



Contract Documents for the Construction of
**Sacramento Regional Wastewater
Treatment Plant**

BOARD OF DIRECTORS

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**NICOLAUS DAIRY FIRE TANK
INSTALLATION PROJECT**



VOLUME 1 OF 2

PART A - SPECIFICATIONS

SEPTEMBER 2020

BID SET

SACRAMENTO REGIONAL COUNTY SANITATION DISTRICT

ACCESS REQUEST

Prime Contractor	Contract #	Date
Sub-Contractor	AR #	Revision
Contact for Contractor	Work Item #	CPM Activity #
Phone	<input type="checkbox"/> Work Plan Attached	<input type="checkbox"/> Drawing Attached

PART 1 – CONTRACTOR WORK PERMIT

Start Date/Time	Completion Date/Time
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Reference Contract Drawings/Specifications

Equipment or System to be Worked On

Location of Work

Provide RMP/MOC no. for work affecting SRWTP Gas Mgmt. or Chemical Handling Areas:

Type of Work (check all that apply)	<input type="checkbox"/> Civil	<input type="checkbox"/> Mechanical	<input type="checkbox"/> Electrical	<input type="checkbox"/> Instrumentation
	<input type="checkbox"/> Process	<input type="checkbox"/> Coating	<input type="checkbox"/> Hotwork	<input type="checkbox"/> Other (specify)
	<input type="checkbox"/> Mobilization	<input type="checkbox"/> Traffic/Ped. Access	<input type="checkbox"/> Shutdown	

Description of Work _____

Anticipated Hazards

Tools/Equipment to be Used	<input type="checkbox"/> Cutting/Welding Torches	<input type="checkbox"/> Arc Welders	<input type="checkbox"/> Jack Hammers
	<input type="checkbox"/> Power Saws	<input type="checkbox"/> Grinders	<input type="checkbox"/> Pneumatic Tools
	<input type="checkbox"/> Backhoe	<input type="checkbox"/> Crane	<input type="checkbox"/> Radioactive Test Device

Revised 11-2015

Access Request – Page 1 of 3

Access Request Instructions

- Contractor fills out AR with sufficient information to define the work and anticipated safety hazards and signs at bottom of page 2.
- If it is a CIP - R.E. reviews AR and signs on page 3 prior to delivering AR to District Representative.
- District Representative(s) reviews and approves the AR with conditions, restrictions, or additional Safety items (all additional safety items on page 2 will be initialed).
- District Rep/RE gives approved AR back to contractor prior to contractor performing the work.
- Contractor reviews AR conditions and Safety page prior to beginning work.

Note: For ARs for utility or outside agency work, contractor interacts directly with District Representative

PART 2 – CONTRACTOR SAFETY PRECAUTIONS

All items checked will be complied with/used in accordance with applicable safety standards (CalOSHA, UFC, etc.) and the requesting contractor's safety program.

<p>HOT WORK PLAN</p> <ul style="list-style-type: none"> <input type="checkbox"/> Isolate Combustibles <input type="checkbox"/> Fire watch <input type="checkbox"/> Fire Extinguishers <input type="checkbox"/> Flash Protection 	<p>REVIEW EMERGENCY PROCEDURES/ALARMS</p> <ul style="list-style-type: none"> <input type="checkbox"/> Chlorine/Sulfur Dioxide Areas <input type="checkbox"/> Oxygen Handling Areas <input type="checkbox"/> Gas Management Areas <input type="checkbox"/> Other _____
<p>AIR MONITORING</p> <ul style="list-style-type: none"> <input type="checkbox"/> Continuous <input type="checkbox"/> Periodic <input type="checkbox"/> Frequency _____ 	<p>HOUSEKEEPING</p> <ul style="list-style-type: none"> <input type="checkbox"/> Debris Removal <input type="checkbox"/> Dust Control <input type="checkbox"/> Maintain access to/through worksite
<p>POTENTIAL ATMOSPHERIC HAZARDS TO BE MONITORED</p> <ul style="list-style-type: none"> <input type="checkbox"/> Oxygen Deficiency <input type="checkbox"/> Oxygen Enrichment <input type="checkbox"/> Combustible Gases <input type="checkbox"/> Toxic Gases <input type="checkbox"/> Other _____ 	<p>EXCAVATION/TRENCHES</p> <ul style="list-style-type: none"> <input type="checkbox"/> Shoring <input type="checkbox"/> Sloping <input type="checkbox"/> Benching <input type="checkbox"/> Barricades <input type="checkbox"/> Excavation Plan Submittal Number _____
<p>HAZARDOUS MATERIALS TRAINING</p> <ul style="list-style-type: none"> <input type="checkbox"/> Substance(s) _____ 	<p>ELEVATED AREAS</p> <ul style="list-style-type: none"> <input type="checkbox"/> Fall Protection <input type="checkbox"/> Guardrails
<p>ENERGY CONTROL PROCEDURES</p> <ul style="list-style-type: none"> <input type="checkbox"/> Lockout <input type="checkbox"/> Blockout <input type="checkbox"/> Tagout 	<p>PIPING/EQUIPMENT OPENING AND/OR ENTRY(ensure prior to opening)</p> <ul style="list-style-type: none"> <input type="checkbox"/> Effectively Isolated <input type="checkbox"/> Depressurized <input type="checkbox"/> Drained <input type="checkbox"/> Purged/Flushed of Hazardous Substance(s)
<p>VENTILATION</p> <ul style="list-style-type: none"> <input type="checkbox"/> Natural only <input type="checkbox"/> Auxiliary, continuous 	<p>ABATEMENT ACTIVITIES (Title 8, Construction Safety Orders)</p> <ul style="list-style-type: none"> <input type="checkbox"/> Asbestos (Article 4 § 1529) <input type="checkbox"/> Lead (Article 4 § 1532.1)
<p>CONFINED SPACE PROCEDURES</p> <ul style="list-style-type: none"> <input type="checkbox"/> Permit Required <input type="checkbox"/> Non-permit <input type="checkbox"/> C-5 <input type="checkbox"/> Entry Permit @ site <input type="checkbox"/> Personnel Retrieval System <input type="checkbox"/> Communication w/ Entrant <input type="checkbox"/> Rescue Personnel @ site <input type="checkbox"/> Supplied Air 	<p>OTHER SAFETY PRECAUTIONS</p> <ul style="list-style-type: none"> <input type="checkbox"/> _____ <input type="checkbox"/> _____ <input type="checkbox"/> _____ <input type="checkbox"/> _____

AR SUBMITTAL SIGNATURE BLOCK

Contractor signs below after page 1 and 2 are filled out with sufficient detail to allow AR to be reviewed. Contractor identifies all anticipated safety items prior to signing below. Safety Office staff will initial next to any additional safety items that have been checked off during the AR review process.

<p>_____</p> <p>Contractor Representative</p>	<p>_____</p> <p>Date</p>
---	--------------------------

RE Comments	<input type="checkbox"/> See Attachment
Reviewed by Resident Engineer (If Applicable)	Date

PART 3 – APPROVERS’ REMARKS

Safety Office Comments	<input type="checkbox"/> See Attachment

Approved By: Regional San Safety Office	Date
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O&M Support Comments	<input type="checkbox"/> See Attachment

Approved By: Regional San O&M Support/District Representative	Date
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SIGNATURE BLOCK

The work described by this Access Request has been reviewed. The work methods described and identified in Parts 1 & 2, and the additional safety precautions identified in Parts 2 & 3 will be complied with and effectively communicated to personnel assigned this task. If the contractor does not agree with additional safety precautions, work shall not start until resolution is attained.

Contractor Representative	Date
---------------------------	------

- Distribution:**
- | | | |
|---|--|--|
| <input type="checkbox"/> Operation Support | <input type="checkbox"/> O&M Manager 1 (2) | <input type="checkbox"/> Electrical Supervisor |
| <input type="checkbox"/> Safety Office Representative | <input type="checkbox"/> Process Team Leader | <input type="checkbox"/> Facility Maintenance |
| <input type="checkbox"/> Resident Engineer | <input type="checkbox"/> Other _____ | <input type="checkbox"/> Project Engineer |
| <input type="checkbox"/> Contractor (supplied by RE) | | |
- *Note – Provide copies of approved ARs to applicable sections, always include O&M Manager 1’s in the distribution.**

SECTION 01 57

19

TEMPORARY ENVIRONMENTAL CONTROLS

PART 1 -- GENERAL

1.01 HOUSEKEEPING

- A. Throughout the construction period, Contractor shall keep the site of the work in a presentable condition, shall dispose of any surplus materials appropriately, clean out all drainage ditches and structures, and repair any fences or other property damaged during the progress of the work, to the satisfaction of the District Representative.
- B. Upon completion of the work, and prior to requesting final inspection, Contractor shall thoroughly clean the site of the work of all rubbish, excess material, and equipment, and all portions of the work shall be left in a neat and orderly condition. The final inspection will not be made until this has been accomplished.

