TABLE OF CONTENTS

PART 1 - GENERAL REQUIREMENTS 2
PART 2 - MATERIAL 2
PART 3 - EQUIPMENT 3
PART 4 - CONSTRUCTION 4
PART 5 - COMPACTION 5
PART 6 - TESTING 6
PART 7 - FINISHING 6
PART 8 - EMBANKMENT TOLERANCES 6
PART 9 - DISPOSAL OF UNSATISFACTORY MATERIALS 6
PART 10 - DUST CONTROL 6
PART 11 - CONTROL OF EROSION 7
PART 12 - MEASUREMENT 7
PART 13 - PAYMENT 8
PART 1 - GENERAL REQUIREMENTS

1.01 Scope of Work - The work to be performed under this Section shall consist of furnishing all labor, materials, tools, transportation, supplies, equipment, appurtenances, fuel, power, and incidentals, and for doing all the work necessary to construct the embankment sections to the lines and grades shown on the plans and described in these specifications.

1.02 Description of Work - For the purpose of these specifications, the term "Import Embankment Slope Fill" includes all earthfill portions of the levee crown and landside levee slopes as designated on the plans for "Import Embankment Fill".

PART 2 - MATERIAL

2.01 The import embankment fill material shall consist of materials classified as silty sand (SM), silty clay (ML), clay (CL), or clayey sand (SC) soils with a minimum of 50 percent (50%) fines passing the No. 4 sieve and a minimum of 20 percent (20%) fines passing the No. 200 sieve, and shall have a plasticity index no less than 8 and no greater plasticity index of 30, and a maximum liquid limit no greater than 45 as determined by ASTM D 4318 (wet test method).

2.02 The import embankment fill material may consist of 15% of quarry type material by volume, but shall not contain any quarry type (rock size particles) material, earthen chunks or clods greater than 2-inches as measured at its largest dimension.

2.03 The import embankment fill shall have a minimum dry density (PCF) of no less than 100 pounds per cubic foot.

2.04 Import embankment fill material shall be of a quality suitable for the purpose intended, and shall not have an organic or plant matter content that exceeds 5 percent (5%) by dry weight, other unsatisfactory materials, and shall be of such nature that it can be compacted readily under watering and rolling to form a firm, stable base.

2.05 The imported embankment fill material should be relatively impervious when compacted and should have negligible compressibility when compacted and saturated. The fill shall be free of other deleterious or unsatisfactory materials.

2.06 The import embankment fill shall be compactable to a relative compaction of not less than 90 percent (90%) for a minimum depth of 0.5-foot below the grading plane.

2.07 Fill materials shall not contain any recycled fill materials, and shall be free of strippings, cleared materials, vegetable matter, organic clays, trash, rubbish, broken tile, Portland cement concrete, asphalt, petroleum-based products, asbestos, bricks, PVC, glass, metal objects, or other objectionable substances, deleterious or unsatisfactory materials.

2.08 Materials determined by the Engineer not suitable for use as import embankment fill material shall be immediately removed from the project and disposed of at the Contractor's sole expense and in a manner satisfactory to the Engineer.

2.09 The import fill materials to be used in the project will be subject to inspection and tests by the Engineer and the Geotechnical Engineer Consultant. The Contractor shall furnish without charge such samples, equipment, and assistance as required.

2.10 Prior to the award of contract, the Contractor shall furnish the Engineer the name(s) of his import fill material supplier(s) and the locations at which such materials are being supplied and the source of the import fill. The Contractor shall provide access, equipment and assistance at the
locations of where such materials are being furnished for inspection and approval by the Engineer and the Geotechnical Engineer Consultant and prior to any material being transported to the site.

2.11 The Engineer or the Geotechnical Engineer Consultant shall obtain a sample of the material from the borrow source proposed to be used prior to the award of the contract. The sample shall be clearly identified as to classification, source, and origin.

2.12 The cost for the initial soil sampling and material tests will be at the expense of the District. If additional material testing is required, those costs shall be at the expense of the Contractor.

2.13 Materials shall be re-sampled and tested at any time as required by the Engineer and the Geotechnical Enginee Consultant. The fact that material is used on the basis of an inspection and a single test shall not relieve the Contractor of responsibility for incorporating material in work which conforms to the requirements of the plans and specifications and any such material not conforming to such requirements will be subject to rejection and whether or not it is in place.

