of the General Permit. Records of all visual observations and sampling results required by the General Permit shall be kept using the forms contained in Appendix "F" and Appendix "G", respectively. Copies of the forms shall be maintained in the SWPPP and submitted to the Engineer within 24 hours of the visual observation or sampling event.

29.9 Numeric Action Level (NAL) Exceedance Report - **The NAL Exceedance Report is applicable to Risk Level 2 construction sites only.** The Contractor shall be responsible for submitting a NAL Exceedance Report to the Engineer in the event that any effluent sample exceeds an applicable NAL.

a. The Contractor shall submit all storm event sampling results using the form in Appendix "G" for each discharge point to the Engineer no later than 24 hours after the conclusion of the storm event.

b. The Contractor shall certify each NAL Exceedance Report in accordance with the Special Provisions for Construction Activity.

c. The Contractor shall retain an electronic or paper copy of each NAL Exceedance Report for a minimum of three years after the date the annual report is filed.

d. The Contractor shall use the reporting form contained in Appendix "G" and include in the NAL Exceedance Report:

   i. The analytical method(s), method reporting unit(s) and method detection limit(s) of each analytical parameter (analytical results that are less than the method detection limit shall be reported as "less than the method detection limit").

   ii. The date, place, time of sampling, visual observation (inspections) and/or measurements, including precipitation.

   iii. A description of the current BMPs associated with the effluent sample that exceeded the NAL and the proposed corrective actions taken.

29.10 Non-Stormwater Discharge or Dewatering - **Dewatering activity should only be considered after other methods have been determined to be inadequate for storm drain construction by the Engineer.** If groundwater will be encountered during the project activities, the dewatering activity must be covered by the General Waste Discharge Requirements for Discharges to Surface Waters that Pose an Insignificant Threat to Water Quality (De Minimus Permit), Santa Ana Regional Water Quality Control Board Order No. R8-2009-0003. The Contractor shall comply with this Order, and notify and obtain approval from the Engineer fifteen (15) days prior to any non-stormwater discharging of groundwater dewatering. If an emergency or unforeseen dewatering activity that will discharge to Waters of the United States occurs, the Contractor shall contact the Engineer immediately.

When discharging groundwater from dewatering activities to surface waters, the Contractor shall comply with and implement the Monitoring and Reporting Program required under Order No. R8-2009-0003. This Order can be downloaded at http://www.waterboards.ca.gov/santaana/board_decisions/adopted_orders/orders/2009_orders.shtml. Under the Monitoring and Reporting Program, the Contractor shall prepare the monitoring report in accordance with the template included in Appendix "H". The Contractor must submit the Monitoring Reports to the Engineer by the 15th day of each month following the monitoring period. The District will submit the Monitoring Reports to the Santa Ana Regional Water Quality Control Board. The Monitoring Reports shall cover the previous month's monitoring activities.

If there is any other form of non-stormwater discharge from the project to surface waters, the Contractor shall immediately contact the Engineer to determine appropriate actions required for coverage under the De Minimus Permit.

Failure of the Contractor to fully comply with this requirement may result in the suspension of construction operations and liability for any associated monitoring, fines, penalties and remediation activities related to the discharge.

29.11 Reports –

(a) Annual Report - The Contractor shall be responsible for preparing an Annual Report to meet the requirements of Section XVI of the General Permit covering the preceding period of construction from July 1st to June 30th. The Annual Report shall be structured in accordance with the template included in Appendix "I". The Contractor shall submit two (2) copies of the Annual Report to the Engineer by July 15th of each year for review and approval. The Contractor shall allow ten (10) working days for the Engineer to review the Annual Report. If revisions are required as determined by the Engineer, the Contractor shall revise and resubmit the Annual Report within three (3) working days of receipt of the Engineer's comments. The Contractor shall submit four (4) copies of the approved Annual Report to the Engineer prior to August 15th of each year. **The Contractor shall be responsible for providing an Annual Report to the Engineer for any construction occurring for part of the year after July 1st prior to receiving final payment on the project.**

(b) Monthly Report – The Contractor shall prepare and submit to the Engineer a Monthly Report within five (5) working days of the end of the month including:

1. All visual observation reports;
2. All sampling and analysis reports;
3. All NAL Exceedance Reports;
4. Summary of changes to the SWPPP and or REAP based on inspection results for the preceding month.