1.03 TRAINING

- 1. The District will provide the educational training for the Contractor's employees at a location approved by the District. Each Contractor and subcontractor employee shall attend a 30-minute training session covering such topics as identifying endangered species.
- 2. The Contractor shall ensure that all of its employees and all subcontractor employees attend the environmental and cultural educational training on the various regulations and requirements. All Contractor personnel shall be trained prior to working on the project.
- 3. The Contractor shall provide written notification to the District of all personnel scheduled to attend and participate in the training at least one week prior to the commencement of construction activities.
- 4. To complete the training, the Contractor shall sign and acknowledge the receipt of the training for its employees.
- 5. Upon completion of the training, the District will issue training certificates in the form of hardhat stickers that are to be worn at all times when performing work on the project.
- 6. The District will provide additional training sessions for new employees no more than once a week, when requested by the Contractor.

1.04 AIR POLLUTION CONTROL

- A. The Contractor shall comply with all air pollution control rules, regulations, ordinances, and statutes which apply to any work performed pursuant to the contract, including any air pollution control rules, regulations, ordinances, and statutes, specified in Section 11017 of the Government Code.

1.06 WATER POLLUTION AND SOIL CONTAMINATION

- A. Contractor shall comply with all federal state, and local rules, regulations, ordinances, and statutes which apply to water pollution and soil contamination.

1.07 SPECIES PROTECTION

- A. The District will provide the environmental monitor and environmental surveys as stated in the CEQA document (attached). In addition, the District will be responsible for environmental mitigation payments for loss of vernal pools, wetlands, Swainson's Hawk foraging habitat within the work area.
- B. TERRESTRIAL BIOLOGICAL RESOURCES: Before ground disturbance, all onsite construction personnel will be instructed by a qualified biologist regarding the potential presence of special-status species on site and the importance of avoiding impacts on these species and their habitat.
- C. SWAINSON'S HAWK AND OTHER NESTING RAPTORS: The Contractor shall request the District performs surveys to locate all active nest sites within 0.5 miles of the Site within 2 weeks of work area disturbance. If a Swainson's Hawks nest is found, construction shall not proceed within 0.25 miles of an active nest (nesting season is from March 15 to September 1) without District approval. The District's qualified biologist will observe the nesting hawks for stressed/detrimental behavior that threatens nest success. If there appears to be a threat to nesting success resulting from construction activity within the 0.25-mile buffer, work shall be halted until the hawk's behavior normalizes and the threat has dissipated. The District Representative will notify the Contractor when to proceed.
- D. A speed limit of 15 miles per hour will be enforced when construction vehicles are driving on the Bufferlands Road.

**** END OF SECTION****

**SECTION 13 - EXISTING FACILITIES
TABLE OF CONTENTS**

<u>Section</u>	<u>Page</u>
13-1 GENERAL	13.1
13-1.01 Preservation of Property.....	13.1
13-1.02 Overloading, Pavement Protection & Repair	13.1
13-2 REMOVING EXISTING FACILITIES.....	13.2
13-2.01 Mailboxes.....	13.2
13-2.02 Signs.....	13.2
13-2.03 Survey Monuments	13.2
13-2.04 Landscaping Improvements	13.2
13-2.05 Abandoned Underground Facilities	13.3
13-2.06 Drainage Facilities.....	13.3
13-2.07 Fences.....	13.3
13-2.08 Concrete	13.3
13-2.09 Removal of Traffic Stripes and Pavement Markings	13.4
13-3 MEASUREMENT AND PAYMENT	13.4

SECTION 13 EXISTING FACILITIES

13-1 GENERAL

This work must conform to the State Specifications and these Specifications. Attention is directed to Section 14, "Restoration of Surfaces," and Section 15, "Clearing and Grubbing," of these Specifications for additional requirements.

Facilities subject to these Specifications include existing facilities that interfere with planned construction as shown or specified in the Contract. The removal of existing utilities must be by the utility owner, unless otherwise shown or specified in the Contract.

13-1.01 Preservation of Property

Roadside trees and shrubbery that are to remain, pole lines, fences, signs, traffic control devices, striping, survey markers and monuments, buildings and structures, conduits, under- or above-ground pipelines, and any other existing improvements and facilities, must be protected from injury or damage. If ordered by the Agency, the Contractor must provide and install suitable safeguards for protection from injury or damage. Existing improvements and facilities that are injured or damaged as a result of the Contractor's operations must be replaced or restored at the Contractor's expense to a condition as good as when the Contractor entered upon the Work. The Contractor must receive Agency approval before the removal of any road sign or permanent traffic control device that interferes with the Work.

Existing facilities within the rights-of-way and construction areas that do not interfere with the Work must be protected from damage. Unless otherwise shown or specified in the Contract, the minimum cover requirements during construction for temporary construction vehicle loading are as follows:

- For metal and plastic pipes, place at least 4 feet of cover over the top of the pipe at construction crossings.
- For reinforced concrete pipe, place at least 3 feet of cover over the top of the pipe at construction crossings.

13-1.02 Overloading, Pavement Protection & Repair

The Contractor must determine safe loading capacities and must not overload any structure, equipment, pavement, or material beyond its safe capacity, or deteriorate any further the preconstruction condition of pavement during construction. Protection of pavement to prevent damage, cracking, or scarring is the responsibility of the Contractor. The Contractor assumes full responsibility for any damage resulting from any such overloading or failure to adequately protect the existing pavement.

The Contractor must request a pre-construction inspection prior to performing any work to validate the condition of all existing public facilities, including, but not limited to, pavement, striping, curb and gutters, median curbing, sidewalks, median pavement, plantings, channelization islands, and traffic signal facilities. Following construction, and prior to field acceptance, a post-construction inspection must be conducted to identify damage resulting from the Contractor's activities. Pre- and post- construction inspections must include representatives from the Contractor and the Agency. Damage identified as a result of the pre- and post-construction inspections that was caused by the Contractor's activities must be repaired by the Contractor to the Agency's satisfaction at no additional cost to the Agency.

13-2 REMOVING EXISTING FACILITIES

Existing facilities that interfere with the Work must be removed, reset, relocated, adjusted, or otherwise modified as shown on the Plans, specified in the Special Provisions, or directed by the Agency. Work on an existing utility must be coordinated with and approved by the facility owner and must comply with the requirements of the facility owner.

Trenches, holes, depressions and pits resulting from the removal of existing facilities must be backfilled with embankment material per Section 18, "Earthwork," of these Specifications. Trenches, holes, depressions and pits that are in surfaced areas, otherwise to remain undisturbed, must be backfilled with materials equal to or better in quality and to the same thicknesses as the surrounding materials.

13-2.01 Mailboxes

Existing mailboxes and newspaper tubes must be removed and reset where shown on the Plans or as directed by the Agency. Mailboxes must be maintained in an upright position adjacent to the construction area between the time the mailbox is removed and reset in its final location.

Mailboxes must be reset on 4 by 4 inches Douglas fir or redwood posts S4S, conforming to provisions of the State Specifications, unless otherwise noted on the Plans. Posts must be set a minimum of 24 inches in concrete bases. Concrete must be Class "C" Portland Cement Concrete as defined in Section 50-5, "Portland Cement Concrete," of these Specifications. Mailboxes that can be salvaged intact, including ornamental or iron supports, must be salvaged and reset. The bottom of mailboxes must be set at a height of 3'-6" above the back of curb or edge of shoulder.

For projects in the County of Sacramento, the face of the mailbox must be set 1 foot behind the back of sidewalk on Class "A" streets, 1 foot behind the back of curb on Class "B" streets, and 1 foot behind the outside shoulder line on Class "C" streets, or as shown on the Plans or directed by the Agency. The classes of streets are as defined in the Improvement Standards of the County of Sacramento, Public Works Agency.

13-2.02 Signs

Attention is directed to Section 12, "Safety, Public Convenience, and Traffic Control," of these Specifications regarding the maintenance of existing traffic control signs.

13-2.03 Survey Monuments

Existing survey monuments and markers shown on the Plans or found during progress of the Work must be preserved. (See Section 5-9.02, "Survey Monuments," of these Specifications.) Survey monuments and markers are hereinafter referred to as "monuments." The Contractor must notify the Agency of any monument encountered and must not remove, disturb or damage the monument until the monument can be cross-referenced and surveyed by the Agency. The Contractor must allow a minimum of 5 Working Days for referencing to be accomplished. When notified by the Agency that the cross-referencing has been completed, the monument may then be removed. The Contractor is not responsible for the replacement of monuments that have been cross-referenced and surveyed by the Agency as specified above.

