

3. Replace defective piping using new materials and repeat inspections until defects are within allowances specified.
4. Reinspect and repeat the procedure until results are satisfactory.

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B. Test new piping systems, and parts of existing systems that have been altered, extended, or repaired, for leaks and defects.

1. Do not enclose, cover, or put into service before inspection and approval.
2. Test completed piping systems in accordance with requirements of authorities having jurisdiction.
3. Schedule tests and inspections by authorities having jurisdiction with at least 24 hours' advance notice.
4. Submit a separate report for each test.
5. Gravity-Flow Storm Drainage Piping: Test in accordance with requirements of authorities having jurisdiction, UNI-B-6, and the following:

a. Exception: Piping with soil tight joints unless required by authorities having jurisdiction.
b. Option: Test plastic piping in accordance with ASTM F1417.

C. Leaks and loss in test pressure constitute defects that must be repaired.

D. Replace leaking piping using new materials, and repeat testing until leakage is within allowances specified.

3.9 CLEANING

A. Clean interior of piping of dirt and superfluous materials. Flush with potable water.

END OF SECTION 334200

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SECTION 334600 - SUBDRAINAGE

PART 1 - GENERAL

1.1 SUMMARY

A. The following provisions of Port of Stockton 'Division 01' General Provisions shall apply to the Work, unless specifically amended in any of the following Sections:
1. Section 01100 Summary
2. Section 01200 Measurement and Payment
3. Section 01250 Modification Procedures
4. Section 01315 Project Meetings
5. Section 01320 Progress Schedules and Reports
6. Section 01330 Submittal Procedures
7. Section 01340 Safety Submittals
8. Section 01410 Regulatory Requirements
9. Section 01420 References and Definitions
10. Section 01500 Temporary Facilities and Controls
11. Section 01540 Site Security and Safety
12. Section 01600 Product Requirements
13. Section 01740 Cleaning
14. Section 01770 Contract Closeout
15. Section 01780 Project Record Documents

B. Section Includes:

1. Perforated-wall pipe and fittings.
2. Drainage material.
3. Geotextile filter fabrics.
4. Cleanouts

C. Related Sections include but are not necessarily limited to:
1. Section 31 12 00 – Earth Moving
2. Section 33 42 00 – Stormwater Conveyance
3. Section 34 11 00 – Trackwork Construction

1.2 ACTION SUBMITTALS

A. Comply with Port of Stockton Division 01 'General Provisions' Sections 01330 and 01340 in addition to the following sections.

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B. Product Data: For each type of product indicated.

PART 2 - PRODUCTS

2.1 PERFORATED-WALL PIPES AND FITTINGS

A. Perforated HDPE Pipe and Fittings:

1. NPS 6 and Smaller: ASTM F405 or AASHTO M 252, Type CP; corrugated, for coupled joints.
2. NPS 8 and Larger: ASTM F667; AASHTO M 252, Type CP; or AASHTO M 294, Type CP; corrugated; for coupled joints.
3. Couplings: Manufacturer's standard, band type.

2.2 SOIL MATERIALS

A. Soil materials are specified in Section 312000 "Earth Moving."

2.3 GEOTEXTILE FILTER FABRICS

A. Description: Fabric of PP or polyester fibers or combination of both, with flow rate range from 110 to 330 gpm/sq. ft. when tested in accordance with ASTM D4491.

B. Structure Type: Nonwoven, needle-punched continuous filament.

1. Survivability: AASHTO M 288 Class 2.
2. Styles: Flat and sock.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine surfaces and areas for suitable conditions where subdrainage systems are to be installed.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 EARTHWORK

A. Excavating, trenching, and backfilling are specified in Section 312000 "Earth Moving."

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3.3 PIPING INSTALLATION

A. Install piping beginning at low points of system, true to grades and alignment indicated, with unbroken continuity of invert. Bed piping with full bearing in filtering material. Install gaskets, seals, sleeves, and couplings in accordance with manufacturer's written instructions and other requirements indicated.
   1. Lay perforated pipe with perforations down.
   2. Excavate recesses in trench bottom for bell ends of pipe. Lay pipe with bells facing upslope and with spigot end entered fully into adjacent bell.

B. Use increasers, reducers, and couplings made for different sizes or materials of pipes and fittings being connected. Reduction of pipe size in direction of flow is prohibited.

C. Fill space below the pipe invert with a layer of drainage course as indicated, upon which the pipe shall be laid with perforations down.

D. Rocks, bricks, broken concrete or asphalt shall not be used to give intermediate support to pipes. Large stones or other hard objects shall not be left in contact with the pipes.

E. Fill excavations for underdrains with drainage course as indicated. Place drainage course and compact as required to fill voids and prevent settlement, without damaging the underdrain pipe.

3.4 PIPE JOINT CONSTRUCTION

A. Join perforated PE pipe and fittings with couplings in accordance with ASTM D3212 with loose banded, coupled, or push-on joints.

B. Special Pipe Couplings: Join piping made of different materials and dimensions with special couplings made for this application. Use couplings that are compatible with and fit materials and dimensions of both pipes.

3.5 CLEANOUT INSTALLATION

A. Comply with requirements for cleanouts specified in Section 334100 "Storm Utility Drainage Piping."

B. Cleanouts for Track Subdrainage:

   1. Install cleanouts from piping to grade. Locate cleanouts at beginning of piping run and at changes in direction. Install fittings so cleanouts open in direction of flow in piping.
   2. In vehicular-traffic areas, use NPS 6 cast-iron soil pipe and fittings for piping branch fittings and riser extensions to cleanout. Set cleanout frames and covers in a cast-in-place concrete anchor, 18 by 18 by 12 inches deep. Set top of cleanout flush with top of pavement grade.
   3. In nonvehicular-traffic areas, use NPS 6 cast-iron pipe and fittings for piping branch fittings and riser extensions to cleanout. Set cleanout frames and covers in a cast-in-place concrete anchor, 12 by 12 by 4 inches deep. Set top of cleanout 2 inches above grade.

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3.6 CONNECTIONS

A. Comply with requirements for piping specified in Section 334200 "Stormwater Conveyance." Drawings indicate general arrangement of piping, fittings, and specialties.

3.7 FIELD QUALITY CONTROL

A. Tests and Inspections:

1. After installing drainage course to top of piping, test drain piping with water to ensure free flow before backfilling.
2. Remove obstructions, replace damaged components, and repeat test until results are satisfactory.

B. Drain piping will be considered defective if it does not pass tests and inspections.

C. Prepare test and inspection reports.

3.8 CLEANING

A. Clear interior of installed piping and structures of dirt and other superfluous material as work progresses. Maintain swab or drag in piping and pull past each joint as it is completed. Place plugs in ends of uncompleted pipe at end of each day or when work stops.

END OF SECTION 334600

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SECTION 341100 – TRACKWORK CONSTRUCTION

PART 1 - GENERAL

1.1 SUMMARY

A. The following provisions of Port of Stockton 'Division 01' General Provisions shall apply to the Work, unless specifically amended in any of the following Sections:

1. Section 01100 Summary
2. Section 01200 Measurement and Payment
3. Section 01250 Modification Procedures
4. Section 01315 Project Meetings
5. Section 01320 Progress Schedules and Reports
6. Section 01330 Submittal Procedures
7. Section 01340 Safety Submittals
8. Section 01410 Regulatory Requirements
9. Section 01420 References and Definitions
10. Section 01500 Temporary Facilities and Controls
11. Section 01540 Site Security and Safety
12. Section 01600 Product Requirements
13. Section 01740 Cleaning
14. Section 01770 Contract Closeout
15. Section 01780 Project Record Documents

B. Section Includes:

1. Jointed rail
2. Continuous welded rail (CWR)
3. Other track materials
4. Fasteners
5. Ballast
6. Ties
7. Turnouts
8. Concrete crossings
9. Asphalt Crossing
10. Steel Casing Pipes
11. Flange Fillers

C. Related Requirements:

1. Section 312000 – "Earth Moving" for track roadbed preparation.

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2. Section 334600 – "Subdrainage" for track underdrains.
3. Section 341105 – "Subballast" for track roadbed subballast.
4. Section 341101 – "Field Welding and Thermal Adjustment" for CWR.

1.2 DEFINITIONS

A. See Port of Stockton Division 01 'General Provisions' Section 01420 for overall project definitions in addition to the sections below.

B. Railroad(s):

1. Union Pacific Railroad (UPRR).
2. Central California Traction Company (CCTC).

C. Owner: Port of Stockton.

1.3 DESCRIPTION OF WORK

A. Provide all labor, materials as specified, equipment, tools, layout survey and incidentals necessary to construct trackwork complete as indicated in the Contract Drawings or as directed by the Owner.

B. Work includes placing and installing rail, ties and ballast, fastening systems, turnouts, tie plates, spikes, anchors, bolts, nuts, washers, insulated joints, grade crossings surfaces, and other track material.

1.4 FUTURE WORK

A. "Port of Stockton Rail Rehabilitation and Upgrades" anticipated Contractor Award Q2 2027.

1.5 REFERENCE STANDARDS

A. Comply with the latest edition of all applicable local, state, and federal codes, including all addenda, specifications, standards, and recommended practices of the documents listed below, except as otherwise indicated:

1. Port of Stockton Track Design Standards, Latest Edition
2. Union Pacific Railroad Industry Track Standards
3. Union Pacific Railroad Safety Rules
4. Union Pacific Railroad General Code of Operating Rules
5. Union Pacific Railroad Engineering Track Maintenance Field Manual
6. Union Pacific Railroad – Instructions governing the Inspection, Welding, Grinding, and Heat Treating of Track Components
7. American Railway Engineering and Maintenance of Way Association (AREMA) Specifications – Manual for Railway Engineering
8. Track Safety Standards of the Federal Railroad Administration
9. CPUC – California Public Utilities Commission General Orders
10. California Department of Transportation (Caltrans) Standard Plans and Specifications
11. Union Pacific Railroad General Specifications.

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1.6 SUBMITTALS

A. Comply with Port of Stockton Division 01 'General Provisions' Sections 01330 and 01340 in addition to the following sections.

B. The Contractor shall submit the following in accordance with the General and Special Conditions:

1. Track Materials: Provide product data for each product indicated.
2. Rail: Certified Mill Test Reports.
3. Shop Drawings: Submit shop drawings and product data for trackwork items not specifically defined by engineering standards.
4. Turnouts: Manufacturer-provided custom geometry layout for turnouts on curves.
5. Equipment: Submit suitability of track construction equipment including equipment manufacturer's specifications. Include equipment specifications for ballast consolidation and tamping equipment.
6. Tools: Submit a list of all track tools and equipment to be employed for installation of rail including rail cutting equipment, rail heating device, and destressing equipment.
7. Material Handling: Submit procedure for transport, stockpiling, and handling of trackwork materials within the limits of the project site.
8. Installation: Submit proposed construction and installation procedure for new trackwork. Contractor may modify the installation procedure stated hereinafter to produce the most efficient method for track installation for approval by the Engineer.
9. Rail End Hardening: Submit rail end hardening procedure.
10. Track Welding: Submit procedure and field welding material technical data for field welding rail.
11. CWR Destressing: Submit method and procedure for thermal adjustment of CWR.
12. Rail temperature anchoring record and rail destressing reports.