29.12 Payment - The contract lump sum price paid for the Stormwater and Non-Stormwater Pollution Control work shall include full compensation for furnishing all labor, materials, tools, equipment and incidentals for doing all the work involved in developing, preparing, obtaining approval of, revising and amending the PRDs, and installing, constructing, maintaining, removing and disposing of BMPs as shown in the SWPPP, as specified in the CASQA Handbooks and Sample Contractor's Water Quality CSMP, General Permit and these Detailed Specifications, and as directed by the Engineer.

The contract lump sum price paid for Non-Stormwater Discharge or Dewatering shall include full compensation for compliance of Section 29.10 "Non-Stormwater Discharge or Dewatering". **Contractor shall not be paid any portion of the contract lump sum if discharge of groundwater from dewatering activities to surface waters is avoided.**

Monthly payment will be made on a basis of the percentage of work completed on the entire project and subject to the submittal of a complete Monthly Report as specified in Section 29.11(b). Failure to complete or report required visual inspections, monitoring, sampling and analysis requirements, NAL Exceedance Reports, and/or other necessary follow-up actions to ensure that the project stays in compliance with the General Permit can be the basis for reducing monthly progress payments for the project. Monthly progress payments will be reduced by the amount of direct costs, overhead costs and engineering costs incurred by the Engineer to address compliance deficiencies, including costs to conduct inspections, monitoring, reporting and supplemental BMP implementation necessary to comply with the General Permit and costs incurred by the Engineer to address complaints, additional State inspections and violations and/or fines issued by the State or US EPA associated with failure to properly comply with the General Permit. Progress Payment reductions can exceed the monthly percentage or total contract lump sum price for Stormwater and Non-Stormwater Pollution Control work.

Payment will be made on a basis of the percentage of work completed on the entire project.

SECTION 30 AND SECTION 31 – NOT USED

SECTION 32 – PRIVATE UTILITY RELOCATION

32.1 Description – This section covers the contract items Removal and Replacement of Existing Utilities at New Landscape Filter Basin; and Removal and Relocation of Existing Irrigation Double Check Valve and Removal and Replacement of Existing 4-Inch Waterline. All utilities to be replaced must be replaced in kind or better. Potholing of a portion of the known existing utilities on the site has been performed, the results of which are included in the Parking Lot Renovation 2010 drawings. The Contractor is responsible for additional potholing as required to protect all existing utilities whether shown or not shown on the drawings and to perform the work.

32.2 Removal and Replacement of Existing Utilities at New Landscape Filter Basin – The Contractor shall remove and replace the existing concrete encased 2-inch waterline, 2-inch gas line and telephone line where they conflict with the landscape filter basin as shown on the LID

Testing and Demonstration Facility drawings. The Contractor shall obtain approval from the Engineer for the new location of these utilities prior to performing the work.

32.3 Removal and Relocation of Existing Irrigation Double Check Valve and Removal and Replacement of Existing 4-Inch Waterline – The Contractor shall remove and relocate the existing irrigation double check valve and remove and replace the associated existing 4-inch waterline as needed to accommodate the check valve relocation as shown on the Parking Lot Renovation 2010 drawings. The Contractor shall verify the alignment of the existing 4-inch waterline by potholing or whatever means necessary prior to performing the work and adjust the new location of the double check valve from that shown on the drawings in order to coincide with the 4-inch waterline alignment. The Contractor shall obtain approval from the District Engineer for the new location prior to performing the work.

32.4 Measurement and Payment – Payment for the Removal and Replacement of Existing Utilities at New Landscape Filter Basin shall be by the linear foot to be removed and will be paid upon completion of construction of the new lines. Payment for Removal and Relocation of Existing Irrigation Double Check Valve and Removal and Replacement of Existing 4-Inch Waterline shall be lump sum and will be paid upon completion of the relocation.

Payment of the contract items Removal and Replacement of Existing Utilities at New Landscape Filter Basin; Removal and Relocation of Existing Irrigation Double Check Valve; and Removal and Replacement of Existing 4-Inch Waterline shall constitute full compensation for all labor, materials, equipment, and all other items necessary and incidental to completion of this item of work.

SECTION 33 – FILTRATION SOIL MIXTURE

33.1 Description - This section covers the contract item Filtration Soil Mixture which is to be used as backfill for the Landscape Filter Basin; Enhanced Grass Swale and Flow Through Planters.