If the Contractor fails to notify the Agency as specified above, or removes, disturbs or damages a monument that is not in direct conflict with the Work or due to the Contractor's carelessness or failure to notify the Agency of the presence of an existing monument, referencing, resurvey, and replacement of the monument is at the Contractor's expense and must be performed by or under the direction of California Licensed Land Surveyor or a California Registered Civil Engineer authorized to practice Land Surveying.

13-2.04 Landscaping Improvements

Existing landscape improvements and appurtenances including irrigation pipes, gate valves, remote control valves, sprinkler heads, hose bibs, automatic irrigation controllers, and yard

lighting systems that interfere with the Work must be removed. Irrigation pipes must be capped at the right-of-way line or easement line, unless otherwise shown or specified in the Contract. Irrigation systems that are affected by the Work which provide irrigation to existing landscaping that is not to be removed as part of the Work must be replumbed and rewired, when necessary, to be operational within 5 Working Days of being affected by the Work. Care must be taken to guarantee that the system is plumbed in a manner consistent with appropriate design pressure and flow. Irrigation lines must be flushed and free of dirt and debris prior to re-plumbing. The Contractor must make arrangements with the abutting property owner to salvage and stockpile materials removed during the Contractor's operations. On projects for underground construction of sewer, drainage, or water facilities in public utility easements or other easements, existing landscape improvements and appurtenances must be reconstructed to their original location and condition, unless otherwise shown or specified in the Contract.

Existing plant material (i.e. trees, shrubs, ground cover and lawn) within the area affected by the Work and designated for removal must be removed per Section 15, "Clearing and Grubbing," of these Specifications.

13-2.05 Abandoned Underground Facilities

Abandoned pipes, conduits, and other abandoned structures and facilities within 2 feet below the roadway subgrade must be removed and disposed of. Pipes that are lower than 2 feet below the roadway subgrade must either be removed or the ends plugged with concrete, at the option of the Contractor, unless specified otherwise in the Contract. Pipe ends must be plugged and structures must be abandoned in accordance with Section 15-1.04, "Abandonment of Pipes, Conduits and Structures," of these Specifications.

13-2.06 Drainage Facilities

The Contractor must maintain existing drainage facilities, including ditches, during the Work. Except where otherwise shown on the Plans, the Contractor must re-establish the drainage facilities to their original locations and in working condition as soon as possible after completing work in the area. For remedial maintenance projects or improvement projects in established areas, the Contractor must coordinate the work so that storm drain systems are fully operational at the end of each Working Day. No runoff is allowed to flow unconfined through trenches or excavations without approval of the Agency.

13-2.07 Fences

Fence material and gates to be relocated or reset must be removed with care to prevent damage to the material. Adhering concrete footings must be removed from fence posts and braces that are to be relocated or reset.

Relocated or reset fences must be placed a minimum of 2 feet from fire hydrants. For security of property or containment, temporary fencing must be furnished and erected where the removed existing fencing was, as shown on the Plans and as directed by the Agency.

Materials removed from existing fences that, in the opinion of the Agency, are unsuitable for reuse become the property of the Contractor and must be disposed of. The unsuitable material must be replaced with material of a type and quality equal to the best of the material in the existing facility. Furnishing of material to replace the unsuitable material will be paid for as extra work as provided in Section 9, "Changes and Claims," of these Specifications. Furnishing of material to replace material that has been damaged by the Contractor's operations will be at the Contractor's expense.

13-2.08 Concrete

Where a portion of a concrete structure, slab, or curb is to be removed, the concrete must be cut with a concrete saw so that the visible edge of the remaining concrete forms a neat, straight line. Where concrete slabs, curbs, ornamental walls, brick work, or similar items are encountered in the course of the construction of underground facilities, except drainage facilities

within road right-of-way, the structure or facility must be reconstructed to match the existing portion of the facility. On roadway projects and drainage construction in highway rights-of-way, the facility must be removed to the right-of-way line, and the end of the facility must be reconstructed to provide a neat appearance.

13-2.09 Removal of Traffic Stripes and Pavement Markings

Pavement surfaces where striping and markings have been removed and are not scheduled to be resurfaced must be slurry sealed. Limits of slurry seal are the full width of affected lanes and extend a minimum of 2 feet beyond the limits of the striping marking removal.

Removal of traffic stripes and pavement markings is required for areas of slurry seal and other areas specifically indicated for stripe removal as shown on the Plans. Removal of painted traffic stripes and pavement markings must comply with the requirements of the State Specifications. Traffic stripe removal must be completed no more than 2 Calendar Days prior to placement of slurry seal.

Traffic stripes and pavement markings must be removed by sandblasting or approved grinding method. To protect the public when sandblasting is performed within 10 feet of a lane occupied by vehicular traffic, the sandblast equipment must be equipped with a shield and a vacuum attachment operating concurrently with the pressure equipment to immediately remove grindings and sand from the surface of the roadway. The Contractor must immediately remove all remaining sand and grindings from the roadway.

Handling and disposal of hazardous materials associated with the removal of traffic stripes and pavement markings must comply with all applicable Federal, State, and local laws, rules, regulations, ordinances and statutes. The Contractor is responsible for all costs associated with non-compliance, including any fines levied.

Placement of permanent or temporary pavement striping, as detailed in Section 48-5 "Placement," of these Specifications, is required prior to opening the subject portion of roadway to traffic.

13-3 MEASUREMENT AND PAYMENT

Full compensation for protecting existing facilities is included in the prices paid for the various items of work, and no additional compensation will be allowed.

Payment for removing, resetting, relocating, adjusting, or otherwise working on existing facilities, will be made at the prices for the various items of work in the Contract, and will be payment for all work involved including disposal and salvaging.

Full compensation for conforming to the provisions in this Section not otherwise provided for is included in the prices paid for the various items of work involved, and no additional compensation will be allowed.

The Contract price paid per linear foot for relocating or resetting existing fence, includes full compensation for furnishing all labor, materials, tools, equipment, and incidentals and doing all the work involved in removing existing fence materials and gates, and relocating or resetting existing fences, complete in place, as specified in these Specifications, as shown or specified in the Contract, and as directed by the Agency.

Full compensation for clearing fence lines and disposing of the resulting material, excavating high points in the existing ground between posts, excavating holes, disposing of surplus excavated material, furnishing and placing Portland Cement Concrete footings, connecting the fences to structures and existing cross fences, and constructing temporary fences, is included in the price paid for relocating or resetting existing fences, and no additional compensation will be paid.

If there is no item in the Contract for relocating or resetting fences, full compensation for conforming to the provisions in this Section not otherwise provided for is included in the prices paid for the various items of work involved, and no separate payment will be made.

Removal of traffic stripes and pavement markings will be measured by the linear foot for removal of four-inch traffic stripes. Stripes of widths other than four inches will be converted to an equivalent length of four-inch stripe for determination of quantities. Traffic stripes with gaps or skipped striping will only be measured along portions with traffic striping; gaps without striping will not be measured for payment. Traffic stripe is defined as paint, thermoplastic, or other stripe material. The unit price bid for stripe removal includes full compensation for all material, tools, labor, and equipment to remove the traffic stripes and pavement markings, remove all debris from the roadway, and disposal of all waste as specified herein.

