

## **SECTION 18**

### **EARTHWORK AND SITE WORK**

#### 18-1 General

##### 18-1.01 Scope

This section covers earthwork and site work. Trench excavation, backfill and (trench) surface restoration, as well as clearing and grubbing, are covered elsewhere in these specifications.

##### 18-1.02 Description of Work

Work under this section shall include, but not be limited to, demolition, site grading, structure excavation and backfill, fencing, culverts, headwalls, aggregate base, paving, erosion control, and surface restoration.

##### 18-1.03 Commencement of Work

Work under this section shall not commence until all control stakes have been set and the Contractor has attended a field inspection with the District Engineer.

##### 18-1.04 Restrictions and Limits

Restrictions to tree and vegetation removal and limitations of work are as described in Section 11 (Clearing and Grubbing) of these specifications.

#### 18-2 Materials

##### 18-2.01 Structure Backfill

Structure backfill shall consist of select backfill, imported fill, or imported select fill. At least 10 days prior to the placement of any fill, the District Engineer shall be notified and samples shall be obtained to determine the suitability of the materials and for conducting compaction tests on these samples.

###### 18-2.01-A Select Backfill

Materials for backfill shall be fine, readily compactable soil or soil-rock mixture selected from the excavation, or from other approved sources, and shall not contain frozen lumps, stones or rock fragments larger than 4-inches, chunks of highly plastic clay, organic or other objectionable material. Rock fragments over 4-inches may be reused if processed down to hard fragments less than 4-inch in size.

###### 18-2.01-B Imported Fill

Materials shall be approved by the District Engineer; they shall meet the requirements of Paragraph 18-2.01-A; shall have plasticity index not exceeding six (6); and, shall be of 3-inches maximum particle size.

### 18-2.01-C Imported Select Fill

Material shall consist of silty sand free of organic matter or other objectionable material, approved by the District Engineer, and meeting the following requirements:

Minimum "R" Value	45
Maximum Expansion Pressure* (psf)	10
Maximum Plasticity Index	6

\*Test Method California 301 - Value at 300 psi exudation pressure.

### 18-2.02 Aggregate Base and Crushed Rock

Aggregate base and crushed rock shall conform to the requirements of Sections 12-2.13-A and B.

### 18-2.03 Drain Rock

Material shall be clean gravel or crushed rock of 1-inch maximum size, with no material passing a Number four (#4) sieve.

### 18-2.04 Seeding and Mulching

Seeding and mulching of areas not paved or aggregate based shall be as specified in Section 29 of these specifications.

### 18-2.05 Pavement

Asphalt pavement shall be asphaltic concrete pavement conforming to CALTRANS, Section 39, and meeting the aggregate grading requirement for ½-inch maximum, medium gradation, and using grade AR-4000 paving asphalt conforming to CALTRANS, Section 92.

## 18-3 Workmanship

### 18-3.01 Preparation for Excavation and Fill Placement

Clearing and grubbing shall conform to Section 11 of these specifications.

#### 18-3.01-A Stripping

Topsoil containing grass roots and other organic matter shall be stripped to a depth of 4" from all excavation and fill areas. The strippings shall be stockpiled at a location acceptable to the District Engineer and then placed on new fill slopes per the plans. Strippings shall be compacted to a minimum of 85 percent relative compaction.

#### 18-3.01-B Preparation for Fill Placement

Stump holes, pits, and depressions within fill areas shall be broken down so as to flatten out the slopes. Each pit or depression, unless otherwise directed, shall be filled with properly moisture-conditioned fill materials. The fill shall be placed in 8" maximum lifts and compacted in accordance with the applicable provisions of these specifications.

### 18-3.02 Excavation

Excavation is unclassified. The Contractor shall excavate whatever material is encountered to the lines and grades shown on the Plans.

If explosives are used, the Contractor shall obtain all necessary permits and comply with the pertinent regulations. Pacific Gas and Electric and Pacific Telephone companies shall be informed if blasting is done in the vicinity of their facilities. Blasting must be approved by District.

The Contractor shall furnish, install, and operate all necessary machinery, appliances, and equipment to keep excavations free of all water which would be detrimental to any phase of construction and shall dewater and dispose of the water so as not to cause injury to public or private property or to cause a nuisance or a menace to the public.