33.2 General Requirements – The Filtration Soil Mixture shall be comprised of eighty-five percent (85%) mineral component and fifteen percent (15%) organic component, by volume, drum mixed prior to placement. The mineral component shall be a Class A sandy loam topsoil that meets the gradation specified in Table 1 below. The organic component shall be nitrogen stabilized compost.

Table 1: Mineral Component Range Requirements

Percent Range (by weight)	Component
70-80	Sand (2.0 – 0.050mm)
15-20	Silt (0.050 – 0.002mm)
5-10	Clay (less than 0.002mm)

The Engineer shall be furnished a "Certificate of Compliance" signed by the manufacturer/supplier certifying that the Filtration Soil Mixture conforms to the specifications above.

33.3 Measurement - Measurement for payment for the contract item Filtration Soil Mixture will be the number of cubic yards of material placed as specified and shown on the drawings.

33.4 Payment - The contract price paid for Filtration Soil Mixture shall include full compensation for all costs incurred under this section.

SECTION 34 – CONCRETE MASONRY UNITS

34.1 Description - This section provides performance specifications for Concrete Masonry Units where specified and shown on the drawings.

34.2 Codes and Standards – Perform all work under this section with materials complying with ASTM, UBC and NCMA Specifications.

34.3 Submittals - Contractor shall submit copies of manufacturer's product information and installation instructions for each item and accessory.

Contractor shall submit samples of exposed masonry units, indicating special shapes, textures and colors.

Contractor shall submit samples and catalogue data for all expansion joint and control joint materials.

34.4 Job Conditions – Contractor shall not lay masonry when the ambient temperature is below 40 degrees Fahrenheit or when it is likely that the ambient temperature will fall below 40 degrees Fahrenheit during or within 24-hours after masonry laying operations. Masonry materials shall be stored so that at the time of use the materials are clean and structurally suitable for the intended use.

34.5 Quality Assurance –

A. Subcontractor Qualifications: Only skilled, first class masons shall be employed for masonry work. The masonry subcontractor shall have a minimum of six (6) years experience in masonry work of the type indicated for this project.

B. Coordination with other Trades: Contractor shall coordinate masonry work with other trades that interface with the masonry work or that require penetration through or attachment to masonry.

34.6 Concrete Masonry Unit – Concrete Masonry Units (CMUs) for wall sections shall be block split face one side, nominal dimensions 8"x8"x16", actual dimensions 7-5/8"x7-5/8"x15-5/8". Load bearing smooth face normal weight CMUs shall comply with ASTM C-90-96, UBC-

21-4 (Type I). Contractor shall provide required shapes such as corner, end units, radius bases, bond beams, lintels, etc., and units open one or both ends, as required. CMUs shall have a minimum net compressive strength of 1,900 psi.

Block color shall be gray with red and black aggregate. CMUs shall be split face block manufactured by Orco Block Company, Inc., or equal as approved by Engineer.

34.7 Caps for Walls – The cap for all CMU walls shall be flat, Stepstone, Inc., Classic or equal as approved by Engineer. The straight cap piece shall be bullnose two sides, length 24", thickness 2-1/2", width 10-1/4". Cap color shall be Stepstone, Inc., French Gray 504, stipple finish or equal approved by Engineer. The flat cap shall be included with the Flow Through Planters, Raised Planters and Entry Sign Walls.

34.8 Mortar and Grout Components –

A. Cement: Cement shall be Portland cement conforming to ASTM C-150, Type I (UBC 19-1).

B. Aggregates: Aggregates for mortar shall conform to ASTM C-144. Aggregates for grout shall conform to ASTM C-404.

C. Lime: Hydrated lime shall conform to ASTM C-51 (UBC 21-13).

D. Water: Clean and free from deleterious substances.

E. Sand: Comply with the "Standard Specifications for Aggregate for Masonry Mortar", ASTM C-144, except provide natural sand graded from coarse to fine within the following passing limits:

No. 4 Sieve	100%
No. 8 Sieve	95% to 100%
No. 16 Sieve	70% to 100%
No. 30 Sieve	40% to 75%
No. 50 Sieve	10% to 35%
No. 100 Sieve	3% to 15%

F. Pea Gravel: Graded with 100% passing the 3/8" sieve and not more than 5% passing the No. 8 Sieve.

G. Contractor shall package materials to be delivered and stored in original packages until ready to use. Contractor shall store cement, lime and aggregates in a manner which prevents deterioration or contamination.