SECTION 18 - EARTHWORK

TABLE OF CONTENTS

<u>Section</u>	<u>Page</u>
18-1 GENERAL	18.1
18-2 ROADWAY EXCAVATION	18.1
18-2.01 General	18.1
18-2.02 Unsuitable Roadway Excavation and Backfill	18.1
18-2.03 Surplus Material	18.1
18-2.04 Unsuitable Material in Embankments	18.1
18-2.05 Subgrade Preparation	18.1
18-2.06 Relative Compaction	18.2
18-2.07 Measurement and Payment	18.2
18-3 STRUCTURE EXCAVATION AND BACKFILL	18.3
18-3.01 General	18.3
18-3.02 Control Density Backfill	18.3
18-3.03 Final Quantity	18.3
18-3.04 Measurement and Payment	18.3
18-4 DITCH AND CHANNEL EXCAVATION	18.3
18-4.01 General	18.3
18-4.02 Grade Control - Lined Channels	18.4
18-4.03 Unsuitable Ditch and Channel Excavation and Backfill	18.4
18-4.04 Unsuitable or Surplus Material Disposal	18.4
18-4.05 Channel Backfill	18.4
18-4.06 Channel Embankments	18.4
18-4.07 Pipe Adjustments	18.4
18-4.08 Payment	18.5
18-4.09 Final Pay Quantities	18.5
18-5 UNSUITABLE MATERIAL EXCAVATION	18.5
18-5.01 General	18.5
18-5.02 Backfill	18.5
18-5.03 Stabilization Fabric	18.6
18-5.04 Approximate Quantity	18.6
18-5.05 Payment	18.6
18-6 IMPORTED BORROW	18.7
18-6.01 General	18.7
18-6.02 Agreements	18.7
18-6.03 Placement	18.7
18-7 SURPLUS MATERIAL DISPOSAL	18.7
18-7.01 General	18.7
18-7.02 Agreement	18.7
18-7.03 Permits	18.8
18-7.04 Payment	18.8
18-8 CLASS "C" SUBGRADE	18.8
18-8.01 General	18.8
18-8.02 Preparation	18.8
18-8.03 Payment	18.9

SECTION 18 EARTHWORK

18-1 GENERAL

Earthwork must conform to the State Specifications, and these Specifications. All references to the "roadway prism", "roadway facilities", "roadway", and "highway" refer to the applicable project features shown on the Plans or referenced in the Special Provisions.

The method and rate of applying water for earthwork and dust control must conform to Section 16, "Water Used in Construction", and Section 17, "Dust Control", of these Specifications.

Attention is directed to Section 10, "Environmental Controls at Work Site", of these Specifications for additional requirements.

Settlement of trenches, structural backfill, or roadways will be deemed to be caused by defective compaction efforts by the Contractor and will be corrected by the Contractor at no cost to the Agency, regardless of compaction test results performed during construction.

18-2 ROADWAY EXCAVATION

18-2.01 General

Roadway excavation must conform to the State Specifications, and these Specifications.

The reference for compaction standard is ASTM D1557 throughout these specifications.

Roadway excavation includes removal of existing pavement sections, ditches and channels in the median area, between roadway and frontage roads and side ditches contiguous to the roadway and other locations shown on the Plans or referenced in the Contract. Excavation and embankment side slopes must be adjusted by the Contractor to clear existing utility poles, vegetation, and other improvements, as directed by the Agency.

Roadway excavation includes excavation of waterway channels as necessary to create a grading plane for the placement of slope protection.

18-2.02 Unsuitable Roadway Excavation and Backfill

Any unsuitable material encountered must be removed and backfilled in accordance with Section 18-5, "Unsuitable Material Excavation", in this Section of these Specifications.

18-2.03 Surplus Material

Unless otherwise specified in the Special Provisions, surplus excavated material is the property of the Contractor and must be disposed of away from the project site in accordance with the provisions in Section 18-7, "Surplus Material Disposal", of these Specifications.

18-2.04 Unsuitable Material in Embankments

Unsuitable material excavated as roadway excavation that, in the opinion of the Agency, can be used for roadway embankment must be placed in the embankment below a plane 30 inches below the finished grade and compacted to a minimum relative compaction of 90 percent.

Unsuitable material excavated as roadway excavation that, in the opinion of the Agency, cannot be worked into the roadway embankment is surplus material and must be removed from the work site or wasted within the right-of-way as directed by the Agency.

18-2.05 Subgrade Preparation

Subgrade preparation must be as specified in Section 19-5, "Compaction", of these Specifications, and conform to the State Specifications.

Organics that exist within the roadway prism prior to grading must be stripped from the ground surface. Stripping must extend 2 to 3 inches below the existing surface as directed by the Agency. Strippings are the property of the Contractor and must be removed from the job site. After removal of strippings, areas to receive fill material or new structural sections must be

scarified to a depth of at least 8 inches and recompact to a relative compaction of at least 95 percent.

Relative compaction of not less than 95 percent must be obtained for a minimum depth of 0.5 foot below the subgrade grading plane for the width between the outer edges of shoulders, whether in excavation, embankment, or at original ground level. All other material must be compacted to a relative compaction of 90 percent, including subgrade under meandering sidewalks not adjacent to curb and gutter. Embankment under bridge and retaining wall footings must be compacted as specified in the State Specifications.

When the next layer of material to be placed on the subgrade is an asphalt concrete pavement, asphalt concrete base, or asphalt concrete subbase, the subgrade grading plane at any point must not vary more than 0.05 foot above or below the grade established by the Agency.

Subgrade or aggregate base must be stable prior to paving. The Agency may direct the Contractor to proof roll the area prior to placing asphaltic concrete. The equipment used for the proof rolling is subject to the approval of the Agency.

For roadway construction, material encountered at the subgrade grading plane as shown on the Plans that the Agency determines unacceptable for roadway foundation must be removed. If the depth of removal is less than 12 inches, the area must be filled with roadway excavation material, if available, or Class 2 aggregate base. If the depth of unsuitable material encountered within the roadway prism extends to a depth of more than 12 inches below the grading plane, removal of unsuitable material must extend to 12 inches below the grading plane. The area from which the unacceptable material has been removed must then be compacted to a relative compaction of 95 percent, or as determined by the Agency. Fill for areas of unsuitable material removed to a depth of 12 inches below the grading plane for roadway construction shown on the Plans must include placement of geotextile fabric as specified in Section 18-5.03, "Geotextile Fabric", of these Specifications, and backfilled with Class 2 aggregate base.

For roadway construction, if there are insufficient quantities of native material to make subgrade, recycled asphalt concrete from the Work must be used. Removed asphalt concrete must be processed to 3-inch maximum size and thoroughly mixed with local native material and placed in the lower lifts of roadway fills as necessary to achieve subgrade.

Subgrade preparation requirements may be waived if the width of the subgrade to be prepared is less than 4 feet and the Agency determines that the existing undisturbed subgrade is firm and stable. The Agency may order mechanical tamping to obtain the desired firmness and stability. The Agency may order removal of soft and unstable material below the grading plane and backfilling with acceptable import materials if the subgrade (grading plane) is unsuitable to place the next layer of the structural section.

18-2.06 Relative Compaction

Whenever relative compaction is specified in these Specifications or the Special Provisions, the relative compaction will be determined by California Test Method. 231, "Method of Test for Relative Compaction of Untreated and Treated Soils and Aggregates by the Area Concept Utilizing Nuclear Gages", with the exception that an individual test result may not be reported as a representative test result. For County contracts, compaction testing will be reported on individual test results.

18-2.07 Measurement and Payment

Measurement and payment for roadway excavation will be the actual amount of roadway excavation performed as measured in the field and will conform to Section 8-1, "Measurement of Quantities," of these Specifications. The Contract price paid per cubic yard for roadway

excavation includes full compensation for compacting natural and original ground, subgrade preparation, haul and overhaul, excavation, placing earth embankment as shown on the Plans

and as directed by the Agency, and furnishing water necessary for the compaction of the material and subgrade preparation. The Contract price paid includes shaping and trimming slopes to solid material and to the lines and elevations shown on the Plans.

The removal of material within the areas of new landscaped median construction to allow for fill with imported topsoil for landscaping will be measured and paid for as roadway excavation. Material to be removed may include existing pavement, existing base material, existing soil and new fill material placed to construct the new roadway.

No additional payment will be made for proof rolling subgrade as directed by the Agency, removing unsuitable material from the work site, or placing unsuitable material in the roadway embankment.

Payment for geotextile fabric used in the backfill of unacceptable material encountered during roadway excavation will be paid for per Section 18-5.05, "Unsuitable Material Excavation – Payment", of these Specifications.

Payment for Class 2 aggregate base used in the backfill of unacceptable material encountered during roadway excavation for roadway construction will be paid for per Section 22-4, "Base and Subbase Material – Measurement and Payment", of these Specifications.

18-3 STRUCTURE EXCAVATION AND BACKFILL

18-3.01 General

Structure excavation and backfill must conform to the State Specifications, and these Specifications. Structure excavation and backfill includes all necessary excavation, structure backfill, and pervious backfill within the limits set forth on the Plans, Standard Drawings, and in the Special Provisions. Structure and pervious backfill must conform to the State Specifications.

Unless otherwise specified in the Special Provisions, jetting of structure backfill is not allowed.

18-3.02 Control Density Backfill

Control density backfill will only be permitted when specified in the Special Provisions. Where permitted, control density backfill must conform to the requirements of Section 50-15, "Control Density Backfill", of these Specifications.

18-3.03 Final Quantity

The quantity of structure excavation shown on the Plans and in the Estimated Quantities will be the final quantity for which payment will be made as provided in the State Specifications.