1.7 QUALITY ASSURANCE

A. Construction Supervision: The track construction shall be progressed with skilled supervision and labor and the Contractor shall assemble the track material in such a manner as may be required by the Engineer. Any supervisor or laborer not satisfactory to the Railroad or the Owner shall be removed from the project at the request of the Engineer.

B. Inspection of Subballast: This inspection should be made just prior to track laying. Track construction shall not commence until the engineer has approved the subballast.

C. Damage and Restoration: The Contractor shall perform hauling, loading and unloading operations as well as track construction in such a manner as to cause no damage to the roadbed, ditches, shoulders, slopes, drainage pipes, risers, drop inlets, roads and any other facilities. Any damage to the forgoing shall be repaired or replaced, where necessary, in a manner satisfactory to the Engineer and at the expense of the Contractor. In making repairs and replacement, equivalent materials shall be used, and the method of placement shall be as directed by the Engineer.

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1.8 TRACK TESTING

A. Tracks will be subjected to frequent inspection, measurement and operational tests by the Owner and Railroad after completion of installation but prior to final acceptance of the work.

B. During the installation and testing period, all personnel, equipment, and materials necessary to make corrections to the track shall be available for replacements, re-ballasting, resurfacing and realigning, or repair of constructed items, as the Engineer may direct to ensure proper completion of the work in accordance with the Contract at the Contractor's cost for compliance with the specifications.

1.9 ADJUSTMENTS

A. Railroad track will be subject to a 'break-in' period after construction is complete. Contractor shall be responsible for the correction of track alignment and final adjustment of turnout components for up to 12 months after the facility has been completed and turned over to the Owner.

B. Adjustments will be made only for items requiring adjustment due to 'breaking-in', but not for damage as the result of derailments or adjustments made by the railroad following construction.

C. Adjustments shall be coordinated with the Owner such as to cause minimal disruption of railroad operations. The cost of these final adjustments shall be considered part of the price of track and turnout construction.

D. Adjustments shall include, at a minimum, out-of-face resurfacing of all trackwork and all turnouts.

1.10 WORK TRAIN SERVICE

A. The Railroad may deliver materials to the site by rail. The Contractor shall be responsible for all coordination and arrangements with the Railroad regarding material shipments to the site. The location where cars are to be spotted, unloaded, and picked up shall be the Contractor's sole responsibility. However, approval of the plan must be received from the Engineer and Railroad.

B. The Contractor shall provide all labor and work trains (or car pullers) required for all work associated with the unloading and distribution of materials.

C. No work train shall operate over any track, completed or skeletonized, without the prior approval of both the Owner and the Railroad designated representative.

D. The cost to re-rail, and repair derailed equipment, as well as the cost to repair track, civil construction damage or other related damage, is the sole responsibility of the Contractor.

E. The Contractor may use its own equipment, locomotives and personnel for work train service.

F. The cost of Work Train Service will not be paid for separately and shall be considered incidental to the Work included in the Construction Documents.

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G. The Contractor shall collect all material cars when empty and place on a track designated by the Owner and/or Railroad for pick up by Railroad. The cars shall be coupled together and ready for movement.

H. Material cars shall be unloaded promptly and spotted for pick up as soon as reasonably possible.

PART 2 - PRODUCTS

2.1 CONSTRUCTION EQUIPMENT

A. Contractor shall submit with their bid a preliminary list, with a final list within 10 working days of Notice to Proceed, indicating what track construction equipment will be used on this project.

B. If the Engineer determines that Contractor's equipment is not in good working condition or that the kind, size, capacity or quantity of equipment is incapable of contributing to the work progress or to the requirements of the drawings and specifications, the Contractor will be directed to promptly replace the equipment with an improved kind, type, size, capacity, or quantity. Rejection of equipment shall not be considered justification for a delay claim.

C. Equipment shall operate within the track clearance outlined, except as otherwise indicated. Equipment shall be compatible with the clearances indicated in Railroad Standard Plans and Engineering Instructions.

D. Wheel contours of all rail-mounted equipment shall conform to the Association of American Railroads (AAR) wheel standards or AREMA maintenance of way equipment wheel standards.

E. All construction loads shall be applied between gauge lines of running rails on each track. Single-wheel loads shall not exceed 16,000 pounds.

F. Surfacing equipment shall have switch-tamping capabilities.

G. Surfacing equipment shall have all tamping feet in place and operational during surfacing operations.

2.2 TRACK TOOLS

A. Furnish tools and equipment necessary to construct the track.

B. Track gauges, track levels, and other tools shall conform to the AREMA "Specifications and Plans for Track Tools" and Railroad Standards.

C. Tools and equipment shall be maintained in a safe condition so as not to damage the work or impair their safe usage and shall be subject to inspection by the Engineer.

D. Tools not conforming to standard shall be "dressed" to AREMA standards or shall be replaced. Substitution of tools other than AREMA or Railroad standards shall be permitted only with the owner's approval.

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2.3 TRACK MATERIALS

A. The Contractor shall be responsible for furnishing all track material and associated parts, tools, and equipment necessary to complete the Work included in the Contract Documents.

B. All track materials shall meet or exceed all Railroad standards.

C. No track materials will be supplied to the Contractor by either the Owner or the Railroad.

D. The track material shall consist of, but not be limited to the following:

1. Continuously Welded Rail (CWR): Port Lead Track on Curves
2. Jointed Rail: Port Lead Track on Tangent, Yard Track on Tangent and Industry Spur Tracks
3. Wood Ties
4. Elastomeric fasteners for use on wood ties
5. Tie Plates
6. E-Clips
7. Cut Spikes, Lock Spikes
8. Screw Spikes
9. Rail Anchors
10. Track Bolts, Nuts, and Spring Washers
11. Joint Bars, Compromise Bars, Insulated Joint Bars
12. Insulated Plugs
13. Ballast - Main Line and Yard Ballast, Walkway Ballast
14. UPRR Class 3 Ballast Access Road/Walkway
15. Turnouts (complete with Switch Stand or Switch Machine and appropriate operating rods)
16. Switch Point Protectors
17. Grade Crossing Surfaces (Prefabricated Timber Crossing Panels)
18. Grade Crossing Surfaces (Prefabricated Concrete Crossing Panels)
19. Grade Crossing Surfaces (Field-Measured Custom Concrete Crossing Panels)
20. Field Welding Kits
21. Rubber Flangeway Filler

2.4 MISCELLANEOUS MATERIALS

A. The Contractor shall provide all additional materials not listed above that are required for the completion of the Work by the Contract Documents.

B. Material for Construction: The Contractor shall provide, at no additional cost to the project, all materials required for construction whether it remains in the final project or not. As an example, this material includes but is not limited to materials necessary for the construction of track prior to field welding such as temporary joint bars, track bolts, nuts, and lock washers.

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2.5 RAIL

A. All rail shall meet Railroad standards and the following minimum requirements. All rail is subject to approval by the Engineer.

1. New 136 lb**.** RE, IS (Head-Hardened) CWR is required on Port Lead Tracks tracks through all curves greater than 7 degrees 30 minutes, meeting or exceeding AREMA Class 1 specifications, as shown on Drawings.
2. New 136 lb**.** RE, IS (Head-Hardened) Jointed Rail is required on Port Lead tangent sections, yard tracks, and in all turnouts placed on Port Lead Track, meeting or exceeding AREMA specifications, as shown on Drawings.
3. New 115 lb. RE IS (Head-Hardened) jointed rail in industry spur tracks, and turnouts not placed on Port Lead Track meeting or exceeding AREMA specifications.
4. Head-free (HF) rail is not acceptable.
5. New IQ rail is acceptable for 115 lb. RE joined rail segments provided, it meets AREMA dimensional specifications.
6. Relay Rail: Contractor may reuse 112 lb. RE rail or heavier, removed along Port Lead Track as part of this project, for other tracks for the project, provided the measured rail wear classifies it as No. 1 relay rail per AREMA standards.

2.6 TIES

A. All ties shall be new creosoted Oak or Douglas Fir and meet UPRR and AREMA standards. Softwood ties are not permitted.

B. Wood ties shall be AREMA No. 5 (7”x9”) and 8’-6” long for Port Lead Track (LD01 and LD02).

C. AREMA No. 5 (7”x9”) and 8’-0” long wood ties are acceptable on other tracks.

D. Wood ties for crossings and transition ties shall be hardwood AREMA No. 5 (7”x9”) and 10’ long.

E. All cross-ties shall have an approved gang nail anti-splitting device on each end per AREMA standards.

2.7 TURNOUTS

A. Port Lead and Yard Track: All turnouts shall be constructed with new 136 lb. RE minimum material per Common Standards of the size and frog type noted on the plans. All turnouts shall be insulated.

B. Other Tracks: All turnouts shall be constructed with new or certified reconditioned 115 lb. RE minimum material meeting Railroad Industrial Track Standards of the size noted on the plans.

C. Switch points shall be Sampson Points.

D. Frogs shall be railbound manganese (RBM) or as indicated on plans.

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E. All turnouts are to include Railroad standard manual switch stands, Racor 36E (Yard) or 36EH (Port Lead Tracks) with appropriate operating rods.

F. All turnouts shall have an extended heel block with a 15-foot adjustable guardrail.

G. Turnouts on Curves: Contractor to coordinate with manufacturer to review site conditions and obtain a proposed custom turnout geometry layout from the manufacturer for the turnouts proposed on curves as shown on drawings. Contractor to provide the manufacturer drawing to Engineer and Railroad for review and approval.

2.8 TIE PLATES

A. Tie Plates shall be new or certified secondhand, double shoulder plates no smaller than 2 times the width of the base of the rail and free of injurious defects and foreign material, conforming to minimum 6-hole punches per UPRR STD DWG 0461 and meet AREMA specifications.

B. Rolled tie plates for use with e-clips shall be new or certified second-hand with a minimum width of 16” and a minimum of 4 each 1” round holes per UPRR STD DWG 0469 and meet AREMA specifications.

C. Victor Plates shall be 16” wide per UPRR STD DWG 0468 and meet AREMA specifications.

2.9 ELASTIC RAIL CLIPS

A. Elastic rail clips for use with rolled plates shall be new e2055 clips per UPRR STD DWG 0436 and meet AREMA specifications.

2.10 RAIL ANCHORS

A. Rail anchors shall be new or certified secondhand bar stock anchor per UPRR STD DWG 0439 or heavy-duty rail anchor per UPRR STD 0419 and meet AREMA specifications.

2.11 SPIKES

A. All spikes shall be 5/8” x 6” cut spikes per UPRR STD DWG 0416 and meet AREMA specifications.

2.12 LAG SCREWS FOR USE WITH ROLLED TIE PLATES

A. Lag screws for use with rolled tie plates shall be new rectangular head timber coach screw per UPRR STD 0431 or evergrip lag screw per STD DWG 0418 and meet AREMA specifications.