2.14 In the event that the Engineer or the Geotechnical Engineer Consultant determines the borrow source(s) needs a chemical analysis to obtain information regarding the environmental suitability of the soil for the project, the Contractor must supply Engineer with information regarding the prior property use of the site from which the soil is proposed to be obtained (e.g. orchard, agricultural land, industrial, commercial, residential, etc.). Based on a review of the borrow site information supplied by the Contractor, the Engineer and Geotechnical Engineer Consultant will determine a list of the analytical test requirements for the soil.

2.15 Number of soil samples to be obtained and tested will be determined by the Geotechnical Engineer Consultant and the Engineer.

2.16 Soil samples are to be representative of all depths, locations and soil types within the borrow source. Sampling and analysis of the soil as described by this specification does not relieve the Contractor from any additional work required (e.g. soil characterization prior to transportation) required by law or regulations. The cost for soil sampling and lab analysis for contamination will be born by the Contractor.

2.15 All chemical analysis shall be conducted by a laboratory approved by a California certified analytical laboratory for the analyses performed. A report shall be compiled under the direction of an experienced hazardous material professional (PE, PG or CEG) which documents sampling and laboratory protocol, chain of custody documentation, sample locations, and results. The results shall include the professional interpretation of results and an environmental opinion of the suitability of the material for the intended source. Said report will be reviewed by the District and Engineer prior to acceptance or refusal of the borrow source. The District reserves the right to refuse and reject any borrow material, with or without justification.

PART 3 - EQUIPMENT

3.01 Equipment, machinery and tools used for shaping the import fill shall be suitable for placement, compaction and sloping and shall be maintained in a satisfactory working and good mechanical condition and subject to the approval of the Engineer.

3.02 Only equipment suitable to produce the quality of work and materials required will be permitted to operate on the project.

3.03 Equipment shall be designed and constructed in accordance with general practice for such equipment and shall be of sufficient capacity to insure the production of sufficient material to carry the work to completion within the time limit specified.

3.04 The Contractor shall provide adequate and suitable equipment to meet the requirements, and, when so directed by the Engineer, shall remove unsuitable, unsatisfactory, and unsafe equipment from the work and discontinue its operation.
A. Equipment and tools used on the project shall be maintained in satisfactory working and good mechanical condition.

B. Compaction equipment shall be non-vibratory type roller, 2-axle tandem roller compactor equipment, sheepfoot rollers, pneumatic-tired rollers, drum rollers or other mechanical means acceptable to the Engineer, to such extent as will produce the specified relative compaction. Vibratory equipment will not be permitted for use on District levees.

C. Watering: Water for compacting, placing the import fill material, subbase, base and surfacing material and for controlling dust shall be applied by means of pressure-type distributors of pipelines equipped with a spray system or hoses with nozzles that will insure a uniform application of water. All equipment used for the application of water shall be equipped with a positive means of shut-off. Unless otherwise permitted by the Engineer, at least one (1) mobile unit with a minimum capacity of 1,000 gallons shall be dedicated for applying water on the embankment fill operations at all times.

PART 4 - CONSTRUCTION

4.01 Clearing and Grubbing - All areas to receive the import fill shall be cleared as shown and noted on the plans and as described in Division 02, Section 02110, "Clearing and Grubbing".

4.02 The Contractor shall deliver import embankment fill material to the levee as uniform mixtures. The mixture shall be deposited and spread to the required thickness. Segregation of material shall be avoided and each layer of material, as spread, shall be free from pockets of coarse or fine material.

4.03 The import embankment fill material shall be placed within the limits shown on the plans. Import fill shall be spread uniformly on the prepared base to the lines and grades indicated on the plans or as directed. Finished grades shall be uniform and neat. Placement of material by methods, which will tend to segregate particle sizes within the layer, will not be acceptable.

4.04 The import fill material shall be placed in a systematic manner with placement beginning at the base of the embankment section and continuing up to the design elevation as indicated on the plans.

4.05 The Contractor shall place materials on the prepared base in horizontal layers of not more than 8 inches in thickness prior to compaction. The fill material shall be placed in horizontal layers and uniformly distribute sufficient moisture in each layer to permit the required compaction. The fill material shall be gently laid out and under no circumstances shall any material be dropped from any height onto the levee section.