18-3.04 Measurement and Payment

Measurement and payment for structure excavation and backfill will be as set forth in the State Specifications, and these Specifications.

The Contract price per cubic yard for structure excavation includes full compensation for all necessary excavation, structure backfill, and pervious backfill within the limits set forth on the Plans, Standard Drawings, and in the Special Provisions.

When removing an existing structure which is to be replaced with a new structure, no payment will be made under this item for the area occupied by the existing structure.

18-4 DITCH AND CHANNEL EXCAVATION

18-4.01 General

Ditch and channel excavation must conform to the State Specifications, and these Specifications. Ditches and channels must be excavated to line and grade and sections as shown on the Plans. Material resulting from excavating ditches and channels must be used in fill and embankment areas as shown on the Plans.

18-4.02 Grade Control - Lined Channels

The Contractor must place grade control points at twenty-five-foot (25') intervals along the invert of the shaped channel. For channels greater than twelve feet (12') wide, the Contractor must place grade control points at twenty-five-foot (25') intervals along each edge of the bottom. Care must be taken to prevent excavating below the channel grade line or beyond the slope lines. Areas excavated below grade or beyond the slope must be filled with suitable materials, as determined by the Agency, and compacted to ninety percent (90%) relative compaction by the Contractor at the Contractor's expense.

18-4.03 Unsuitable Ditch and Channel Excavation and Backfill

Any unsuitable material encountered must be removed and backfilled in accordance with Section 18-5, "Unsuitable Material Excavation", in this Section of these Specifications.

18-4.04 Unsuitable or Surplus Material Disposal

Unsuitable or surplus material excavated as channel excavation which, in the opinion of the Agency, cannot be worked into the required embankments, is the property of the Contractor and must be disposed of as specified in Section 18-7, "Surplus Material Disposal", in this Section of these Specifications, unless otherwise specified in the Special Provisions.

18-4.05 Channel Backfill

In areas where the bottom of the existing channel is below the proposed grade or beyond the slope lines, the Contractor must fill and compact those areas to a minimum 90 percent relative compaction with suitable material, as determined by the Agency. This work is included in the Contract price paid for channel excavation and no additional payment will be made.

18-4.06 Channel Embankments

Embankments must be placed as shown on the Plans. Embankment areas must be filled with suitable material, as determined by the Agency, resulting from channel excavation. The fill must be placed in a neat and uniform manner, and must be spread uniformly to the grades as shown on the Plans. Where embankment is made on the existing channel or on other slopes, the existing slope must be plowed or cut into as the embankment is constructed so as to tie the new embankment to the existing slope. All fill slopes must be trimmed for a uniform appearance. Fill areas in unlined channels must be compacted to a minimum relative compaction of 90 percent, unless otherwise shown on the Plans.

In lined channels, fill areas must be compacted to a minimum relative compaction of 90 percent to an elevation 1 foot above the top of the channel lining, unless otherwise shown on the Plans.

Localized erosion, sloughing or other slight irregularities in the existing channel which may occur between cross-sections, may not be shown on the Plans or cross-sections. Where the localized erosion, sloughing or irregularities extend beyond the limits of the channel cross-section, these areas must be filled and compacted to conform to the design channel cross-section. No additional payment will be made for these fills.

18-4.07 Pipe Adjustments

Side drain pipes without racks or flap gates must be extended or shortened as required to discharge into the new channel so that the pipe outlet is flush with the channel. The pipe used for extending existing side drains must be of the same diameter as the existing pipe, and must conform to one of the options specified in these Specifications.

Side drain pipes with access control racks or flap gates must be extended or shortened to conform with Standard Drawing 9-26H. Access control racks must conform to Standard Drawing 9-26G.

The method of placing pipe extensions must conform to these Specifications and the Standard Drawings. Existing side drain pipes to be shortened must be neatly cut off parallel to the slope of the channel.

18-4.08 Payment

The unit price paid for ditch and channel excavation will be as specified in the State Specifications.

18-4.09 Final Pay Quantities

When the Estimated Quantities for a specific portion of the Work are designated on the Plans as Final Pay Quantities, the Estimated Quantities will be the final quantities for which payment for the specific portion of the Work will be made, unless the dimensions of said portions of the Work shown on the Plans are revised by the Agency. If the dimensions are revised, and the revisions result in an increase or decrease in the Estimated Quantities of portions of the Work, the final quantities for payment will be revised to the amount represented by the changes in the dimensions. The Estimated Quantities for specific portions of the Work are approximate only and no guarantee is made that the quantities that can be determined by computations based on the details and dimensions shown on the Plans will equal the Estimated Quantities. No additional payment will be made if the computed quantities do not equal the Estimated Quantities.

If portions of an item are not designated on the Plans as Final Pay Quantities, those portions will be measured and paid for in accordance with the applicable provisions of these Specifications and the Special Provisions.

In case of any discrepancy regarding final pay quantities, the Final Pay Quantities shown on the Plans will govern.

18-5 UNSUITABLE MATERIAL EXCAVATION**18-5.01 General**

Unsuitable or unacceptable material encountered in the construction of roadways must be removed as roadway excavation and backfilled as detailed in Section 18-2.05, "Subgrade Preparation", in these Specifications.

Unsuitable material is material determined by the Agency to be unsuitable in its natural location and condition for roadway, channel, or structural foundation. Unsuitable material is material below a horizontal plane 2 feet below subgrade for channel or foundation of structure as determined by the structural section, flow line or foundation, or 2 feet below original ground, whichever is lower.

The Contractor's method of excavating unsuitable material must not undermine the existing base material. If, in the opinion of the Agency, the Contractor's method of excavating is increasing the amount of unsuitable material required to be excavated, the Agency will direct the Contractor to correct the condition at the Contractor's expense.

18-5.02 Backfill

Backfill to replace unsuitable materials must be placed and compacted to a minimum relative compaction of 95 percent within 30 inches of finished grade on roadways and structural foundations, and to a minimum relative compaction of 90 percent below 30 inches of finished grade on roadways and below subgrade in channels.

Suitable backfill material must be one of the following:

1. Pit run materials as specified in Section 50-8, "Pit Run Base (Graded)", of these Specifications.
2. Roadway, structural, or channel excavation material approved by the Agency.
3. Imported borrow as specified in Section 18-6, "Imported Borrow", of these Specifications.
4. Cobbles as specified in Section 50-9, "Cobbles", of these Specifications.
5. Geotextile fabric as specified in Section 50-10.01, "Nonwoven Geotextile Fabric", of these Specifications, backfilled with Class 2 aggregate base.

6. Any approved combination of 1, 2, 3 and 4 above.

18-5.03 Stabilization Fabric

If during the preparation of the bottom of an excavation, or during the proof rolling of roadway subgrade, it becomes apparent to the Agency that the existing grade is unstable, a woven stabilization (geotextile) fabric must be used as directed by the Agency. The fabric must be a woven fabric with similar characteristics as Mirafi 600X, as described in Section 50-10-02.

Prior to placing the stabilization fabric, the unstable road subgrade must be over-excavated a minimum of 18", or as directed by the Agency, the exposed bottom must be rolled as smooth as practical before the stabilization fabric is placed. The fabric must overlap a minimum of 18 inches, or must be sewn or glued. If overlapped, the fabric must be placed so that the preceding roll overlaps the following roll in the direction that the aggregate base is to be spread. The fabric coverage must be wider than the unstable zone, a minimum of 18 inches in all directions, and may be tacked or pinned on the outer edges to hold in place. If sewn or glued, the seam strength must be at least 90 percent of the rated tensile strength of the fabric.

Once placed, the fabric must be covered by at least 18 inches of Class 2 Aggregate Base, unless other material is specified by the Agency. The first lift must be 12 inches in thickness, and all subsequent lifts must be 6 inches thick. All Aggregate Base must be compacted to a minimum degree of 95 percent of ASTM D-1557, unless otherwise specified by the Agency.

The geotextile fabric must be shipped and stored in a protective wrapping that protects the fabric from ultraviolet radiation. The fabric must be covered with the approved fill material within 48 hours of placement. The fabric must remain flat and unwrinkled during fill placement. If the fabric is damaged during construction, the damaged section must be covered by a new piece of fabric that is large enough to meet the overlap requirements described in this Section.

18-5.04 Approximate Quantity

Where a quantity is shown in the Contract for unsuitable material excavation, the quantity is approximate and is indicated for bid comparison only. No guarantee is made or implied that the quantity shown will not be reduced or increased or deleted, as required by the Agency.