2.13 TRACK BOLTS, SPLIT WASHER, AND SQUARE NUT

A. Track bolts, split washer, and square nut shall be new and appropriate size for rail section per UPRR STD DWG 0941 and meet AREMA specifications.

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2.14 JOINT BARS

A. Non-insulated joint bars shall be new or certified second hand and shall be forged, toeless/head-free, 6-hole, 36" in length to match rail section per UPRR STD 0901 and meet AREMA specifications.

B. Insulated joint bars shall be new poly insulated, 6-hole, 36" minimum in length to match rail section per UPRR STD 0905 and meet AREMA specifications.

2.15 COMPROMISE JOINT BARS

A. Compromise joint bars shall be utilized when rails of dissimilar rail sections are connected. Compromise joint bars shall be new or certified second-hand and shall be forged, with a minimum of 6 holes, to match the rail section per UPRR STD 0902 and meet AREMA specifications. The following compromise joint bars will be used for this project:

1. 136RE – 115RE
2. 136RE – 112RE
3. 115RE – 112RE

2.16 BALLAST

A. Ballast shall be UPRR Class 2 per UPRR STD DWG NO. 0010A for all tracks.

B. Walkway ballast shall be UPRR Class 1 per UPRR STD DWG NO. 0008A, or screenings as approved by the Owner and in accordance with Railroad standards and CPUC requirements.

C. Access Road shall be UPRR Class 3 Ballast per UPRR STD DWG NO. 008A.

D. Material properties and placement for new imported ballast should meet the requirements and specifications presented in UPRR. A number of AASHTO and ASTM gradations are similar to UPRR's and may be acceptable for use if UPRR gradations are not readily available.

E. Ballast shall be quarried rock crushed to the gradation meeting Railroad criteria and free from loam, dust and other foreign particles, with fully fractured faces.

2.17 PREFABRICATED TIMBER CROSSING PANELS

A. Grade crossing shall utilize prefabricated timber panels per UPRR STD DWG NO. 0301A, unless indicated otherwise on plans.

B. Material Specifications, tolerances, finish, and testing shall be per UPRR STD DWG NO. 0301A.

2.18 PREFABRICATED CONCRETE CROSSINGS

A. Grade crossing shall be precast concrete, shunt-resistant, steel-clad panels for 10-foot long wood ties conforming to the Railroad standard drawings.

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B. Grade crossing panels shall be 8 foot 1-1/2” in length measure along the track center line and shall conform to the 19-1/2" tie spacing requirement.

C. Panels placed in curves exceeding 3 degrees shall be manufactured curves panels to match the degree of curvature of the track.

D. Minimum 28-day compressive strength shall be 6,000 psi.

2.19 ASPHALT CROSSINGS

A. Asphalt crossings shall be provided with 4” minimum hot mix asphalt and extending minimum 2’-6” past nearest rail, per UPRR STD DWG NO. 0302 where specified on plans and meet AREMA standards.

B. Crossties shall be 8’-6” long and spaced 19.5” o.c. at asphalt crossings.

C. Spray track coat shall ebe per Caltrans specifications.

D. Asphalt crossings shall install rubber flangeway fillers at all asphalt road crossings in accordance with UPRR Standard Detail 0302. Fillers shall be placed to ensure a smooth transition between rail and asphalt. Refer to UPRR Standard Drawings and Specifications for more information.

2.20 STEEL CASING PIPES

A. Casing pipes shall meet the material properties specified in the AREMA Manual for Railway Engineering standards.

B. Casing pipe and joints shall be so constructed as to prevent leakage of any substance, capable of withstanding railroad loading. The inside diameter of the casing pipe shall be great enough to allow the carrier pipe to be removed subsequently without disturbing the casing pipe or roadbed.

C. Steel casing pipe shall have a specified minimum yield strength of at least 35,000 psi.

2.21 RAIL LUBRICATORS

A. The rail lubricator shall be a solar powered Portec Model Protector IV GF, including all appurtenances such as the environmental Catch-All Track Mat.

2.22 TIE PLUGS

A. Tie plugs used for filling holes in cross ties where spikes have been removed shall be 5/8" x 4-1/2" and be made of Cedar.

2.23 RUBBER FLANGEWAY FILLER

A. Flangeways gap between the rail gage and pavement shall not exceed 3 inches in width.

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B. Flangeway Fillers for Asphalt Crossing Surface: Hi-Rail RS Rail Seal, Omni Rail-Guard VRA or approved equivalent.

2.24 INVENTORY OF MATERIAL

A. All material delivered will be counted and recorded as it is unloaded by the Contractor and quantities checked against the waybill. Any discrepancies are to be reported immediately to the Owner. If the quantities check, the Contractor or their Superintendent will sign for the material and the Contractor is then responsible for the material. A copy of the inventory sheets showing the car number, date received, material inventoried from the car or truck, and storage location, if stored, shall be furnished to the Owner. Any shortage or overage of materials shall be immediately reported to the Owner.

PART 3 - EXECUTION

3.1 GENERAL REQUIREMENTS

A. All work shall be completed in accordance with Railroad Standard Plans and Engineering Instructions.

3.2 TRACK LAYOUT

A. All field track survey layout, both horizontal and vertical, shall be by the Contractor and included in the unit track price. Stakes shall be reset by the Contractor for alignment and top of rail elevation before the finishing lift is made. The final track surface, cross-level and line shall not deviate from the plans and stakes by more than the following:

1. The deviation from uniform profile on either rail at the mid-ordinate of a 62-foot chord may not be more than one half (1/2) inch.
2. Deviation from zero cross-level at any point shall not be more than one quarter (1/4) inch.
3. The difference in cross-level between any two points less than 62 feet apart on tangents or curved track may not be more than three eighths (3/8) inch.
4. Deviation of final line on tangent or curved track shall not exceed one half (1/2) inch in terms of the difference between measured and theoretical mid-ordinates of a 62-foot chord.

3.3 ROADBED PREPARATION AND DRAINAGE

A. Clearing and grubbing, grading, excavation, embankment preparation, drainage, subgrade preparation and subballast are specified elsewhere.

B. Where the subgrade or roadbed is damaged during distribution of materials, ruts and depressions shall be filled and compacted and the roadbed surface leveled by the Contractor. The damaged roadbed shall be re-approved by the Engineer prior to track construction. No additional compensation will be given for this work.

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C. Notify Owner and Railroad for inspection of the roadbed prior to the start of track construction. Track construction shall not commence without the Owner and Railroad approval of the condition of the roadbed.

3.4 PROTECTION

A. Existing Tracks to Remain: Protect adjacent tracks, turnouts, derails, walkways and other track facilities during constructions operations.

1. Do not interrupt existing track operations unless authorized in writing by Owner and Railroad.

B. Track Cut-Over by Contractor: Obtain written approval from Owner and Railroad for any track cut-over windows.

1. Provide written schedule to Owner and Railroad detailing the timeframes for proposed track outages at least 4 weeks in advance of proposed cut-over.
2. No track cut-over shall be performed unless authorized in writing by the Owner and Railroad.

3.5 TIE INSTALLATION PROCEDURES

A. Cross ties and switch ties shall be handled to avoid breaking or bruising. They shall not be thrown from cars or trucks onto rails, other track material or rocks. Moving and placing ties with picks, spike mauls, sledges, or shovels is prohibited. Surfaces damaged, cut, or drilled in the field shall be coated with creosote or coal tar creosote.

B. Port Lead and Yard Track shall have timber cross ties spaced at 19.5 inches center-to-center, or as shown on the Railroad Standard Plans for turnouts, transition areas, and road crossings.

C. Industry Spur Tracks shall have timber cross ties spaced at 21.25 inches center-to-center.

D. Ties shall be installed in such a manner that there is a tie under each joint as defined in the FRA Track Safety Standards (except in CWR areas where ties are not allowed under field welds). Turnout ties shall be spaced according to the Engineering Track Standard Turnout Plans.

E. Switch ties, crossing ties, and bridge ties shall be spaced as indicated on the Drawings and in accordance with Railroad standards.

F. Ties shall be laid perpendicular to the centerline of the track with the grain up (heartwood side down). The best ties shall be used at the rail joints. The ends of ties on one side of the track shall be parallel to the rail so that the center of the tie will be on the approximate centerline of the track. The ends shall be aligned on the inside of curves and shall continue on that side until reaching a curve in the opposite direction.

G. Ties shall be placed and maintained square to the line of rail on straight track and radially on curves. The hooks or tongs shall be lined parallel with the rail. The hooks or tongs shall be used in handling ties instead of picks, spike mauls, sledgehammers or other improper tools to avoid injuring the ties. New treated ties must not be adzed without authority from the Engineer. If adzing is authorized, an approved preservative shall be applied to the adzed surface.

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H. For timber cross ties, adzing shall be restricted to that necessary to provide a sound true bearing for the tie plate and approved by the Engineer. Adzing in excess of 0.2 in. shall not be permitted. Where adzing is necessary, completely saturate the cut surface with creosote or other approved preservatives.

I. Ties damaged as a result of improper handling by Contractor and rejected by the Engineer shall be removed and replaced with undamaged ties at no additional cost to the Owner. The cost of replacement ties is the responsibility of the Contractor.

J. Grade crossing ties shall be 10 foot long and shall extend for a distance of 10 ties beyond the ends of the crossing panels. These ties are to be spaced on 19.5-inch centers and shall be installed with pandrol fastenings. Tie spacing must be adjusted to support the ends of the panels.

3.6 TIE PLATES

A. Timber Ties

1. Tie plates must set squarely on the tie and shall be of the dimensions to fit the base of rail used. All tracks shall be fully tie plated and spiked in accordance with the proper criteria. Tie plates shall be centered and have full bearing on ties. Rail shall be properly seated in the tie plates and not riding on the shoulder of the tie plate.
2. Tie plates shall be free of dirt and other foreign material when installed.
3. Canted tie plates shall be installed so as to cant the rail inward.
4. Rolled tie plates for use with e-clips shall be used within the limits of precast concrete panels and approach ties.
5. Curve blocks shall be used on curved track segments greater than 3 degrees.

3.7 RAIL

A. Unloading Jointed Rail: Rail must not be dropped from cars but must be unloaded with an authorized device. Jointed rail shall be distributed in upright position convenient for tonging into place. Rail must be so placed that it will be below top of rail of track to be laid. Rails to be handled with machine must be center marked to indicate proper location for application of rail tongs.

B. Hoisting Jointed Rail: When handling rail, tongman, groundman and any other employee must always face the direction of rail movement. Employees must not turn their back on rail being handled. The hoisting line should be in a vertical position over center of rail when lifted from ground to minimize end motion and swinging.

1. In addition to a tongman, one or two tailmen with tag lines will be assigned, when necessary, to steady the rails being lifted to or from car. When loading cars and tongman cannot be seen by the operator, the tailmen in view of the operator must relay signals from the tongman. The tongman and tailmen must step well into clear while rail is being hoisted and deposited inside car.
2. When unloading and distributing rail, tongman and at least one additional employee will be used in handling rail from car. Rails must be swung from car in a level position.
3. In handling rails from ground on stockpile to car, tongman, after applying tongs, shall signal operator of machine to take slack out of line to hold tongs in position. Tongman

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shall then step into clear and signal operator to hoist rail. Spreader bar will be used when handling rails exceeding 48 feet in length.