4.06 The import embankment fill shall have the maximum density obtainable with the natural moisture content of the fill material. However, if in the opinion of the Engineer, the material is too dry for proper compaction, the Contractor shall be required to pre-wet the material to uniformly distribute sufficient moisture in each layer before rolling to permit the desired compaction. Material that is too wet shall be spread adjacent to the site and permitted to dry, assisted by scarifying, if necessary, until moisture content is reduced to permit the placement and compaction to continue as directed by the Engineer. The final adjustment shall be made on the fill, as required, until a uniform distribution of moisture is obtained.

4.07 Additional embankment fill lifts shall not be placed if the previous lift did not meet the required dry density or if soil conditions are not considered stable. The embankment material may require blending and/or discing to uniformly moisture condition soils used for embankment fill. If the embankment material contains excessive moisture, it shall not be compacted until the material is dry enough to obtain the required compaction.
4.08 Compensation for any additional work involved in reworking and drying the embankment material to the required moisture content shall be considered as included in the contract price paid and no additional compensation will be allowed therefor.

4.09 When moisture content and conditions of the spread layers are satisfactory, each layer shall be compacted to 90 percent (90%) relative compaction in accordance with ASTM D 1557-78 procedure.

4.10 The entire embankment shall be brought to not less than the prescribed net grade and cross section at all points. Finished grades shall be uniform and neat, and shall be sloped as shown on the plans.

4.11 The Contractor shall be responsible for monitoring the progress of the material placement in insures compliance with the specified lines and grades.

4.12 Compensation will be based upon the actual quantity placed within the specified tolerances. Contractor will not be compensated for material placed in excess of the specified tolerances unless otherwise directed by the Engineer.

PART 5 - COMPACTION

5.01 It is the intent of these specifications to secure an embankment having the maximum density obtainable with the natural moisture content and should be between 0 and 4 percent (4%) above optimum of the embankment fill material. However, if the material is too dry for proper compaction, the Contractor will be required to pre-wet the material to uniformly distribute sufficient moisture in each layer before rolling to permit the required compaction. Material that is too wet or contains excessive moisture shall not be compacted and shall be allowed to dry, assisted by scarifying if necessary, until moisture content is reduced to permit the placement and the required compaction.

5.02 The moisture content of the embankment material at the time of compaction should be between 0 and 4 percent (4%) above optimum and shall be such that the specified relative compaction in accordance with ASTM D 1557-07 Procedure will be obtained and the embankment shall be in a firm and stable condition.

5.03 Landside levee slope excavation, subgrade, and areas that receive embankment fill shall be scarified to a uniform depth of twelve (12) inches and compacted to 90 percent (90%) relative compaction in accordance with ASTM D 1557-07 Procedure.

5.04 Levee crown and roadway areas that receive fill shall be scarified to a uniform depth of three (3) inches and compacted to 90 percent (90%) relative compaction in accordance with ASTM D 1557-07 Procedure prior to placement of fill material.

5.05 The embankment fill material shall be deposited, spread, and compacted on the prepared subgrade to the required thickness.

A. Embankment fill areas shall be compacted to not less than 90 percent (90%) relative compaction in accordance with ASTM D 1557-07 Procedure.

B. The relative compaction of each layer shall be not less than 90 percent (90%).

C. Rolling by non-vibratory compactors shall always be commenced along the edge of the area to be compacted and the roller shall gradually advance toward the center of the area to be compacted.

D. Rollers shall be operated along lines parallel or concentric with the centerline of the road being constructed, and no material variation therefrom will be permitted. All compactors must be maintained in good mechanical condition during the course of this project.
E. The complete embankment fill section shall be thoroughly compacted, even, true to grade and cross section, and free from ruts, humps, depressions, soft spots, and irregularities.

F. Compaction of the specified areas shall be performed with a non-vibratory type roller compactor. **Vibratory equipment will not be permitted for use on District levees.**

G. Water for compacting material shall be applied by means of pressure-type distributors of pipelines equipped with a spray system or hoses with nozzles that will insure a uniform application of water. All equipment used for the application of water shall be equipped with a positive means of shut-off. Unless otherwise permitted by the Engineer, at least one (1) mobile unit with a minimum capacity of 1,000 gallons shall be available for applying water on the project at all times for excavation and fill operations as described.

**PART 6 - TESTING**

6.01 The District will retain the services of an independent Geotechnical Engineer Consultant and testing laboratory to perform the sampling and testing as required and to check compliance with the Specifications. The Contractor shall remove surface materials at locations designated by the Geotechnical Engineer. The independent testing laboratory will sample and perform all required tests such as moisture content; gradation, and moisture density relationships on the excavation and embankment fill materials.