18-5.05 Payment

The additional excavation greater than that required for preparation of original ground or subgrade will be paid for at the Contract unit price per cubic yard for the various types of excavation involved. Unsuitable material excavated more than 2 feet below subgrade will be paid for as extra work per Section 9, "Changes and Claims", of these Specifications if no item for unsuitable material excavation appears in the Contract.

Backfill, when made with material excavated from the work site, will be paid for at the same Contract unit price paid for roadway excavation or channel excavation, whichever applies. The pay quantity will be the same as that quantity computed for unsuitable material excavated.

Imported borrow, pit run material and cobbles, and the placing of such materials, will be paid for as specified in these Specifications for those items.

The quantity of geotextile fabric to be paid for will be measured by the square yard of area covered, not including additional fabric for overlap. The Contract price paid per square yard for the geotextile includes full compensation for furnishing all labor, materials, tools, equipment, and incidentals. The price per yard also includes doing all work involved in placing the geotextile, complete in place, as directed by the Agency. The need for this item is contingent upon the need to stabilize unsuitable base material encountered during construction and may be extended or deleted without limit at the discretion of the Agency with no change in the Contract unit price.

If the Contractor elects to place cobbles or other material in the channel bottom to provide a working surface in lieu of de-watering the channel, the cost of furnishing and placing the material is at the Contractor's sole expense.

18-6 IMPORTED BORROW

18-6.01 General

Imported borrow must consist of material required for the construction of embankments and must be obtained from sources listed in the Special Provisions or, if no sources are listed, from sources the Contractor may elect. The Contractor's sources must be approved in advance by the Agency. Imported borrow must be free of roots, vegetable matter, and other unsatisfactory material, and be of such character that it will readily bind to form a firm and stable embankment when compacted.

The imported borrow material must have a sand equivalent of not less than the average sand equivalent of the native material that is adjacent to the existing roadbed, and an R-value of not less than 20, or as otherwise specified in the Special Provisions. Clayey soils cannot be used. Imported borrow material must be tested by the Contractor at the Contractor's expense prior to being transported to the project site. Test result must be provided to the Agency.

If the Contract does not contain a pay item for imported borrow, the earthwork must be considered balanced with no imported material required. If the Agency deems it necessary to place imported borrow due to field conditions, shrinkage, or swell, the imported material must be furnished and placed as extra work, as provided in Section 9, "Changes and Claims", of these Specifications.

18-6.02 Agreements

The Contractor must enter into an agreement with the property owner of any privately owned material site to hold the owner harmless from any claims for injury to persons or damage to property resulting from the Contractor's operations on said property. The agreement must contain provisions to relieve the Agency of any obligation to the property owner or claims for injury or damage of persons or property. Copies of the agreement and all permits, licenses and environmental clearances required for the removal of the material from the site must be furnished by the Contractor to the Agency a minimum of 2 Working Days prior to commencing operations at the material site. The Contractor's attention is directed to the State Specifications regarding local materials and their sources.

18-6.03 Placement

The imported borrow material must be placed and compacted as specified for roadway embankment.

18-7 SURPLUS MATERIAL DISPOSAL

18-7.01 General

Surplus materials resulting from excavations not required for backfill or embankment construction or to satisfy right-of-way agreements as set forth on the Plans and in the Special Provisions, are the property of the Contractor, and the Contractor must dispose of the surplus materials off the rights-of-way or easements, unless permitted by the Agency to be disposed of on the work site.

18-7.02 Agreement

When any materials are to be disposed of outside the rights-of-way or easements, the Contractor must obtain written permission from the property owner upon whose property the disposal is to be made. The Contractor must enter into an agreement with the property owner to hold the owner harmless from any claims for injury to persons or damage to property resulting from the Contractor's operations on the property. The agreement must contain provisions to relieve the Agency of any obligation to the property owner for any injury or damage to persons or property. The agreement must also include a sketch showing the location where the material is to be deposited. A copy of the permission obtained from the property owner, the agreement, and all permits, licenses and environmental clearances required for the disposal must be

furnished by the Contractor to the Agency a minimum of 2 Working Days prior to commencing disposal operations. Excess materials cannot be deposited in a location that will block or restrict a natural or artificial drain. Material cannot be deposited within the dripline of certain ornamental, landmark, and native oak trees, as specified in Section 10-13, "Protection of Existing Trees", of these Specifications.

18-7.03 Permits

If copies of all required permits are not provided to the Agency as required, the Contractor's operations may be stopped in accordance with Section 5-21, "Temporary Suspension or Delay of Work", until copies of the permits are provided to the Agency.

The Contractor or owner of the property where excess material is to be deposited is responsible for obtaining all required permits from any agency that has jurisdiction over the proposed disposal site.

If the disposal of materials outside the right-of-way or easements could affect any waterway as set forth in Ordinance No. 1 of the Sacramento County Water Agency, the Contractor must obtain a permit from that agency, in addition to the property owner agreement as set forth above.

In addition to any permit required by the Sacramento County Water Agency, disposal of materials must conform to the applicable Agency grading ordinances. The Contractor or the owner of property on which material is to be disposed of must obtain a grading permit, if required, prior to disposal of any excess excavated material.

Copies of any required permits must be furnished to the Agency. No permits will be required if disposal sites are shown on the Plans unless otherwise specified on the Plans or in the Special Provisions.

Prior to placing any material within the 100-year floodplain of any of the 13 natural streams as adopted by the Board of Supervisors, the Contractor or property owner must first obtain a Use Permit from the Planning and Community Development Department.

18-7.04 Payment

Compensation for disposal of surplus material and all is included in payment for other earthwork items and no separate payment will be made.

18-8 CLASS "C" SUBGRADE

18-8.01 General

Areas of existing pavement shown on the Plans or as directed by the Agency to receive an overlay of asphalt concrete must be prepared as Class "C" subgrade. Class "C" subgrade applies to subgrade prepared on an existing roadbed, subbase, base, surfacing or pavement that was not constructed by the Contractor, and on which a layer of subbase, base, surfacing, pavement, or other specified material is to be placed.

18-8.02 Preparation

In advance of spreading new subbase, base, surfacing or pavement material, the existing roadbed, subbase, base, surfacing or pavement must be cleaned of all dirt and loose material.

If ordered by the Agency, a leveling course of the material to be placed must be spread upon the existing roadbed, subbase, base, surfacing, or pavement, in accordance with the specifications for the type of material being placed.

Where shown on the Plans or specified or directed by the Agency, the existing roadbed, subbase, base, surfacing or pavement must be scarified, watered, and rolled prior to placing new material.

Broken, failed or other unsatisfactory portions of the existing roadbed, subbase, base, surfacing or pavement, and sections interfering with new construction must be removed and disposed of. The areas and depths to be removed will be directed by the Agency. The area in

the exposed spaces must be watered and compacted, after which the space must be filled with subbase, base, surfacing or pavement material as directed by the Agency.

18-8.03 Payment

Unless otherwise specified in the Special Provisions, the excavation and disposal of existing pavement other than that shown on the Plans to be excavated as a part of, or adjacent to, an area to be excavated to provide a new structural section, will be paid for as extra work per Section 9, "Changes and Claims", of these Specifications.

Excavation of pavement and materials shown on the Plans necessary for preparation of Class "C" subgrade will be paid for as roadway excavation as set forth in Section 18-2.07 "Roadway Excavation - Measurement and Payment", of these Specifications.

Full compensation for furnishing all labor, material, tools, equipment, and incidentals and for doing all the work involved in preparing Class "C" subgrade, including the leveling course, excluding excavation, as shown on the Plans, specified in these Specifications or the Special Provisions, or as directed by the Agency, is included in the Contract prices paid for the materials, in place on the subgrade as shown on the Plans, or directed by the Agency.