C. Unloading of CWR Strings

1. The Contractor shall be solely responsible for unloading all welded rail. If the Contractor has the CWR delivered to the site on rail, it shall be on CWR trains. The Contractor shall provide for the handling and laying of welded rail strings in such a manner as to avoid damage to the roadbed, sub-ballast and rail strings. Care must be taken to avoid twisting or damaging the welded rail strings. The speed of unloading welded rail strings shall not exceed 4 MPH. Guide rollers shall be placed in pairs about every 39 feet for the entire length of each string at the unloading end of the rail train. This will carry the welded strings from the cars in a gradual are not deforming the rail. In areas where new construction is adjacent to existing track, continuous welded rail may be unloaded using a threader car and pulling away from the rail. The Contractor shall provide such equipment, tools and materials as necessary and in common practice for welded rail track construction. It may be necessary for the Contractor to move the welded rail strings to the exact location of installation. The Contractor shall furnish such additional equipment and supplies as may be required to handle and place the CWR strings and the cost thereof included in the unit price for track construction.
2. Rail, which is staged for installation, shall be placed with one string on either side of the ties at a sufficient distance to not impede the Work. Welded rails shall be positioned for installation in a manner to minimize handling and to prevent buckling. Rail shall be stored and staged for installation with the base-side down. Care shall be taken to avoid placing rails on manhole covers, electrical connections or near any other installation that could be susceptible to damage.
3. CWR and continuous bolted strings of rail shall be handled in accordance with Union Pacific Railroad Chief Engineer’s instructions, using special equipment provided for that purpose.
4. CWR must not be unloaded where it would obstruct a grade crossing and must either be cut or buried through it.
5. When unloading CWR, joint straps shall be removed, rail ends by-passed when necessary and wooden blocks or shims shall be placed between rail ends to accommodate thermal expansion of rail.

D. CWR Installation

1. CWR will be placed on the tie plate/rail seat using guide rollers, or rail crane. Under no circumstances will the rail be struck with a spike maul, sledgehammer, or other device as a means of adjustment for installation.
2. Once seated, rail shall be affixed to the tie using cut spikes or mechanical fastening system per Railroad Engineering Instructions.
3. Where timber ties are employed, one rail will be laid first, and fully fastened before the second rail is installed.
4. In advance of the rail anchoring, an approved rail thermometer shall be used to determine rail temperature. Thermometer shall be placed on web or base of rail shaded from the sun and left long enough to record the rail temperature accurately. The temperature shall be checked frequently. All rail thermometers shall be checked for accuracy. Rail

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temperature shall be recorded by the Contractor and recorded for reference during destressing operation. The air and rail temperature at the time of anchoring shall be painted on the web of the rail with four (4) inch letters. As an example: A98°R102° will indicate an air temperature of 98°and a rail temperature of 102°. The marking should be made with a type of permanent paint. Record of temperature will include the rail temperature, ambient air temperature, weather conditions at time of construction, and a means of definite identification of rail location. A copy of rail laying temperature records shall be submitted to the Engineer not more than 24 hours after rail has been laid, and prior to CWR destressing.

5. Rail shall be de-stressed at the required temperature only after final track line and grade has been achieved, or as directed by the Engineer.
6. Rail shall be anchored, after the rail has been destressed at the required temperature, as required per Railroad Engineering Instructions and only after final track line and grade has been achieved, or as directed by the Engineer.
7. The ends of CWR strings will be connected using joint bars prior to ballasting operation. Rail ends will be drilled per these specifications, OMITTING THE HOLE CLOSEST TO THE END OF EACH STRING.
8. Tools used for field cutting rails shall be approved rail saws or abrasive cutting wheels. Rail cutting will be performed in accordance with this specification. Cutting torches shall not be used on rail. Any rail damaged by torches shall be rejected and removed from the track.
9. No rail shorter than 18 feet will be allowed except for temporary closures and transition rails.

3.8 RAIL JOINTS

A. Placement: The joints in opposite rails shall be staggered one-half the rail length but not less than 12 feet apart, except closer joints may be required at turnouts and insulated joints. Rail less than 18 feet in length shall not be installed in track. No joint shall be less than 6 feet from the ends of open-deck bridges, or less than 3 feet from switch points. No joint shall be installed within 20 feet of a road crossing, outer perimeter of any structure, or any location which restricts access to the joint. Where joints are required in these areas, the joints shall be welded.

B. Drilling

1. Rail ends for bolted joints shall be drilled in accordance with Railroad Engineering Instructions. Any additional holes in rail will be sufficient cause for rejection.
2. Holes for complete bolting of cut rails shall be drilled with an approved type of rail drill. Under no circumstances shall new holes be drilled between two holes already drilled. Cutting rails or drilling holes in rails by means of acetylene or electric torch will not be permitted.
3. No holes closer than five (5) inches from the weld will be permitted in the rail. The distance is measured from the cut face to the closest edge of the hole unless authorized by the Engineer.
4. A variation of 1/32 inch in size and location of bolt holes will be allowed.
5. Holes shall be located with the proper size rail-drilling template and marked with a center punch prior to drilling. Drilling through joint bars is prohibited.

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6. Lubricating coolant must be used during the drilling operation. All burrs and fins must be carefully removed by grinding.

C. Rail Expansion Shims

1. Expansion shims must be used to establish the proper opening between rails. At joints, the opening between rail ends must be as shown in the following table:

Rail Temperature	39 Ft. Rail Opening	78 Ft. Rail Opening
Below 25° F	1/4”	1/2”
25° F to 50° F	3/8” every other joint	3/8”
51° F to 75° F	1/8”	1/4”
76° F to 100° F	1/8” every other joint	1/8”
Above 100° F		1/8” every other joint

2. Rail thermometers of the approved type must be used to determine the rail temperature and being provided.
3. EXCEPTION: Expansion shims must not be used at the ends of strings when laying CWR.

D. Rail Cutting

1. Rails shall be cut square and clean by means of rail saws and cleaned a minimum distance of six (6) inches from the end with torch and wire brush to free the area of grease, rust, and other foreign materials.
2. All rail ends to be cut must be supported.
3. Contractor will not cut rail strings except as required to fit rail to turnouts or crossings.
4. Rail shall be cut with rail saw to a tolerance of 1/32 inch from square. All burrs shall be removed and ends made smooth. Torch cut rails will be rejected.
5. Where the running surface of rails at joints are battered or mismatched by more than one sixteenth (1/16) inch, the Contractor shall build up or grind and profile the rail per Railroad Company Instructions Governing the Inspection, Welding and Heat Treating of Track Components. A rail of larger section shall not be ground down to match the lesser, instead the lesser shall be built up.
6. When laying rail up to switches, a combination of rails less than standard length shall be used to avoid cutting, if practicable. Rail saws shall be used when necessary to cut rail. The use of a torch or track chisel will not be permitted. Rail cutting and shall utilize proper lubrication and coolant. When necessary to cut second hand rail, the cut end shall be beveled. When necessary to cut new standard carbon rail, the cut end shall be end hardened and beveled in accordance with Railroad Company Instructions Governing the Inspection, Welding, Grinding, and Heat Treating of Track Components.

E. Rail End Hardening

1. All permanent rail joints shall be field end hardened in accordance with the AREMA Manual, Chapter 4, Rail, Part 2, Specifications - "Specifications for Steel Rails," Supplementary Requirement, End Hardening.

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F. Joint Bars

1. Joint Bars must be well-oiled and properly applied with full number and correct size of bolts, nuts and spring washers. Joint bolts must be properly tightened before spiking rail and the two center bolts will be tightened in advance of the end bolts.
2. Bolts shall be placed with the nuts alternatively on the inside and outside of the rail. Nuts must be placed with the flat side toward the rail. Track bolts, joint bars and finishing surfaces of rails at joint bars shall be swabbed with oil.
3. Bars shall be properly seated in the rail and the full number of correct-size bolts, nuts, and spring washers installed. Every bolt and nut shall incorporate a lockwasher. Bolts shall be tightened to torque of approximately 650 ft-lbs, beginning at the center of the joint and working both ways to the ends of the joint. After the track has been in service all bolts shall be checked and re-tightened to a torque of approximately 650 ft-lbs.
4. The application of lubricants and general maintenance of rail joints in jointed-rail territory are necessary to ensure that the rail is working properly to accommodate rail expansion and contraction resulting from temperature variations, and prevent the occurrence of track buckles or sun kinks and pull-aparts. Joint bars and rail ends must be cleaned and lubricated with an approved joint lubricant when installing joint bars. Joints must be installed with the full number of bolts and the nuts tightened to the proper tension.
5. When laying new or second hand jointed rail, or constructing new track using jointed rail, the contact surface of the rail ends and joint bars shall be lubricated using a liberal amount of approved lubricant.
6. To maintain free rail movement in existing joint rail territory, joint area must be thoroughly lubricated along all marring surfaces and into the interior of the bars, using a Hudson sprayer or equivalent. Frozen joint conditions shall be corrected by loosening the bolts and breaking the bars free from the rail to permit proper oiling and ensure free rail movement within the joint.

G. Insulated Joints

1. Insulated joints shall be installed per the manufacturer's instructions and Railroad Engineering Instructions. Insulated joints shall not be installed prior to destressing CWR.

H. Compromise Joints

1. At permanent connections of different rail sections, compromise joints or compromise welds shall be installed in accordance with the Railroad Engineering Track Standards, and where practicable they shall not be located in crossings, main track curves, or in turnouts.
2. Compromise Joints are required at all locations between the ends of rail of different weights or cross sections. The Contractor shall install all compromise joints as directed by the Engineer. Installation of compromise joints shall be considered incidental to track laying and no separate payment made, therefore. Compromise joints shall not be placed within the limits of turnouts.