**PART 7 - FINISHING**

7.01 The surface of the top layer shall be finished to the designated grade and cross section. The finished surface shall be of uniform texture. Light blading during compaction may be necessary for the finished surface to conform to the lines, grades, and cross sections. Should the surface for any reason become rough, corrugated, uneven in texture, or traffic marked prior to completion, such unsatisfactory portion shall be scarified, reworked, watered and thoroughly recompacted to conform to the specified requirements, or replaced as directed.

**PART 8 - EMBANKMENT TOLERANCES**

8.01 Material placed or excavated on the embankment slopes shall not vary more than 0.10 foot above or below the designated grade. Material placed on the levee crown roadways shall not vary more than 0.1 foot above or 0.0 foot below the grades specified. Tolerances for embankment material placed on the levee crown roadway shall not vary more or less than 0.50 foot in width.

**PART 9 - DISPOSAL OF UNSATISFACTORY MATERIALS**

9.01 Rejected materials that are unsuitable; material that is removed for the required correction of defective areas; otherwise unsatisfactory waste materials; and debris shall be removed from the work site and disposed of in a manner satisfactory to and approved by the Engineer and at the Contractor's expense.

**PART 10 - DUST CONTROL**

10.01 During the course of construction, the Contractor shall keep all areas generating dust well watered as noted on the plans and described in 00800 Special Provisions, 1.13 "Dust and Mud Control", and as specified herein. There shall at all times be sufficient water equipment dedicated to the project and embankment fill site operations to maintain material compaction control, and to abate dust nuisance.
PART 11 - CONTROL OF EROSION

11.01 The Contractor shall maintain earthwork surfaces true and smooth and protected from erosion. Where erosion occurs, the Contractor shall provide fill or shall excavate as necessary to return earthwork surfaces to the grade and finish specified. Compensation for erosion control is considered as included in the Contract Prices paid for the various items as set forth in the Contractor's Bid and no additional compensation will be allowed therefor.

PART 12 - MEASUREMENT

12.01 All import embankment fill material will be measured for payment by the number of tons (2,000 pounds avoirdupois) of material placed within the dimensions as shown on the plans and accepted in the completed sections. No payment will be made for material placed outside the specified limits, dimensions, and locations, unless otherwise ordered by the Engineer. The import embankment fill material will be measured for payment by the tonnage accepted in place, as determined either by certified scale weight measurement or by barge displacement measurement approved by the Engineer and the Engineer's quantity determination shall be final.

A. The material delivered and placed at each designated fill site shall be recorded by tonnage, identified accordingly, and tickets submitted daily to the Engineer's Field Representative, unless otherwise directed.

12.02 Scale Weight Measurement - For materials delivered by land hauling unit, measurements will be based on certified scale weight.

A. Scales used for measurement shall, at the option of the Contractor, be either public scales or approved scales provided by the Contractor. Weighing shall be at the point nearest the work at which a public scale is available or at which it is practicable for the Contractor to provide a scale. When the Contractor's scales are used, the Contractor shall be certified and bonded as a licensed weighmaster in accordance with all requirements of the State Inspection Bureau, and any employees of the Contractor engaged in weighing materials under this Contract shall be deputized to perform such weighing under the provisions of the State Inspection Bureau charged with scales inspection.

B. Contractor scales shall be standard manufactured truck scales of a beam variety and shall be equipped with the type of registering beam, which imprints the weight on the ticket and an "under and over" indicator, and be capable of accommodating the entire vehicle. Scales shall be tested, approved, and sealed by a State Certified Inspector. The scales shall be calibrated and resealed as often as necessary and at least once every three (3) months, to ensure accuracy. All State inspections, calibrations, and sealing of the scales shall be at the expense of the Contractor.

C. Unlicensed weighmasters or individual truck drivers are prohibited from weighing and issuing delivery tickets.

D. Vehicles used in material hauling shall be weighed empty daily, at such time as desired, and each shall bear a plainly legible identification mark.

E. Delivery tickets or weigh bills, which are not dated and signed by the authorized licensed weighmaster during that day and shift will not be accepted for measurement and payment and will be deducted from any invoice submitted for payment.
F. Copies of weigh bills or delivery tickets shall be submitted to the Engineer daily during the progress of the work. The Contractor shall furnish the Engineer or his designated representative scale tickets for each load of material weighed. These tickets shall include ticket number, load number, commodity, tare weight, and identification mark of each vehicle weighed, date, time, and location of loading and material source.