**SECTION 19 - TRENCH EXCAVATION, BEDDING AND BACKFILL
TABLE OF CONTENTS**

<u>Section</u>	<u>Page</u>
19-1 TRENCH EXCAVATION.....	19.1
19-1.01 Exploratory Excavation	19.1
19-1.02 Trench Width	19.1
19-1.02.A Storm Drain Pipe	19.1
19-1.02.B NOT USED.....	19.1
19-1.02.C Water Pipe.....	19.1
19-1.03 Pavement Cutting	19.1
19-1.04 Maximum Length of Open Trench.....	19.2
19-1.05 Control of Water.....	19.2
19-1.06 Shoring and Bracing	19.2
19-1.07 Special Foundation Treatment	19.2
19-1.08 Excavation Method	19.3
19-1.09 Payment	19.3
19-2 PIPE BEDDING AND BACKFILLING OF TRENCHES	19.3
19-2.01 Pipe Bedding	19.3
19-2.01.A NOT USED.....	19.3
19-2.01.B Storm Drain	19.3
19-2.01.C Water Distribution Systems	19.4
19-2.02 Initial Backfill	19.4
19-2.02.A NOT USED.....	19.4
19-2.02.B Storm Drain	19.4
19-2.02.C Water Distribution Systems	19.5
19-2.03 Trench Backfill	19.5
19-2.04 Payment	19.6

SECTION 19 TRENCH EXCAVATION, BEDDING AND BACKFILL

All sewer facilities constructed within the Sacramento Area Sewer District service area (<http://www.sacsewer.com/pdf/map-servicearea.pdf>) must be constructed in accordance with the Sacramento Area Sewer District Standards and Specifications available at <http://www.sacsewer.com/pdf/ord/2011-SASD-Standards-and-Specifications-v1.pdf>

19-1 TRENCH EXCAVATION

Trench excavation includes the removal of all materials and obstructions and the control of water necessary to construct the Work as shown or specified in the Contract. Unless otherwise shown or specified in the Contract, excavation must be by open cut or as directed by the Agency.

Attention is directed to Section 10-5, "Control of Water in the Work", and Section 14, "Restoration of Surfaces", of these Specifications, for additional requirements. Surface water must not be allowed to enter the pipe trench or the existing downstream pipe system. Surface water, groundwater, pipe leakage, or the contents of severed pipe must not be permitted to enter water pipe that is not abandoned.

Section 18-2.03, "Surplus Material" and Section 18-7, "Surplus Material Disposal", of these Specifications applies to excess material from trench excavations.

19-1.01 Exploratory Excavation

An encroachment permit must be obtained from the Agency prior to exploratory excavations within highway rights-of-way or other public easements. Prior to the end of each work day, exploratory excavations made outside of the paved surface during that work day must be backfilled with sand or native excavated materials as directed by Agency and mechanically compacted to prevent settlement. Excavations made within the paved surface must be permanently restored per Standard Drawing 4-64.

19-1.02 Trench Width

Minimum and maximum trench widths at the top of the pipe must be as shown or specified in the Contract Documents or these Specifications. If trench widths at the top of the pipe are exceeded, the Contractor must provide stronger pipe or improved bedding and backfill conditions, as approved by the Agency to meet the changed load requirements. If the trench width is exceeded for any reason within the Contractor's control, the stronger pipe or improved bedding and backfill will be provided at the Contractor's expense.

19-1.02.A **Storm Drain Pipe**

Unless otherwise shown or specified in the Contract, for storm drain pipe the minimum and maximum trench width must be as shown on Standard Drawing 9-1.

19-1.02.B **NOT USED**

19-1.02.C **Water Pipe**

Water pipe minimum and maximum trench widths are shown on Standard Drawing 8-17 unless otherwise shown or specified in the Contract.

19-1.03 Pavement Cutting

When the trench is in an existing paved area, work must be done in accordance with Standard Drawing 4-64. Pavement must be saw cut on neat lines parallel and equidistant from the trench centerline. The width of the saw cut must not be greater than is required to properly install the pipe and not damage the edges of the pavement left in place, or as directed by the

Agency. Pavement between the lines must be broken up and removed as directed by the Agency immediately ahead of the trenching operations.

Pavement must not be cut until the respective utility companies have marked the location of their underground facilities and the Agency has given final approval of the trench alignment.

19-1.04 Maximum Length of Open Trench

Unless otherwise specified in these Specifications or the Special Provisions, or approved by the Agency in writing, at the end of each work day, no more than 300 feet of trench is allowed to remain open at any one location, including excavation, pipe laying and appurtenant construction, backfill, and trench that has not been temporarily resurfaced, but excluding manhole excavations. The remainder of the trench must be backfilled and compacted, and when in streets, opened to traffic as soon as possible. The maximum allowable length of open trench for cast-in-place concrete pipe is specified in Section 36-3, "Trench Excavation", of these Specifications. Failure by the Contractor to comply with these limitations may result in a temporary suspension of work in accordance with Section 5-21, "Temporary Suspension or Delay of Work", of these Specifications.

19-1.05 Control of Water

Control of water must conform to the requirements in Section 10-5, "Control of Water in the Work", of these Specifications.

19-1.06 Shoring and Bracing

The Contractor must furnish and install sufficient shoring and bracing to insure the safety of personnel and public, protect the Work, and protect adjacent improvements. The Contractor must comply with the requirements of Section 12-6, "Excavation and Trench Safety", of these Specifications.

Sheeting must not extend below the bottom of the pipe barrel. The contractor must take care to prevent damage to existing surface or subsurface improvements, both public and private, during drilling and driving operations. Unless otherwise specified in the Special Provisions or required by the Agency, all sheeting, timbering, lagging, and bracing must be removed during backfilling, and in a manner that prevents movement of the ground or damage to the pipe or other structures. When the Agency requires that sheet piling, lagging, and bracing be left in place, it must be cut off where designated and the upper part withdrawn. If steel piling is used, it may be removed as backfill is placed and compacted.

When using movable trench supports, care must be exercised to prevent disturbing the pipe location, jointing, or embedment. Removal of trench protection below the top of the pipe and within 2-1/2 pipe diameters on each side of the pipe will be prohibited after the pipe embedment has been placed and compacted. Movable trench supports will only be allowed in either wide trench construction where supports extend below the top of the pipe or on a shelf above the pipe with the pipe installed in a narrow, vertical wall subditch. Voids left in the trench wall or embedment materials by support removal must be filled with bedding material and compacted. Removal of bracing between sheeting must only be done where backfilling proceeds and bracing is removed in a manner that does not relax trench support.

19-1.07 Special Foundation Treatment

Whenever the bottom of the trench is soft, spongy, unstable, rocky, or, in the opinion of the Agency, otherwise unsuitable as a foundation for pipe bedding, the unsuitable material must be removed to a minimum depth of 6 inches, or to a depth designated by the Agency, and replaced with compacted crushed rock, gravel, or sand as directed by the Agency. When the trench bottom is cobbled or of material that might, in the opinion of the Agency, allow loss of sand backfill, the backfill material must be crushed rock or gravel graduated so that 100 percent will pass the 3/4 inch sieve and not more than 15 percent will pass the number 8 sieve. Crushed rock or gravel must conform to Section 50-16, "Clean Crushed Rock", of these Specifications.

Sand backfill, when permitted or required by the Agency, must conform to the requirements in Section 50-13.01, "River Sand", of these Specifications. The backfill must be compacted to a non-yielding condition. Jetting is not permitted. As an alternate to the bedding materials specified above, the Agency can direct the Contractor to furnish and place geotextile fabric below the bedding materials. The geotextile material must be a woven fabric in accordance with Section 50-10.02, "Woven Geotextile Fabric", of these Specifications. Unless stated otherwise in the Special Provisions, furnishing and placing of geotextile fabric will be paid for as extra work per Section 9, "Changes and Claims", of these Specifications.

If material more than 12 inches below the typical trench bottom is ordered removed by the Agency, the excavation below that point and the imported material required to backfill the trench to that elevation will be paid for as extra work per Section 9, "Changes and Claims", of these Specifications unless otherwise specified in the Special Provisions. Before excavation of the pipe trench in fill areas or roadway embankments, the fill area or embankment must be completed to a height above the pipe invert grade line of not less than 2 times the internal pipe diameter or to final fill or embankment subgrade, whichever is lower, but in no case less than 12 inches above the top of the pipe. The embankment must be compacted to a minimum relative compaction of 90 percent for a distance on each side of the pipe equal to at least 2 pipe diameters. The remainder of the embankment must be compacted to the minimum relative compaction specified elsewhere in these Specifications for the type of construction being done, or as specified in the Special Provisions or on the Plans. Special foundation treatment for cast-in-place concrete pipe must be as specified in Section 36-4, "Cast-In-Place Concrete Pipe (CIPCP) - Special Foundation Treatment", of these Specifications.

19-1.08 Excavation Method

Methods used in excavation must not damage surrounding property, remaining pavement, or existing improvements that are to remain. Outriggers for excavation equipment, and other heavy equipment, must be fitted with street pads to prevent pavement damage.

19-1.09 Payment

Full compensation for trench excavation, including all equipment, labor, materials, control of water, shoring and bracing, and other safety measures required, is included in the prices paid per linear foot of the respective sizes, grades, and types of pipes listed in the Contract, and no additional compensation will be paid.

Additional bedding material used to stabilize the foundation if required, over the amount required by the Contract, will be paid for as provided in the Special Provisions, unless the necessity for the additional bedding material was caused by an act or failure to act on the part of the Contractor or is required for the control of groundwater, in which case the Contractor is responsible for the expense of the additional excavation and material.