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3.9 RAIL FASTENERS

A. Cut Spike Installation

1. Rail shall be spiked per Railroad Engineering Instructions and in accordance with Engineering Track Standards Drawing 0453 UPRR. All track spikes are to be the proper size, with square reinforced throat design, conforming to the current Railroad Specifications.
2. Tie plates shall be adjusted as necessary so that the spikes can be driven into the predrilled spike holes in the ties. Care shall be taken to make sure that the base of rail is not riding on the shoulder of the tie plate when spikes are driven. Spikes shall be started, driven vertically, and square when driven into the spike holes of the tie plate. Push or hydraulic spikes shall not be used, but percussion spikes will be allowed. Crooked or bent spikes shall be removed and replaced. When spikes are pulled, the hole shall be plugged with a standard treated tie plug. In driving the spikes, the last few blows of the hammer shall be such that the spike head will not be bent or broken, and the hammer shall not be permitted to strike directly upon the rail. Spikes shall not be driven at rail joints until all bolts in the joints have been installed and tightened. Spikes shall not be driven against the ends of joint bars. Good secondhand spikes may be used as hold-down or rattle spikes.
3. All special switch plates, frog plates and guardrail plates in all turnouts and crossings frogs must be fully spiked (i.e., all spike holes filled)
4. Spikes shall not be installed through the slots in skirted-type, slotted joint bars (angle bars). No spikes shall be driven against the ends of joint bars.
5. Whenever possible, new spikes should be used for rail spikes and secondhand spikes should be used for hold-down spikes. Additional rail spikes may be driven in lieu of hold-down spikes through road crossings or at other locations where hold-down spikes cannot be installed. When only two rail spikes per plate are required, gauge and field side spikes will be staggered so they do not fall directly across from each other. Where possible in eight-hole tie plates, hold-down spikes will be staggered so they do not fall directly in line with the rail spikes on the same side of the tie plate. In six-hole tie plates, rail spike holes punched the greatest distance from the edge of the tie plate will be used in preference to holes nearer the edge of the plate. Whenever possible, field and gauge side rail spikes must be installed in corresponding tie plate spike holes in consecutive ties resulting in a uniform spiking pattern.
6. Where spiking cannot be accomplished in accordance with the above due to lack of sufficient spike holes in smaller tie plates, spiking shall be made to maximum extent tie plates permit. Curve blocks or other approved fasteners may be used in lieu of or in conjunction with track spikes as authorized by the Union Pacific Railroad Chief Engineer.
7. Care shall be taken not to strike rail or fastenings when driving spikes. Bent spikes shall be removed and the spike hole treated and plugged per these Specifications. A new spike should then be driven in the available adjacent hole.

B. Elastic Fasteners: Galvanized elastic fasteners will be installed in grade crossings per manufacturer's instructions and Railroad Engineering Instructions. Where special tools are recommended for the attachment of rail clips, the Contractor shall supply such tools at no additional cost to the Owner.

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C. Screw and Lock Spike Installation: Screw and lock spikes will be installed per UPRR Engineering Instructions. Ties must be pre-bored and treated prior to installation of spikes. Any tie, which is bored clear through (holes on more than one face), will be replaced at the Contractor's expense.

D. Track Bolts, Nuts and Spring Washers: Track bolts, with nuts, which have wrench turn fittings, shall be used. Spring washers shall be the correct size to fit the bolt. All bolts shall be tightened with the approved bolt machine or torque wrench to a torque of 650 foot-pounds. If a track wrench is used, the nut must be tightened until the spring washer is fully compressed. Bolting shall be started with the center bolts working toward the ends and all nuts shall be turned up tight with bolt heads staggered inside and outside of the rail alternatively. All joint bars, rail ends, bolts, nuts and washers to be well covered with a lubricant coating as approved by the Engineer. All bolts will be rechecked for proper torque, before the track will be accepted by the Union Pacific Railroad.

E. Tie Plugs: If spikes are withdrawn, the holes shall be swabbed with creosote or approved wood preservative substitute and plugged with creosoted tie plugs of proper size to fit the hole. If spikes are withdrawn and spikes are to be reinserted in existing spike holes, the holes shall be swabbed with creosote or approved wood preservative substitute prior to re-driving the spike. Tie plugs shall not be installed in pre-bored holes unless spikes have been driven and withdrawn.

3.10 RAIL ANCHOR INSTALLATION

A. Rail anchors shall be in accordance with anchor pattern No. 2 per UPRR Standard Drawing 0420.

B. Rail anchors shall be installed after the ballast operation and the track is raised, lined and ties re-spaced. Under no circumstances shall rail anchors be installed on ties under or immediately adjacent to rail joints, nor shall anchors be installed on one side of the tie under one rail and on the opposite side of the tie under the other rail. Care shall be taken to avoid overdriving or damaging anchors and shall be installed per rail anchor manufacturer's specifications. Anchors shall not be driven or slid along the rail.

C. Rail anchorage shall be box anchored on every other tie.

D. Sufficient rail anchors shall be applied and maintained to effectively control longitudinal rail movement. Anchors shall be installed on the same side(s) of the tie on both rails. Anchors must not be applied to one rail only but must be applied to both rails in a uniform pattern. In bolted-rail territories and where standard joints, insulted joints, or weld safety straps are installed in CWR territories, anchors must not be applied on the opposite rail directly across from the joints or straps. Compression clips or other approved fasteners may be used in lieu of, or in conjunction with, rail anchors as authorized by the Railroad Representative.

E. All switch ties shall be completely box anchored.

F. When using sledge to remove rail anchors, the foot must be placed on top of the rail anchor in such a manner to prevent the anchor from flying and causing injuries.

G. Spike mauls must not be used in lieu of sledges for applying and removing rail anchors.

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H. Care must be taken to avoid overdriving as this may fracture or spread the metal resulting in loss of holding power.

I. Rail anchors fractured or metal spread, will be rejected.

3.11 BALLAST AND SURFACING

A. Ballast

1. A minimum of 8 inches of ballast shall be placed below the tie for all tracks, unless otherwise stated.
2. Ballast shall be uniformly distributed, and the track raised, lined, surfaced, and tamped, with the finished surface of the ballast dressed in accordance with the Contract Drawings.
3. The ballast section shall have a shoulder width of at least 12” beyond the edge of track ties before sloping on CWR tracks. On jointed rail tracks, the shoulder width may be 9”.

B. Lifts

1. The ballasting of track will be performed in ‘lifts.’ A four (4) inch lift will include the application of sufficient ballast and tamping to effectively raise the track 4 inches from its current elevation.
2. Tamping shall be performed between each lift in accordance with these Specifications.
3. The track shall be laid and connected before ballast is spread and raised. It will not be permissible to operate over long stretches of track before it has been raised and surfaced unless approved by the Engineer. Immediately prior to unloading ballast for the initial four (4) inch raise, the track shall be lined as close as practical to the stakes and all ties straightened and re-spaced as necessary. Ballast shall then be spread evenly and leveled to the required section, taking care to assure that subgrade material is not intermixed with the ballast.
4. Ballast shall be spread and the track raised in a series of lifts to the approved elevation. No single lift shall be higher than four (4) inches. In raising track, if jacks or mechanical tampers are used they shall be so regulated as to avoid the bending of angle bars or straining of joints. Sufficient sets of track jacks, if used, shall be simultaneously used and properly spaced to avoid sharp breaks or bends in the rail when the track is raised. Both rails shall be raised simultaneously and to proper cross-level by utilizing standard track level boards with each set of track raising jacks.
5. The final lift shall not exceed 2 inches.

C. Tamping

1. Tamping will be performed in accordance with the Railroad’s Engineering Instructions.
2. Tamping is to be done by machines approved by the Engineer, in a manner that will produce uniform compaction. Tamping must not disturb subgrade/subballast. Thorough tamping under the rail seat is required, and joint ties shall be tamped especially firm. In areas inaccessible to on-track machines, a hand held method of power tamping, approved by the Engineer, shall be used to meet the uniform compaction requirement stated above.
3. Raising and tamping of track shall be performed with an automatic, vibratory, squeeze type power tamper with 16 tamping heads, capable of raising both rails simultaneously and maintaining cross-level. The equipment to be used for surfacing operations will be

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subject to approval by the Owner. Every tie in the track shall receive two or more full insertions of the tamping heads.

4. Ballast shall be power-tamped under both sides of ties from each end to a point 15 inches inside each rail for 8’-6” or 9 foot ties. The center shall be filled with ballast, but tamping shall not be permitted in the center of the tie between the above stated limits. Both ends of the ties shall be tamped simultaneously and tamping inside and outside of the rail will be done at the same time. Tamping will not be permitted at the middle of a tie where ballast is to be left to settle of its own accord.
5. Regardless of the kind of ballast or the kind of power tamper used, tamping tools shall be worked opposite each other on the same tie. Ballast under switch ties and ties in road crossings shall be tamped the entire length of each tie. All ties shall be tamped to provide solid bearing against the base of the rail after the track or turnout is raised to grade at final surfacing. All down ties shall be brought up to the base of rail and machine tamped. The resultant track surface and alignment shall be both uniform and smooth.
6. Tamping of track in snow or frozen ballast conditions will not be permitted.
7. All ties that are pulled loose in the track raising operation shall be placed in their proper position and properly tie-plated and fully spiked before tamping.
8. The track shall be true to line and grade as staked with tangent track level transversely. During each track raise, the track is to be tamped in such a manner that it will be uniform. When raising track, a spot board or other approved device shall be used to maintain grade, and a level shall be used to keep track to proper cross-level. Laser guided alignment is desirable but is not required. However horizontal alignment must be maintained during the raising operation. Use of automated controls on tampers will satisfy this requirement.
9. After ballasting is completed and the track is in correct gauge, surfaced and lined according to the stakes, the ballast shall be trimmed neatly to the section shown on the drawings, and any surplus material shall be spread evenly along the slopes of the ballast section. Dressing of the ballast by placing earth higher than the ballast toe and thus preventing proper draining will not be permitted.
10. Hand tamping with shovels or picks will not be permitted unless authorized by the Engineer. A method of power tamping approved by the Engineer must be used in areas where on-track machine tamping is not feasible or practical.
11. Two tamping tools shall always be used opposite each other on the same tie. Tampers shall be started from a nearly vertical position and worked downward past the bottom of the tie, after which the tool should be slanted downward to force ballast under the tie. Double tamp every joint tie.
12. Excess ballast shall be removed, or may, at Contractor's option, be placed as directed by the Engineer. Payment will not be made for ballast in excess of dimensions shown on the Contract Drawings.
13. Overworked and excessively tamped ballast as determined by the Engineer shall be removed and replaced at no additional cost.
14. After the track has been raised to its final elevation and super-elevation, a tamping and consolidation of all tracks shall be performed, before the track is placed in service.
15. All ties after tamping shall have tie plates squarely under rail and seated in plate with no debris or stones between base of rail and tie plate.

D. Surfacing Limits

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1. All existing tracks at tie-in locations shall be surfaced to a minimum distance of 200 feet in each direction.

3.12 GRADE CROSSINGS

A. Grade crossings will be located as shown on the Plans and installed according to the Railroad's Engineering Instructions and Standard Plans. The Contractor shall coordinate the installation of the grade crossing surface with the roadway contractor and the Owner.

B. Contractor shall provide 8:1 longitudinal slope ballast walkways at all grade crossing locations to create a continuous trainman's walking through all crossings.

C. Asphalt crossings:

1. Rail joints should fall outside the crossing area a minimum of 15' from the end of the crossing.
2. Use of clamps are required in each tie crib within the limits of the crossing.
3. Hot mix asphaltic concrete must comply with Caltrans specifications and be placed in 2" minimum and 4 inches maximum lifts.

3.13 CWR DESTRESSING

A. The Contractor shall thermally adjust (destress) CWR after field welding is complete. Rail shall be adjusted for the Railroad recommended neutral temperature for the area. The Engineer will supply the neutral temperature to the Contractor in writing. Rail laid whose temperature was at or near the supplied neutral temperature at the time of installation must still be checked and thermally adjusted unless directed otherwise in writing by the Engineer.

B. Contractor to supply method and procedure for thermal adjustment of CWR for engineers' approval prior to commencement of work.

C. The method used to thermally destress CWR shall not damage any portion of the track.

D. Each track will have a Record of Neutral Temperature of Welded Rail as Laid completed by the Contractor and submitted to the Engineer within 24 hours of thermal correction.