H. Contractor shall not use material which is caked, lumpy, partially set or otherwise deteriorated.

34.9 Mortar and Grout Mixes –

A. Mortar (ASTM C-270, UBC 21-15) - Type S Mortar: 1 part Portland cement; 1/4 to 1/2 part lime putty or hydrated lime; 2-1/4 to 3 times the sum of the volume of the cement and lime used of sand. (Average compressive strength at twenty-eight (28) days shall be 1,800 psi.)

B. Grout (ASTM C-476, UBC 21-19) - 1 part Portland cement; 2-1/4 to 3 damp loose sand; 1 to 2 parts coarse aggregate.

Sufficient water shall be added to make a workable mix that will flow into joints of masonry without separation or segregation. When grout is to be placed in masonry units with typical rates of absorption the slump of the grout should be approximately 8 to 10 inches depending on temperature and humidity conditions.

34.10 Reinforcing Steel – Reinforcing bars shall comply with ASTM A-615, Grade 60.

34.11 General Workmanship – Contractor shall lay block in running bond with mortar for bed joints flattened; furrowing of bed joint mortar will not be permitted. Head joints solidly filled with mortar for a distance in from the face of the wall or unit not less than the thickness of the longitudinal face shell. Shove blocks into place to compact the head joint mortar and improve the bed joint. Vertical cells shall have vertical alignment sufficient to maintain clear, unobstructed and continuous vertical cells for grouting. Remove overhanging mortar and debris from cells before grouting.

Contractor shall accurately place reinforcing steel as shown on the drawings, positively secured and supported in such a manner that no movement occurs when the grout is poured. Reinforcing and tie wires shall be embedded in the grout. The thickness of the grout between masonry units and reinforcing steel shall be a minimum of one (1) bar diameter.

Contractor shall damp cure masonry work for a period of not less than seven (7) days after the work is completed. Contractor shall make provisions for curing on Saturdays, Sundays and Holidays.

Contractor shall replace any defective blocks and block cuts as indicated by the Engineer.

34.12 Joints – Exposed vertical and horizontal joints shall be solidly filled as the work progresses. After joints are thumb print firm, they shall be tooled to a tight, smooth concave surface with an approved tool. Joint width shall be 3/8", 1/2" for slump block.

Control of expansion joint shall be continuous through the mortar and masonry, at a maximum of 40' 0", unless shown otherwise.

34.13 Curing – Top of grout pour should be kept damp to prevent too rapid drying during hot or drying weather and drying winds.

34.14 Cleaning – Immediately after the wall has been fully grouted, the scum and stains which have percolated through the blocks and joints shall be hosed off with low pressure water through a jet nozzle.

Contractor shall keep area clean and neat. After completion of grouting, clean up and remove resultant debris from the site.

34.15 Measurement and Payment – No measurement or payment will be made per this section. Measurement and Payment for Concrete Masonry Units shall be per Section 16.

SECTION 35 – PERVIOUS PAVERS

35.1 Definitions -

A. Base Course: Layer of open-graded aggregate beneath the bedding course layer comprised of #57 stone per ASTM D 448-08.

B. Bedding Course: Layer of open-graded aggregate directly beneath the paver units comprised of #8 stone per ASTM D 448-08.

C. Bundle: Several layers of paver clusters stacked vertically, packaged, and tagged for shipment, also commonly called a "cube".

D. Chamfer: A 45 degree beveled edge around the top of a paver unit, usually 1/8" to 1/4" wide. The Chamfer helps prevent edge chipping, and delineates the individual paver unit.

E. Flats: The portion of the vertical side faces of a paver other than the spacer bars.

F. Laying Face: The working edge of the pavement where the laying of pavers is occurring.

G. Method Statement: The paver installer's and manufacturer's plan for construction and quality control of the pavers.

H. Spacer Bars: Small protrusions on each side of pavers which are used to keep them uniformly spaced while minimizing chipping and spalling.

I. Subbase Course: Layer of open-graded aggregate beneath the base course layer comprised of #2 stone per ASTM D 448-08.

J. Void Filler: ORCO Permeable Chips or approved equal. Open-graded aggregate used to fill the openings in the paver units.

K. Wearing Course: The top surface of the paver surrounded by a chamfer.

35.2 General Requirements, Pervious Pavers - Contractor shall provide labor, materials, tools and equipment to furnish and install a permeable concrete paving stone system as indicated on the drawings and as specified herein. All drainpipes, observation wells, overflow pipes, geotextile (if applicable) and impermeable liner (if applicable) should be in place per the drawings prior to or during placement of the subbase and base, depending on their location.