19-2 PIPE BEDDING AND BACKFILLING OF TRENCHES

19-2.01 Pipe Bedding

Pipe bedding must be furnished and placed as shown on the Plans and in accordance with the requirements of these Specifications. Pipe must be placed on a firm layer of bedding material, and must be bedded uniformly throughout its length. Pipe bedding material for water distribution systems must conform to the requirements in Section 50-13.02, "Graded Sand", of these Specifications.

19-2.01.A NOT USED

19-2.01.B Storm Drain

Unless otherwise indicated in the Contract, storm drain pipe bedding must be furnished and placed as detailed in Standard Drawing 9-1 and in conformance with these Specifications.

Storm drain pipe bedding material must conform to Section 50-16, "Clean Crushed Rock", of these Specifications.

To achieve uniform placement in the bedding material, shape the bedding or, if approved by the Agency, lightly "bounce" the pipe to set it into the bedding. Pipe bedding material must be placed at a minimum thickness meeting the greater of the following criteria:

1. The minimum bedding thickness is 3 inches for pipe with an internal diameter 10 inches or less, and 4 inches for pipe with an internal diameter 12 inches or greater; or
2. The minimum bedding thickness must be equal to the difference between the outside diameter of the pipe barrel and bell plus 1-1/2 inches; or
3. When soil conditions in the trench bottom are unstable, rocky, or otherwise unsuitable as a foundation for pipe bedding, the minimum bedding thickness must conform to Section 19-1.07, "Trench Excavation - Special Foundation Treatment", in this Section.

19-2.01.C Water Distribution Systems

Water distribution pipes must have 6 inches of sand bedding that conforms to the requirements of Section 50-13.02, "Graded Sand", of these Specifications. If existing soil is too porous to hold sand, a geotextile fabric approved by the Agency must be placed on the trench bottom. Ductile iron pipe and fittings, copper pipe and fittings, valves, and all other buried metal must be encased in 8 mil polyethylene encasement in accordance with AWWA C105 and Section 41-5.03, "Polyethylene Encasement," of these Specifications.

19-2.02 Initial Backfill

Initial backfill must be furnished and placed as shown or specified in the Contract and in accordance with the requirements in these Specifications.

19-2.02.A NOT USED

19-2.02.B Storm Drain

Unless otherwise specified in the Special Provisions, the following initial backfill requirements apply.

- For cast-in-place concrete pipe, initial backfill must conform to Section 36-14, "Cast-in-Place Concrete Pipe (CIPCP) – Backfill", of these Specifications and Standard Drawing 9-1.
- For all other pipes initial backfill for storm drain construction must conform to this Section 19 and Standard Drawing 9-1.
- Granular materials must conform to Section 50-16, "Clean Crushed Rock", of these Specifications.
- For field conditions requiring control density backfill the material must conform to Section 50-15, "Control Density Backfill", of these Specifications.
- For field conditions requiring portland cement concrete backfill the material must conform to Section 50-5.01, "Portland Cement Concrete - Composition", Class "B-2", of these Specifications.

After placement of bedding, the Contractor must place initial backfill material to the spring line of the pipe, thoroughly compacting it by vibratory drum roller, vibrating surface plate, insertion vibrator, shovel slicing, or light tamping to provide proper support under the pipe haunches. The remaining initial backfill material must be placed per Standard Drawing 9-1. To reduce impact damage, there must be at least 12 inches of cover over the pipe before using hand-held or walk-behind compaction equipment, and at least 3 feet of cover before using ride-on equipment. The pipe must not be disturbed or displaced during placement and compaction.

When using control density or concrete backfill, the Contractor must anchor the pipe to prevent floating or displacement of the pipe. The anchors must be spaced to insure a continuous even grade in the flow line of the pipe.

19-2.02.C Water Distribution Systems

Initial backfill for water distribution systems must be placed immediately after pipe joints have been completed and inspected by the Agency and must comply with the requirements of Standard Drawing 8-17. Unless otherwise specified, initial backfill for water distribution systems, including pipes, fire hydrant branch leads, water services, and water appurtenances, must be sand conforming to the requirements in Section 50-13.02, "Graded Sand", of these Specifications. Initial backfill must be placed and compacted to a height of 8 inches above the top of the pipe.

Initial backfill must be placed immediately after pipe joints have been completed and inspected by the Agency. The material must be carefully placed and compacted so as not to disturb or damage the pipe, and must be brought up evenly on both sides. Initial backfill material must be placed in layers not exceeding 8 inches in depth before compaction at or near optimum moisture content. Compaction must be by mechanical pneumatic or vibratory compaction equipment approved by the Agency. Ponding or jetting is not permitted, although water may be sprayed from a 2-inch truck hose onto initial and final sand backfill. The compacted material must achieve a relative compaction of at least 90 percent as determined by ASTM D-1557. Trench jacks must not be removed prior to completion of initial backfill. If a trench shield or rolling shoring system is used, it must be raised as backfill lifts are compacted so that the bottom of the shoring is not within the lift being compacted. The method of raising must not allow loose soil from the trench walls to contaminate the initial backfill zone.

19-2.03 Trench Backfill

Trench backfill must consist of material placed between the initial backfill and subgrade in paved areas or to the top of the trench in unpaved areas, unless otherwise shown or specified in the Contract.

The trench backfill material can be native material excavated at the work site if the trench depth is greater than 4 feet measured from the top pipe to the finished road surface. The native material is subject to approval by the Agency, and must be free of organic or other unsuitable materials that can cause voids or depressions to develop during or after placement of the backfill. Rocks, stones and solid earth chunks exceeding 3 inches in greatest dimension are not allowed in trench backfill material.

Trench backfill material must be placed in layers not exceeding 8 inches in depth before compaction at or near optimum moisture content. Until the total backfill above the top of the pipe exceeds 3 feet, machine-placed backfill material must not be allowed to "freefall" more than 2 feet. Compaction effort must be applied parallel to the pipeline starting at the trench wall and proceeding to the center of the trench. If a trench shield or rolling shoring system is used, it must be raised as backfill lifts are compacted so that the bottom of the shoring is above the lift being compacted, without allowing the trench walls to collapse or otherwise contaminate the backfill.

The backfill material for trench depths less than 4 feet measured from the top pipe to the finished road surface must be imported granular material, uniformly graded Class 2 aggregate base conforming to the requirements in Section 50-7, "Aggregate Bases", of these Specifications. The imported granular material must be placed in lifts not to exceed 6 inches after compaction. Compaction requirements for imported granular material are the same as compaction requirements for job-excavated native material.

Unless otherwise shown or specified in the Contract, compaction of backfill material must be by mechanical pneumatic or vibratory compaction equipment appropriate to the existing conditions that will not result in damage to adjacent ground, existing improvements or the Work. Ponding and jetting methods will not be permitted, except by written permission of the Agency.

Unless otherwise shown or specified in the Contract, trench backfill material must be compacted to a relative compaction of not less than 90 percent, as determined by ASTM

D1557. The top 6 inches below the subgrade must be compacted to a relative compaction of 95 percent, except that trenches in easements outside the street rights-of-way must be compacted to 90 percent relative compaction throughout the depth. Compaction testing will be performed by the Owner and the cost thereof will be borne by the Agency, except that retests of areas that fail to meet the required compaction will be charged to the Contractor and deducted from payment due the Contractor.

Unless otherwise specified in the Special Provisions, the Contractor has the option to use imported granular material for trench backfill in place of native material excavated at the work site. The imported granular material must be uniformly graded Class 2 aggregate base conforming to the requirements in Section 50-7, "Aggregate Bases", of these Specifications. The imported granular material must be placed in lifts not to exceed 6 inches after compaction. Compaction requirements for imported granular material are the same as compaction requirement for job-excavated native material. Unless otherwise specified in the Special Provisions, the optional use of imported granular material for trench backfill is at the Contractor's expense.

No warranty is made or otherwise implied as to the suitability of native material excavated at the work site for use as trench backfill material. Costs for processing native materials for use as trench backfill materials must be at the Contractor's sole expense and are not reimbursable by the Agency.

19-2.04 Payment

Full compensation for furnishing, placing, and compacting pipe bedding and trench backfill materials is included in the prices paid per linear foot of the respective sizes, grades, and types of pipes listed in the Contract, and no additional compensation will be paid.

Actual excavation quantities to be paid for will be calculated based on the maximum width of trench shown on the plan and measured at the top of the pipe.

Actual trench resurfacing quantities to be paid for will be calculated based upon the maximum width of trench specified herein.