All grading shall provide adequate surface drainage during construction.

Subsurface exploration of the project sites has not been performed or is indicated in the contract documents. Unusual subsurface conditions are not anticipated; however, work shall include all excavation regardless of surface or subsurface conditions.

The Contractor should visit the site and acquaint himself with all existing conditions. Prior to bidding, bidders may make their own subsurface investigations to satisfy themselves as to site and subsurface conditions but such subsurface investigations shall be performed only under time schedules and arrangements approved in advance by the District Engineer.

Excavations shall be taken to the depths shown on the Plans. If soft or otherwise unsuitable material is encountered at or below Plan grade, the unsuitable material shall be removed to a depth recommended by the District Engineer and replaced with structure backfill. The excavation and replacement of unsuitable material ordered by the District Engineer will be paid for as specified in Section 7 of these specifications.

Overexcavation below the slab grades shown on the Plans caused by an act or failure to act on the part of the Contractor shall be replaced with compacted structure backfill. Overexcavations under footings shall be replaced with concrete of equal strength to that of the footing. Cuts below grade shall be corrected by similarly cutting adjoining areas and creating a smooth transition. The Contractor shall bear all costs for correcting overexcavated areas.

After footing excavation has been completed, the bottom 6-inches shall be compacted to 95 percent maximum test density prior to the placement of any additional fill material or concrete.

Rough grading shall be completed prior to excavation for footings, pipes and conduits, or other structures. Where pipelines enter and leave a structure, the requirement for trench excavation and backfill shall be complied with up to the excavation line of the structure, unless specified or directed otherwise.

Excavation shall extend a sufficient distance from walls and footings to allow for placement and removal of forms, installation of services, and for inspection, except where concrete is authorized by the District Engineer to be deposited directly against the excavated surface.

Keep excavations free of all water, which would be detrimental to any phase of construction and dewater and dispose of the water so as not to cause injury to public or private property or to cause a nuisance or a menace to the public.

### 18-3.03 Placement of Material

#### 18-3.03-A Moisture Control

All fill and backfill material shall be moisture conditioned to approximately optimum moisture content prior to compaction, with optimum moisture content as determined by AASHTO T-180, unless otherwise directed. The Contractor will be required to add water and manipulate the fill materials by harrowing or other approved methods so as to provide a uniform distribution of moisture in the material. The application of water to the fill material shall be done at the site of excavation or stockpile, and shall be supplemented, only if necessary, by sprinkling on the embankment.

If, in the opinion of the District Engineer, the top or contact surfaces of a fill section become too dry or smooth to permit suitable bond between these surfaces and the additional fill to be placed thereon, it shall be moistened and/or worked with a harrow, scarifier, or other suitable equipment in an approved manner to a sufficient depth to provide satisfactory bonding before the next succeeding layer of earth fill material is placed.

When the moisture content of the material being compacted is below that required, water shall be added and the material mixed to assure uniform distribution of moisture until the moisture content is satisfactory. When the moisture content of the material is greater than that required, the material shall be aerated by scarifying until the moisture content is satisfactory.

The Contractor shall furnish all labor, material, tools, equipment, and incidentals for transporting a sufficient supply of water and furnish the necessary equipment to apply the water to the material.

#### 18-3.03-B Structure Backfill

Structure backfill shall be placed around all structures and where shown on the Plans. Structures on or in the treatment pond dikes shall be backfilled with embankment material. Structure backfill shall be moisture conditioned to near optimum moisture content, placed in uniform layers not to exceed 8-inches in loose thickness, and compacted to a relative compaction of not less than 92 percent of maximum dry density as determined by AASHTO T-180.

Do not operate any heavy equipment, which may cause damage within five feet of walls of concrete structures or underground pipelines for the purpose of depositing or compacting backfill material. Compact structure backfill adjacent to concrete walls with pneumatic tampers or other approved equipment that will not damage the structure. The Contractor shall be responsible for all damage to structures that result from the compaction operation and shall repair all damage at his own expense.

#### 18-3.03-C Seasonal Limits

No fill material shall be placed, spread, or rolled while it is frozen or thawing, or during unfavorable weather conditions. When the work is interrupted by heavy rain, fill

operations shall not be resumed until field tests by the District Engineer indicate that the moisture content and density of the fill are as previously specified.