3.14 TURNOUTS

A. Turnouts shall be constructed per Railroad Standard Plans, Engineering Instructions, and these Specifications.

B. The switch stands shall be fastened securely to headblocks and shall be square with the track. The targets shall be lined parallel with the rails of the major track when the switch is lined for the major track.

C. Turnouts shall have all special switch plates, frog and guard rail plates fully spiked. All switch ties shall be fully tie plated. All frogs, with the exception of self-guarded frogs, shall be protected by guardrails installed in accordance with the standard plans before any train is allowed to pass over them.

D. Turnouts shall also include switchman walkways.

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E. Panel turnouts shall be constructed in strict conformity with the standard plans and these specifications. Care shall be taken in unloading or moving the panel sections so as not to skew or bend the sections or cause damage to the prepared subgrade. The Contractor shall adjust anchors, ties, spikes, switch plates, braces, etc., as necessary to conform to the standard plan.

F. Switch apparatus must be in full working order prior to acceptance by Owner.

3.15 STEEL CASING PIPES

A. Installation of steel casing pipes shall be per the AREMA Manual for Railway Engineering standards.

B. Casing pipe shall be so installed as to prevent the formation of a waterway under the railway, with an even bearing throughout its length.

3.16 TRACK CRITERIA AND TOLERANCES

A. Alignment and Gauge: Track shall be constructed to the alignment and grade prescribed.

1. All rails shall be gauged according to the Railroad's Maintenance of Way Rules.
2. The standard gauge is 4 foot 8-1/2 inches at 5/8 inch below the top of rail on the two inside gage faces of the rail.
3. For tracks with curves over 6 degrees, gauge may be widened up to 1/4 inch. The alignment shall be maintained on the outside rail of the curve and the extra width of gauge applied to the inside rail of the curve. This extra width shall be uniformly graduated throughout the spiral curve.
4. All gauges used by the Contractor shall be checked by the Engineer. If found to be more than 1/16 inch in variance from the master gauge, those gauges shall immediately be removed from the job.
5. When track is being gauged, all spike pulling and re-driving should be done along one rail, on the opposite side from the rail used for lining. Before moving the rail, all spike holes must be plugged tight, and when re-spiking, the gauge must be laid square across the track, close to the point where spikes are being driven, and the rail held firmly up to gauge.
6. Profile grade and horizontal alignment shall not exceed 1/8 inch in 50 feet.

B. Superelevation: Superelevation and runoffs will not be provided for any new track construction.

C. Tangent Track: Tangent track shall be level unless otherwise specified. The inside rail of each track on curves shall be maintained at the prescribed grade. Deviation from cross-level shall not exceed 1/8 inch.

D. Install track, other track material, turnouts, derails and road crossings in accordance with the Contract Drawings and the Railroad's Engineering Instructions and Standard Plans.

E. Construct track within specified tolerances for uniformity of gauge, cross-level, profile grade, and horizontal alignment. Humps, sags, or hollows in track surface or alignment irregularities in excess of specified tolerances will not be accepted. Railroad standards will be used for all new track construction.

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F. Provide vertical and horizontal control stakes every 50 feet on curves and every 100 feet on tangents.

G. The low rail on all superelevated tracks shall be designated as the profile rail.

END OF SECTION 341100

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SECTION 341101 - FIELD WELDING AND THERMAL ADJUSTMENT

PART 1 - GENERAL

1.1 SUMMARY

A. The following provisions of Port of Stockton 'Division 01' General Provisions shall apply to the Work, unless specifically amended in any of the following Sections:

1. Section 01100 Summary
2. Section 01200 Measurement and Payment
3. Section 01250 Modification Procedures
4. Section 01315 Project Meetings
5. Section 01320 Progress Schedules and Reports
6. Section 01330 Submittal Procedures
7. Section 01340 Safety Submittals
8. Section 01410 Regulatory Requirements
9. Section 01420 References and Definitions
10. Section 01500 Temporary Facilities and Controls
11. Section 01540 Site Security and Safety
12. Section 01600 Product Requirements
13. Section 01740 Cleaning
14. Section 01770 Contract Closeout
15. Section 01780 Project Record Documents

B. Section Includes:

1. Field welding of continuous welded rail (CWR)

C. Related Requirements:

1. Section 341100: Trackwork Construction

1.2 DEFINITIONS

A. See Port of Stockton Division 01 'General Provisions' Section 01420 for overall project definitions in addition to the sections below.

B. Railroad:

1. Union Pacific Railroad (UPRR).
2. Central California Traction Company (CCTC).

C. Owner: Port of Stockton.

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1.3 DESCRIPTION OF WORK

A. Provide all labor, materials as specified, equipment, tools, layout survey and incidentals necessary to install field welds for all trackwork complete, including turnouts as indicated in the Contract Drawings or as directed by the Owner.

B. The Contractor shall perform all field welding and thermal adjustment in continuous welded rail (CWR) strings and turnouts using a Railroad approved flash butt welding process or Railroad approved thermite-welding method.

C. The thermal adjustment of CWR to the neutral rail temperature as specified by the Railroad including, but not limited to, all cutting, drilling, welding, heating, cooling, re-spiking, re-fastening, anchoring, and adjustment of rail length required to establish said neutral temperature.

1.4 REFERENCE STANDARDS

A. Field rail welding must adhere to the minimum criteria set by the subsequent Reference Standards:

1. American Railway Engineering and Maintenance of Way Association (AREMA) Manual for Railway Engineering.
2. FRA: 49 CFR Part 213, Track Safety Standards, most current and addenda, Federal Railroad Administration.
3. ASTM International (ASTM):
   a. ASTM E164 Standard Practice for Ultrasonic Contact Examination of Weldments.

B. Refer to SECTION 341100 – Trackwork Construction for list of applicable reference standards.

1.5 SUBMITTALS

A. Comply with Port of Stockton Division 01 ‘General Provisions’ Sections 01330 and 01340 in addition to the following sections.

B. Submit under the provisions of Special Conditions and Requirements:

1. Procedure: Submit proposed materials, methods, and procedures to be used for flash butt field welding of CWR. If Contractor elects to perform field welding of CWR using the thermite welding process, submit proposed method subject to Owner's approval. For either method, include procedure, materials and methods and include the following items:
   a. Trade name of the manufacturer and technical specifications for the welding procedure, inclusive of performance standards for the welding machine.
   b. Welding method for high-strength rail if it varies from the standard rail requirements.
   c. Method used for cutting and cleaning of the rail ends.
   d. Minimum and maximum spacing between rail ends.
   e. Method used for maintaining the rails in alignment during welding.
   f. Method used for preheating including time and temperature.
   g. Tapping procedure including the minimum time required for cooling the weld under the mold insulation.

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h. Method used, including a description of special tools and equipment for removing the gates and risers and finishing the weld to the final contour.

i. Detailed resume of the experience of all welding supervisory personnel including foreman showing ample experience in the welding and adjustment of CWR.

1.6 QUALIFICATION

A. Welding shall be performed under the direct supervision of an experienced welding foreman or supervisor with a minimum of three years' experience in field flash butt or thermite welding, working as specified herein.

B. All welding supervisory personnel must be pre-qualified by the Railroad prior to the initiation of the welding and destressing process. The Railroad reserves the right to disqualify any supervisor or foreman, who in the opinion of the Railroad, does not demonstrate through experience or action sufficient experience in the procedures described or referenced herein.

PART 2 - PRODUCTS

2.1 MATERIALS

A. For thermite welding, materials and equipment shall be as manufactured by "Boutet", "Orgotherm", "Elektro-Thermite", or other approved equivalent for standard rail.

B. Contractor shall furnish all equipment and material required in the production of thermite welds.

C. Contractor shall provide welding kits for the fielding welding. Material procurement, delivery, handling, distribution and coordination shall be in accordance with the specifications included in SECTION 341100 - Trackwork Construction.

PART 3 - EXECUTION

3.1 FIELD WELDING

A. GENERAL

1. Unless noted otherwise, field welding of CWR should be flash butt welding only and thermite welding should be performed only to tie in CWR strings with jointed rail.
2. All thermite welding shall be supervised and performed by an experienced rail-welding supervisor certified by the welding equipment manufacturer.
3. Welding shall be performed under the direct supervision of an experienced and certified welding foreman or supervisor.
4. Contractor shall perform testing of all weld sections and share results with the Owner and Engineer. All welds giving fault indication by ultrasonic inspection, magnetic particle inspection or visible inspection shall be replaced by the Contractor at no expense to the Owner. This includes the addition of a rail plug and the additional welds.

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5. The Contractor will be compensated for only one weld at a joint, all additional work associated with attempting and failing to make a successful weld, resulting in a rail plug and two welds will be at Contractor's expense.
6. Thermite welding will not be performed during rain or snow.
7. Wearing protective clothing and safety equipment is strongly suggested during welding operations.
8. Never dump hot slag on wet soil, wet ballast or into water.
9. If Contractor chooses to weld joints prior to the rail being laid, de-stressed and anchored, then joints will need to be spaced approximately every fourteen hundred (1,400) feet to provide for the thermal adjustment that will occur before it is anchored. Any variance from this will have to be approved in writing by the Engineer. If approval has not been given and Contractor has welded the rail then Contractor will, at its cost, cut and re-weld the rail at approximately fourteen hundred (1,400) foot intervals.

B. WELD PREPARATION

1. All welds, including compromise welds, shall be in compliance with Union Pacific Railroad Company Instructions Governing the Inspection, Grinding, and Heat Treating of Track Components.
2. The faces of the rail ends shall be arranged at right angles by cutting or grinding and shall be further cleaned to remove all scale and rust, along with any other recommendations of the welding kit manufacturer.
3. The ends of the rails to be welded shall be properly gapped and aligned to produce a weld, which will conform to the specified alignment tolerances. No dip in the rails will be allowed.
4. Rail ends will be preheated prior to welding to a sufficient temperature and for a sufficient time to ensure full fusion of the weld metal to the rail ends without cracking of the rail or weld, per manufacturer's instructions.

C. USE OF RAIL EXPANDER

1. A rail expander will be placed on the rail to maintain the correct gap and crown unless temperature conditions are such that the possibility of rail movement is eliminated.
2. If a change in rail temperature is anticipated while the weld is being poured or while it is cooling, the rail expander should be adjusted to compensate for any stresses, which will occur at the weld due to a change in temperature.
3. The rail expander must remain on the rail until the weld is complete and has cooled to 700° Fahrenheit. This is verified when the center of the weld around its entire periphery will not melt a 700° Fahrenheit temperature.
4. When the rail expander is removed it must be released in a gradual manner.

D. RAIL HEATING

1. As soon as the welded rail strings are in place on plated ties, the temperature shall be taken. If the rail temperature is less than the temperature shown on the Rail Laying Temperatures for Continuous Welded Rail drawing in the Engineering Track Standards, install a temporary "Dutchman" to allow for future thermal adjustment. If the rail temperature is greater than the temperature shown in the Rail Laying Temperature Chart, joint bars shall be applied without a "Dutchman". After determination has been made that

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the rail is properly seated in the tie plates, gauge spikes shall be driven at least every sixth tie. Laying of welded rail in track using a track-laying machine is acceptable.