Care must be taken not to damage drainpipes during compaction and paving. No mud or sediment can be left on the base or bedding aggregates. If they are contaminated, they must be removed and replaced with clean materials.

Any excess thickness of soil applied over the excavated soil subgrade to trap sediment from adjacent construction activities shall be removed before application of the subbase materials.

Contractor shall keep the area where pavement is to be constructed free from sediment during entire job. Base and bedding materials contaminated with sediment shall be removed and replaced with clean materials.

Contractor shall not damage drainpipes, overflow pipes, observation wells, or any inlets and other drainage appurtenances during installation. Contractor shall report any damage immediately to the Engineer.

35.3 General Requirements, Pervious Paver Open-Graded Subbase and Base for Traffic Loading Areas Only – This section applies to any area where pervious pavers will be subjected to vehicular wheel loads. These areas are defined on the drawings as areas with compacted subgrade. Prior to subbase and base placement, Contractor shall verify that the subgrade has been shaped and compacted (where shown) in conformance to the lines, grades and cross-sections shown on the drawings, in order to provide for construction of the pavement structure. The Contractor shall moisten, spread and compact the #2 stone subbase in 4" to 6" lifts. For each lift, Contractor shall make at least two (2) passes in the vibratory mode then at least two (2) in the static mode with a minimum 10 ton vibratory roller until there is no visible movement of the #2 stone. Contractor shall not crush the aggregate with the roller. The surface tolerance of the compacted #2 stone shall be ±2 1/2" over a 10' straightedge. Contractor shall moisten, spread and compact #57 base in 4" to 6" lifts over the compacted #2 subbase with a minimum 10 ton vibratory roller until there is no visible movement of the #57 stone. Contractor shall not crush aggregate with the roller. The surface tolerance the compacted #57 base should not deviate more than ±1" over a 10' straightedge. In-place density of the base and subbase may be checked per ASTM D 4254 or as directed by the Engineer. Compacted density should be ninety-five percent (95%) of the laboratory index density established for the subbase and base stone.

35.4 General Requirements, Pervious Paver Open-Graded Subbase and Base for Non-Traffic Loading Areas Only – This section applies only to areas where pervious pavers will not be subjected to vehicular wheel loads. These areas are defined on the drawings as areas with uncompacted subgrade. The intent of the procedures in this section is to consolidate the subbase and base while minimizing compaction of the subgrade. The Contractor shall provide a

demonstration to the Engineer of the consolidation procedure prior to commencing this portion of the work.

Prior to subbase and base placement, Contractor shall verify that the subgrade has been shaped and compacted (where shown) in conformance to the lines, grades and cross-sections shown on the drawings, in order to provide for the construction of the pavement structure. The Contractor shall moisten, spread and consolidate the #2 stone subbase in up to 12" lifts with a lightweight vibration plate compaction machine. The surface tolerance of the compacted #2 stone shall be ±2½" over a 10' straightedge. The Contractor shall moisten, spread and consolidate the #57 stone base in up to 12" lifts over the consolidated #2 subbase with a lightweight vibration plate compaction machine. The surface tolerance of the consolidated #57 base should not deviate more than ±1" over a 10' straightedge.

35.5 General Requirements, Pervious Paver Open-Graded Bedding Course - The bedding course shall be spread loose in a uniform layer to give a depth after compaction of the paving units of 2". The bedding course (#8 stone) should be moist to facilitate movement into the base course (#57 stone). The Contractor shall screed the bedding course using either a mechanical screed beam apparatus or by the use of screed guides and boards. The surface tolerance of the screeded bedding course (#8 stone) should be ±1/2 inch over 10 feet. The screed bedding aggregate shall not be subjected to any traffic by either mechanical equipment or pedestrian use prior to the installation of the paver units. The voids left after the removal of the screed rails shall be filled with loose aggregate as the paver bedding course proceeds.

35.6 General Requirements, Pervious Paver Void Filler - Pervious paver void filler shall be ORCO Permeable Chips or approved equal. Contractor shall spread dry chips evenly across pavement, sweep chips with a broom into joints, remove excess chips, and then vibrate surface with plate compactor. This process shall be repeated until joints are full. Permeable chips or approved equal may not be used as bedding material. Any pavers damaged or misaligned during this procedure must be replaced or realigned by the Contractor accordingly.