#### 18-3.03-D Field Observation and Testing

Site preparation of all areas to receive fill shall be reviewed by the District Engineer, or his representative, prior to the placement of any fill.

Field observation by the District Engineer, or his representative, shall be made during the fill and compacting operations so that he can ascertain whether the fill was made in accordance with these specifications.

Field density and moisture content tests may be made by the District Engineer, or his representative, in order to determine the compaction and moisture content of each layer of fill. When these tests indicate that the density of any layer of fill or portion thereof is below the required percent density, the particular layer or portion shall be reworked until the required density has been obtained.

The Contractor shall make excavations and other necessary provisions for the District Engineer to take compaction and moisture content tests at locations selected by the Engineer. The District Engineer shall select and notify the Contractor of test locations prior to there being more than two feet of fill over the test location. After the test locations have been selected, the District Engineer shall perform the required tests as quickly as possible and shall not unnecessarily delay the Contractor. Compaction and moisture content tests shall be completed within 24 hours after test locations have been selected. Where tests indicate the compaction is unsatisfactory, the District Engineer may reject the work up to half the way to the next acceptable test. The Contractor may, at his expense, order additional tests by the District Engineer if he feels such tests do not adequately define the work.

The District Engineer may order additional compaction and moisture content tests at any location where work has been found not to be in conformance with the specifications.

Rejected work shall be corrected by the Contractor and may be retested if so ordered by the District Engineer. If such work is found to be in accordance with the Contract Documents, the District shall pay the cost of the retest. If such work is not found to be in accordance with the Contract Documents, the Owner shall pay the cost of the retest. If such work is not found to be in accordance with the Contract Documents, the Contractor shall pay such costs.

### 18-3.04 Site Grading

#### 18-3.04-A General

Finish grades and existing or natural grades in the area adjacent to the structures are indicated on the plans. The Contractor shall do all grading, filling-in, or excavating, as required, to completely grade the site to lines and grades shown, and to provide for the indicated drainage. Where finish grade corresponds practically with existing grade, the ground shall be worked up and graded off evenly with existing grade. The grading operation shall generally consist of moving and transporting materials within the area; however, the Contractor shall provide any additional fill material, if necessary, to complete the site grading to the elevations shown, or to waste any excess material

which may result. Clearing and stripping shall be as required in Section 11 and in 18-3.01-A of these specifications.

#### 18-3.04-B Ground Surface Preparation

Before excavating or placing fill material, complete all clearing and grubbing, and scarifying ground surface to provide ample bond between old and new material.

#### 18-3.04-C Placement of Fill

Place fill material in layers not exceeding 8-inches loose measurement. Compact each layer before placing the next layer. As the compaction of each layer progresses, continually level and manipulate to assure uniform moisture and density. Water shall be added to the approximate optimum moisture content in the borrow area prior to placement in the fill area.

#### 18-3.04-D Density Requirements

The top 0.5 feet of cut or fill materials that are to support roadway pavements, parking areas, and walks shall be compacted to 95 percent of the maximum density. All fill below the top 0.5 feet and all fill not supporting roadways, parking areas, or walks shall be compacted to 90 percent of maximum density, unless otherwise shown on the drawings.

#### 18-3.04-E Channels

Construct drains, ditches, and inlet and outlet channels for culverts as shown or as directed. Round and trim channel slopes neatly to line. Final flow line grade shall be reasonably uniform to provide free drainage without puddling.

#### 18-3.04-F Slope Finishing

Leave earth slopes with a roughened but reasonably uniform surface without noticeable breaks. The final surface shall be similar to that obtained by using a farm disk or harrow parallel to the roadway. Blend slopes smoothly with the adjacent terrain. Grading shall provide for drainage away from all sides of structures.

#### 18-3.04-G Disposal of Excess Material

Excess Material shall be disposed of off site at the Contractor's expense. This alternative shall be as directed by the District Engineer and shall conform to the provisions of this specification.

### 18-4 Measurement and Payment

No measurement for separate payment shall be made for any of the work specified in this section, and all costs in connection therewith shall be included in the contract price for the Booster Pump Station.