2. Rail temperatures and ambient air temperatures shall be recorded at the time of the anchoring. Measurements shall be taken at both ends of the rail and at approximately 400-foot intervals along the rail. Rail thermometers shall be placed on the shady side of the rail and left in places long enough to accurately record the temperature. The temperatures shall be recorded and given to the Engineer whenever CWR is placed.
3. All rail shall be anchored within a temperature range shown on Rail Laying Temperatures for Continuous Welded Rail chart in Engineering Track Standards. If the rail temperature is outside of this range, the rail shall be brought within the range by either mechanical heaters or water cooling as hereafter provided. The required amount of movement shall be calculated using this temperature.
4. Immediately prior to the time that rail heating or cooling commences, the joint bars at the far ends of the first pair of strings to be heated shall be removed. Spikes shall be pulled for one 39 foot rail length at the beginning of the adjoining welded rail strings, and the rail shall be barred outward to permit the heated rails to run. The rail heating or cooling shall progress from the fixed ends of the rails toward the free far ends.
5. Rail vibrators shall be used to induce movement of the rail. The vibrators used shall be subject to the approval of the Engineer. When the heating and rail anchoring have progressed to the end of the strings, the Contractor shall cut the adjoining welded rail strings, re-spike the rail, and complete the joints in accordance with Union Pacific Railroad Company Instructions Governing the Inspection, Welding, Grinding and Heat Treating of Track Components.
6. Suitable heating capacity should be available to ensure proper rail temperatures are maintained in the event of rain while the work is being performed and the neutral rail temperature drops below that required.
7. The mold shall be left in place after tapping for a sufficient time to permit complete solidification of the molten metal and proper slow cooling to prevent cracking and provide a complete weld with the proper hardness and ductility.
8. Depending upon the type of change expected, one of the following procedures will assist in preventing temperature-induced stresses from affecting the quality of the weld:
   a. Rail temperature is low and when a raise in temperatures is anticipated the rail expander should be set to expand the gap and enough pressure built up to cause a slight increase in the gap. This should prevent any subsequent decrease in gap width.
   b. Rail temperature is high and when a drop in temperature is anticipated the rail expander should be set up to pull and enough pressure built up to cause a slight subsequent increase in width.
   c. Whenever either of the above procedures is required, the final gap width must be as stated in the manufacturer's instructions for the rail weight being welded.

E. WELD LOCATIONS

1. Thermite welds will not be placed as follows:
   a. Within 14 feet from another thermite weld
   b. Within two (2) feet from an existing plant weld
   c. Within two and one half (2-1/2) feet from the end of a bonded joint without written approval by the Engineer.

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2. Welds must be located in cribs between ties and located no closer than four (4) inches to nearest tie.
3. On curves where the slag basin is placed on the low side, the plug portion of the mold must be filled so that is it horizontal when placed in the mold and will cause the molten metal to flow equally to both sides of the mold.

F. FIELD WELDING RECORD AND RAIL MARKINGS

1. Field welding record shall be continuously maintained and furnished to the Engineer within 7 workdays of completing the weld. The weld must be recorded on the prescribed form and retained for at least one year after installation. The record shall include the following minimum details, noting that a different recording and marking procedure will be required for free end welds or for destress welds used to close up openings in rail:
   a. Date and time of weld(s)
   b. Location by station, specifying track and rail
   c. Contractor foreman initials
   d. Weather, air and rail temperature for destress welds (welds made to close up rail)
   e. Track condition, anchorage and rail stresses for de-stress welds, or the word "FREE" for free end welds.
2. The thermite weld tags, furnished with the weld kits, shall be fully completed and installed.
3. Rail shall be permanently marked on the web of rail in legible characters at least 1-1/2 inches high at each field weld with the following information:
   a. Date of Weld (MO/DAY/YR)
   b. Initials of welder performing weld
   c. Air temperature at time of weld when making a destress weld.
   d. Rail temperature at time of weld, or target rail temperature when rail is being pulled with a hydraulic jack to achieve an adjustment, when making a destress weld.
   e. The word "FREE" when making a free end weld
   f. Example, for a destress weld: 5-5-93/ABC/AT 90/RT 120
   g. Example for a free end weld: 5-5-93/ABC/FREE

G. TOLERANCES OF FIELD WELDS

1. A straightedge 36 inches in length, applied to finished welded joint area, may show the following maximum variations:
   a. Rail Head:
      1) Vertical Offset 0.020 inches
      2) Horizontal Offset 0.040 inches
      3) Vertical Crown 0.030 - 0.045 inches
      4) Horizontal Kink 0.020 inches
   b. Rail Base:
      1) Horizontal Offset 0.060 inches
      2) Offset Bending 0.010 per inch

H. FINISHING OF FIELD WELDS

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1. Sharp edges and burrs are to be removed, including chimneys from welds. All welds shall be ground smooth.
2. Weld joints shall be smooth on top and sides of head and straight in line. No over grinding is permitted.
3. Weld joints shall be smooth on sides and bottom. Offset blending permitted at rate of 0.010 per inch.
4. Weld joints shall be smooth on both sides of web to within approximately 1/8 inch of original contour. Width of remaining upset will be between 1/2 inch and 5/8 inch.
5. Finishing of welds must be sufficient to allow testing using the ultrasonic test method as described below. Welds rejected because of insufficient or unsatisfactory finishing of welds will be refinished, repaired or replaced at the Contractor's expense until the weld meets the testing criteria.

I. FIELD WELD TESTING

1. Rail welds shall be tested by the Engineer through the use of a testing agency using the Ultrasonic testing method in accordance with ASTM E164.
2. Contractor shall inform the Owner daily of the location of completed welds to facilitate the testing and inspection by the Owner. All thermite welds performed under this contract will be listed on a Daily Thermite Welding Report, including the welds Contractor will not be reimbursed for.
3. Welds not meeting the following requirements will be rejected:
   a. Each completed weld shall have full penetration and complete fusion and be entirely free of cracks with no evidence of surfacing or internal fissures or cracks. Total area of internal defects such as porosity and slag inclusions shall not exceed 0.060 square inch and the largest single porosity or slag defect permitted shall not exceed 1/8" in diameter.
   b. Cracks that show in the finished weld are cause to reject weld.
   c. Pit holes that show in web and base of weld after finish grinding are cause to reject weld. Pit holes in head not exceeding 1/4 inch in depth may if approved by the Engineer, be repaired by gas welding.
4. Welded joints not meeting these specifications and tolerances will be replaced at no additional cost to the Owner. The defective weld shall be cut out, and a new section of rail not less than 15 feet long shall be inserted, welded into place as described in this section, and re-tested. Additional welds resulting from the rejection of field welds will be at the Contractor's expense.

3.2 THERMAL ADJUSTMENT OF RAIL

A. GENERAL

1. All CWR will be thermally adjusted to the target neutral temperature (TNT) as prescribed by the Railroad for the Stockton, CA area.
2. Rail does not need to be adjusted when the actual rail temperature exceeds the designated rail laying temperature.
3. The rail shall be thermally adjusted using rail heaters or expanders to the correct length when the actual rail temperature is less than the designated rail laying temperature. The rail shall be heated evenly and uniformly so that the rail expansion occurs evenly and

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uniformly throughout its length per Railroad Engineering Instructions, and AREMA Manual for Railway Engineering, Chapter 4.

4. If rail is laid at a temperature less than the designated rail laying temperature, rail must be adjusted or properly protected prior to hot weather.
5. Thermal correction or adjustment and welding of the CWR shall not be done until the track has been put to the proper alignment, surface and cross level per these specifications. Thermal correction shall be made immediately preceding the final ballast lift.

3.3 CUTTING IN SHORT SECTION RAIL AND THERMITE WELDING THE ENDS

A. A short section of rail shall be cut in the CWR, when directed by the Owner, for the following reasons:

1. To repair defective rail.
2. To repair defective welds.
3. To de-stress rail.
4. To make a connection between rail strings or adjust rail to meet a specific point (i.e. to connect CWR to stock rail or frog).
5. To install a prefabricated insulated joint.

B. The short section of rail to be cut in shall be at least 18 feet long and shall be of the same weight, size, section, and class of rail being replaced or joined.

C. Before cutting out rail in CWR, prevent remaining CWR from further movement by applying full anchors for at least 200 feet each way. After cutting CWR, a rail expander/puller or other means shall be used to prevent rail movement until a weld or temporary joint is installed.

D. The ends of the short rail section and the CWR shall be sawed or abrasive cut.

E. Follow procedures specified for completing field welding by thermite process.

F. Repair of rail due to damage by Contractor shall be at Contractor's expense.

G. When repairing a defective rail or weld, the new rail shall be the same length as rail being replaced, or as required to achieve thermal adjustment.

H. When performing field welding, rail temperature adjustments must be made in accordance with SECTION 341100, using either heating of rail or mechanical rail pullers. The first weld of a replacement plug may be at ambient temperature, but the second (de-stress weld or rail closure weld) must be made while the rail is heated to 115° Fahrenheit or pulled mechanically to equal a neutral temperature of 115° Fahrenheit.

3.4 CWR DESTRESSING

A. The Contractor shall thermally adjust (destress) CWR after field welding is complete. Rail shall be adjusted for the UPRR's recommended neutral temperature of 120 degrees Fahrenheit for UPRR's Sacramento Subdivision. The Engineer will supply the neutral temperature to the Contractor in writing. Rail laid whose temperature was at or near the supplied neutral

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temperature at the time of installation must still be checked and thermally adjusted unless directed otherwise in writing by the Engineer.

B. Contractor to supply method and procedure for thermal adjustment of CWR for engineers' approval prior to commencement of work.

C. The method used to thermally destress CWR shall not damage any portion of the track.

D. Each track will have a Record of Neutral Temperature of Welded Rail as Laid completed by the Contractor and submitted to the Engineer within 24 hours of thermal correction.

3.5 ASSOCIATED WORK

A. The Contractor is advised that the process of field welding and de-stressing rail may include, but is not limited to, the following and is considered incidental to the cost of welding and de-stressing:

1. Contractor shall re-space cross ties as necessary to prevent a weld from sitting on a tie.
2. Contractor shall tamp and dress track, as necessary, to provide firm support at the weld.
3. Contractor shall plug and re-drive all necessary spikes.
4. Contractor shall properly re-apply and adjust anchors as necessary to conform to anchor pattern.
5. Contractor shall clean up all waste from the field welding process and shall dispose of all superfluous materials.
6. No additional compensation will be allowed for compromise welds.
7. No payment will be made for additional welds created by avoidable plugging, without written authority of the Owner.