G. A master log of all vehicle loadings shall be furnished for each day of loading operations. Before the final statement is allowed, the Contractor shall file with the Engineer certified weigh bills and/or certified tickets for all fill actually used in the construction covered by the Contract.

12.03 Displacement Measurement - For materials delivered to the job by barge or to an intermediate point for trans-shipment by rail or highway, the measurement of materials delivered and placed will be based on the displacement of the transporting vessel. One (1) cubic foot of barge displacement will be assumed to be equivalent to 62.5 pounds of weight.

A. All barge displacement charts used for measurement and payment shall be prepared, certified, signed, and dated by an independent licensed Marine Surveyor, for all barges/vessels used to transport materials to the project site. A copy of the certified charts shall be provided to the Engineer by the Contractor prior to the commencement of any material delivery and placement on site.

B. Use by the Contractor of any revised barge charts, which have not been recalibrated and recertified by a licensed Marine Surveyor, shall nullify any on site displacement measurements and acceptance of material.

C. Any barges or vessels requiring dry-docking, alterations, refitting, structural repairs, and/or recertification by the U.S. Coast Guard, and any barges or vessels which have not been recertified for displacement within the last five (5) years, shall, at the option of the Engineer, be required to be recertified for displacement by an independent registered and licensed Marine Surveyor prior to the transportation of material.

D. A new barge displacement chart with the recertification measurements, date, and signature of the registered and licensed Marine Surveyor shall be issued to the Engineer prior to the delivery and acceptance of materials on site.

E. All displacement measurements shall be made at the site where the material is to be unloaded. Copies of barge loading memos or delivery tickets shall be signed and submitted to the Engineer daily during the progress of the work, unless otherwise directed.

1. Barges/vessels used to deliver materials on site shall bear a plainly legible identification mark (e.g. name, number, etc.).

2. The barge delivering materials, when measured at the designated delivery point, shall be free from bilge water. Pumping of excess bilge water during off-loading operations shall nullify the displacement measurements.

3. The barge loading memos or delivery tickets for each load of material delivered shall be submitted daily and shall include the barge/vessel identification mark, date, commodity/material type, project area/name, site location and/or stationing, loaded and empty measurements and tonnage, off-loading plant/equipment name or identification mark, and weighmaster's signature initials.

4. The off-loading vessel at the project site shall maintain a current master log.

5. The master log shall contain actual displacement measurements, loaded and unloaded, for each barge of material placed. The log shall also include the quarry source; the date and time of the measurements, and a signature by the vessels weighmaster certifying the measurements.
6. The hard copy of the master log shall be made available for the review of the Engineer at his request.

PART 13 - PAYMENT

13.01 Payment for import embankment fill material, measured as specified, will be made at the Contract unit price per ton, which price shall include compensation for providing and furnishing all labor, materials, tools, equipment, and incidentals and for doing all the work involved in obtaining, excavating, loading, hauling, placing and compacting imported fill material, in place, as shown on the plans and indicated in the specifications herein.

13.02 At the direction of the Engineer for the purpose of District maintenance, the Contractor may be required to make incidental use of import embankment fill material for site repairs not specifically shown or otherwise designated on the plans. Payment for such incidental placement and use will be measured as specified and made at the Contract unit price per ton bid.

13.03 Full compensation for all costs incurred and work covered in this Section shall be included in the prices paid for as set forth in the Contractor's Bid and no additional or separate compensation will be made therefor.

13.04 All delivery tickets, weighmaster certificates, weigh bills, barge loading memos, or barge delivery tickets which are not correctly calculated, dated, identified, and signed by an authorized licensed weigh master or authorized representative during that day and shift, will not be accepted for payment and will be deducted from any invoice submitted for payment.

13.05 The following quantities will not be paid for and such quantities will be deducted from the final total quantities:

A. Quantities of material wasted or disposed of in a manner not called for under the Contract.

B. Rejected loads of material, including material rejected after it has been placed by reason of the failure of the Contractor to conform to the provisions of the Contract.

C. Material not unloaded from the transporting vehicle.

D. Material placed outside the line indicated on the plans or established by the Engineer.

E. Material remaining on hand after completion of the work.

13.06 No compensation will be allowed for hauling and disposing of rejected material.

END OF SECTION 02221