END OF SECTION 341101

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SECTION 341105 - SUBBALLAST

PART 1 - GENERAL

1.1 DESCRIPTION OF WORK

A. The following provisions of Port of Stockton 'Division 01' General Provisions shall apply to the Work, unless specifically amended in any of the following Sections:

1. Section 01100 Summary
2. Section 01200 Measurement and Payment
3. Section 01250 Modification Procedures
4. Section 01315 Project Meetings
5. Section 01320 Progress Schedules and Reports
6. Section 01330 Submittal Procedures
7. Section 01340 Safety Submittals
8. Section 01410 Regulatory Requirements
9. Section 01420 References and Definitions
10. Section 01500 Temporary Facilities and Controls
11. Section 01540 Site Security and Safety
12. Section 01600 Product Requirements
13. Section 01740 Cleaning
14. Section 01770 Contract Closeout
15. Section 01780 Project Record Documents

B. This Section consists of Contractor furnishing all transportation, labor, materials, equipment and survey layout necessary and incidental to complete the placement of subballast in the designated areas.

C. This Section also specifies procedures, performance criteria and requirements for subballast placement to the design lines, grades and elevations specified herein and shown on the Contract Drawings.

D. Work under this Section shall include but shall not be limited to:

1. Place, compact and grade subballast as required to elevations and sections shown on the Contract Drawings.
2. Placement of porous drainage aggregate over track underdrains within the subballast section as indicated in the Contract Documents.

1.2 DEFINITIONS

A. See Port of Stockton Division 01 'General Provisions' Section 01420 for overall project definitions in addition to the sections below.

B. Railroad:

1. Union Pacific Railroad (UPRR)
2. Central California Traction Company (CCTC)

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C. Owner: Port of Stockton.

D. Engineer: JMA Civil, Inc.

E. Geotechnical Engineer: Kleinfelder

1.3 RELATED REQUIREMENTS

A. Section 312000: Earthwork

B. Section 341100: Trackwork Construction

1.4 REFERENCE STANDARDS

A. Comply with applicable provisions of all local, state, and federal codes, specifications, standards, and recommended practices, and in particular:

1. Geotechnical Report: Included.
2. ASTM D 1557 – Modified Proctor Test - Moisture Density Relations for Soils and Soil-Aggregate Mixtures Using 10-pound Rammer and 18-inch Drop.
3. ASTM D 1241 – Specification for Materials Soil-Aggregate Subbase, Base and Surface Course.
4. ASTM C88, Standard Test Method for Soundness of Aggregates by Use of Sodium Sulfate or Magnesium Sulfate.
5. ASTM C117, Standard Test Method for Materials Finer than 75-µm (No. 200) Sieve in Mineral Aggregates by Washing.
6. ASTM C127, Standard Test Method for Density, Relative Density (Specific Gravity), and Absorption of Coarse Aggregate.
7. ASTM C131, Standard Test Method for Resistance to Degradation of Small-Size Coarse Aggregate by Abrasion and Impact in the Los Angeles Machine.
8. ASTM C136, Standard Test Method for Sieve Analysis of Fine and Coarse Aggregates.
9. ASTM C142, Standard Test Method for Clay Lumps and Friable Particles in Aggregates.
10. ASTM C535, Standard Test Method for Resistance to Degradation of Large-Size Coarse Aggregate by Abrasion and Impact in the Los Angeles Machine
11. California Department of Transportation (Caltrans) Standard Plans and Specifications, latest edition.
12. American Railway Engineering and Maintenance of Way Association (AREMA) Specifications – Manual for Railway Engineering, latest edition.
13. Union Pacific Railroad (UPRR) Company Technical Specifications for Construction of Industrial Tracks, latest edition.

1.5 SUBMITTALS

A. The Contractor shall submit the following in accordance with the Contract Documents:

1. Certification that subballast material meets the requirements of this Section.

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2. An outline of intended subballast placement procedures as required for the project. This submittal is for the Owner's general information and in no way relieves the Contractor of complete responsibility for the successful performance of intended placement methods.

3. Contractor shall submit to Owner, the Modified Proctor densities of subballast materials.

4. The results of the compaction tests required by this Section will be prepared by the Contractor. Results will be formatted and presented in a manner that will indicate that the frequency of tests required by this specification has been made and that all subballast has been placed in accordance with this Section.

1.6 QUALITY ASSURANCE

A. Prior to commencing work, examine the Contract Drawings and Specifications, inspect the site, consult all available record drawings of existing work and utilities, and note all conditions and limitations which may influence work required by this Section.

B. Materials not meeting the requirements of this Specification shall not be used in the Work.

C. The Work shall be carried out in conformance with applicable laws, codes, ordinances and regulations of federal, state and local authorities having jurisdiction, including the furnishing of any required excavation drawings to said authorities and the obtaining of permits.

D. The Contractor will perform field density tests (compaction tests) on the subballast at locations where new subballast is proposed on plans, placed at a minimum of every 5,000 square feet placed, with intervals between tests not to exceed 200 feet. Additional tests as deemed necessary to ensure compliance to these specifications will be made at the discretion of the Engineer or Geotechnical Engineer.

E. Density of material shall be determined by ASTM D 2922, ASTM D 1557, or ASTM D 3017.

PART 2 - PART 2 - PRODUCTS

2.1 SUBBALLAST

A. Subballast shall be coarse aggregate, limited to crushed stone, as defined in the Railroad Track Standards, with a minimum of one fractured face, meeting the quality requirements of all standards listed in Section 1.4 of this document and approved by the Owner.

B. Imported sub-ballast should consist of compacted well-graded crushed rock, consistent with Design Criteria and guidelines presented in UPRR Standard Drawings 0010A and 0010B – “Ballast & Subballast Material Specifications”.

C. Subballast shall be uniformly graded and shall meet the following gradation requirements, per Railroad Standards:

Sieve Size	Percent Passing
2”	100
1"	90-100
3/8”	50-84

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Sieve Size	Percent Passing
No. 10	26-50
No. 40	12-30
No. 200	0-10

Or meet the requirements for Class II Aggregate Base, as specified in Caltrans Standard Specifications Section 26, whichever is better.

PART 3 - EXECUTION

3.1 SUBBALLAST DEPTH:

A. A minimum of 6 inches of subballast shall be placed below the ballast for all yard tracks and industry spur tracks, unless otherwise stated. For Port Lead tracks (LD01 and LD02), the minimum subballast thickness shall be 12 inches.

3.2 SLOPES

A. The exposed foreslopes for sub-ballast should be no steeper than 2H:1V.

3.3 TRACK UNDERDRAIN

A. Track Underdrains will be installed per Section 334600 “Subdrainage” and is not covered under this Section.

B. The Contractor shall be responsible for the placement of porous drainage course above the subgrade and through the subballast layer as indicated in the Contract Documents.

C. The drainage course shall meet the requirements of Section 312000 “Earth Moving.”

3.4 PLACEMENT OF SUBBALLAST

A. Subballast shall be placed only when weather conditions do not detrimentally affect the quality of the finished subballast. Subballast is not to be placed in snow or on soft, muddy, or frozen subgrade.

B. Hauling and placing of subballast will not be permitted when doing so will rut or deform the finished subgrade.

C. Drainage Course will be placed continuously along each underdrain, from the top of subgrade to the top of the subballast.

3.5 COMPACTION EQUIPMENT

A. Determine the type, size, and weight of the compactor best suited to perform the work at hand. Control the lift (layer) thickness with approval of the Owner. Exert proper control over the moisture content of the material to obtain satisfactory results.

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B. In areas inaccessible to conventional compactors, or where maneuvering space is limited, approved impact rammers, small drum vibrators, vibratory plate, or pneumatic buttonhead compaction equipment may be used with layer thickness not to exceed 4 inches before compaction.

3.6 COMPACTION

A. Properly place and compact subballast and porous drainage aggregate material and correct any deficiencies resulting from insufficient or improper compaction of such materials throughout the contract period.

B. During the progression of the work, the Owner will inspect the Contractor's operations and will permit the work to continue where:

1. Lift thickness is controlled and does not exceed the 6 inches maximum allowed by the Specifications, and the equipment meets all specified class criteria. Thinner lifts and lighter equipment than the maximum allowed may be necessary for satisfactory results.
2. The composite effort (number of passes and travel speed) is uniformly applied. It is noted that higher levels of effort above the minimum specified may be necessary for satisfactory results on some materials.
3. The Owner concludes from results of the on-site density tests that proper compaction has been attained per ASTM D 1557.

C. Significant rutting under the action of the compactor is not allowed on the final passes on a lift.

D. Before compaction, each layer shall be moistened or aerated as necessary to provide the optimum moisture content. Method of reaching the proper moisture content must be submitted to and approved by the Geotechnical Engineer.

E. Subballast should be uniformly moisture conditioned to between 1 to 3 percent above the optimum moisture content, placed in horizontal lifts less than about 8 inches in loose thickness, and compacted to a density of not less than 95% of the maximum dry density determined by ASTM D 1557.

F. Whenever the Contractor's operations do not conform to the above criteria, or requirements contained in other subparagraphs of this Section, the Geotechnical Engineer will prohibit placement of an overlying lift until the Contractor takes effective corrective action.

3.7 DENSITY CONTROL

A. The Contractor shall perform density testing as required. The density of the compacted subballast, in place, will be determined by ASTM D 1557.

B. The Contractor shall take corrective action if density tests do not meet requirements including re-rolling and manipulation of the moisture content, at no cost to the Owner.

C. The Geotechnical Engineer will perform spot checks of the compaction to confirm that work is being performed in accordance with these specifications. These periodic tests do not relieve the Contractor of the testing required in this Section.

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3.8 MOISTURE CONTROL

A. Where material must be moisture conditioned before compaction, uniformly apply water to surface layer of placed material, and mix uniformly in such manner as to prevent free water appearing on surface during or subsequent to compaction operations.

B. Remove and replace or scarify and air-dry soil material that is too wet to permit compaction to specified density.

C. Material that has been removed because it is too wet to permit compaction may be stockpiled or spread and allowed to dry. Assist drying by disking, harrowing, or pulverizing, until moisture content is reduced to a satisfactory value, as determined by moisture-density relation test.

3.9 FINISH ELEVATION

A. Subballast and porous drainage aggregate at underdrain locations shall be finished to the lines and grades shown on the Contract Drawings and shall be maintained in a condition or manner acceptable to the Owner until the final acceptance and completion of all work under this Contract. Any irregularities that develop in the subballast section during construction operations and prior to laying track shall be filled and compacted to a smooth and even surface true to the subballast elevations without any additional cost to the Owner.

B. The Contractor shall perform field engineering and surveying in accordance with Contract Documents.

C. Use existing established reference points as indicated on the Contract Drawings or as designated by the Owner to establish the new elevations and lines. Carefully preserve all established reference points, and if displaced, damaged, or lost, replace them immediately at Contractor's expense.

D. Finished grade shall be laser graded to the lines and elevations indicated on Contract Documents.

E. The elevations indicated in the Contract Documents are intended to be the final grade and elevations. However, all subballast shall be uniformly graded, provide positive drainage as indicated in the Contract Documents and shall not vary from the elevations and subballast sections by more than 0.08 feet (one inch).

3.10 FIELD QUALITY CONTROL

A. The Owner reserves the right to perform density tests at any time.

B. Activities of the Owner or the Owner’s testing agent shall not relieve the Contractor of responsibility for providing Contractor quality control.

END OF SECTION 341105

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