35.7 Submittals – The Contractor shall submit the following for approval by the Engineer prior to commencing work.

A. The Method Statement.
B. Material samples of pavers showing the range of variation within the selected color(s) for approval by the Engineer, void filler aggregate, bedding course aggregate, base and subbase course aggregate including a current sieve analysis of each showing conformance to the specifications.

35.8 Quality Control Plan – The Contractor and manufacturer shall establish, provide and maintain a quality control plan. The quality control plan shall provide reasonable assurance that the materials and completed construction submitted for acceptance will conform to the contract requirements. The Quality Control Plan shall contain at a minimum, but not be limited to, the following elements:

A. The manufacturer's quality control procedures.

B. The manufacturer's production records showing at a minimum the date of manufacture. Copies of such records shall be made available to the Engineer upon request.

C. The Contractor's quality control procedures, including but not limited to, dimensional control methods, typical daily work schedule to ensure that all pavers placed on the bedding course on any given day are adjusted as required and vibrated, and installation of void filler completed at the end of that work day. (Exception: The installation of the void filler may not be installed for the first and second day due to start-up procedures.)

35.9 Sampling and Testing - Pavers shall be tested according to ASTM C140. Pavers shall be sound and free from defects that would interfere with the proper placing of the pavers or impair the strength or performance of the construction.

35.10 Method Statement - The Contractor shall prepare and provide to the Engineer prior to commencement of work a Method Statement describing the overall plan to complete the work. This plan shall include at a minimum:

A. The quality control plan.

B. Clear diagrams of the site showing the proposed starting points of the installation and the proposed directions of installation.

C. A description of the personnel and equipment to be employed for each portion of the work including installation and quality control.

D. Installer shall state the proposed daily installation rate.

E. The installer's intention to machine-lay or hand-lay the pavers and provide qualifying experience to date for the appropriate method of proposed installation for the paver system.

35.11 Qualifications – The Contractor shall demonstrate that they have installed similar paver systems for projects of a similar nature, totaling at least 300,000 square feet. Qualifications shall be submitted at the time of bid, without exception.

Contractor's Qualifications:

Contractor shall provide installation history, including references in writing with contact information, demonstrating to the satisfaction of the District their ability to perform the paver installation and related work indicated in the drawings and specifications.

The Contractor shall have suitably experienced personnel and a management capability sufficient to execute the work shown on the drawings and specified herein.

The Contractor's foreman shall demonstrate, including references, a minimum of five (5) years experience in the installation of unit paver systems similar in size and nature to this project.

35.12 Delivery, Storage and Handling - Concrete paving units shall be delivered to the site, palletized in such a way that no damage occurs to the product during hauling and unloading. All pavers shall be delivered to the site in approximately the chronological order in which they were manufactured. They shall be staged on the site as per the method statement. Each bundle of pavers shall be marked with a weather-proof tag identifying at a minimum the manufacturer, type and size of paver.

35.13 Paver Units - All interlocking paving stones shall be rated for vehicular traffic loading and comply with the quality specifications for solid concrete interlocking paving units as required per ASTM C 936.

A. Portland Cement: Conform to ASTM C 150.

B. Aggregates: Conform to ASTM C 33 for normal weight concrete aggregate (no expanded shale or lightweight aggregate) except that grading requirements shall not necessarily apply.

C. Water: Clean and free from any deleterious matter.

D. Other Constituents: Air-entraining admixtures, integral water repellents and finely ground silica shall have a proven record of performance and shall conform to the relevant ASTM standards.

E. Compressive Strength: At the time of delivery to the work site, the average compressive strength of the pavers shall not be less than 8,000 psi, with no individual unit less than 7,200 psi. Testing procedures shall be in accordance with ASTM C 140.

F. Absorption: The average absorption shall not be greater than five percent (5%) with no individual unit result greater than seven percent (7%) per ASTM C 140.

G. Dimensional Tolerances: Pavers shall be prismatic in plan and formed with straight, uniform edges. The tolerance for the flat portions of the sides shall not exceed 1/32" as measured with a steel straight edge. "Slumped" pavers exceeding this tolerance will be rejected. The length, width and thickness of the paving stones shall meet the allowable tolerances specified in ASTM C 936.

H. Pigment: Conforming to ASTM C 979.

I. Color: As specified on the drawings

J. Thickness: Minimum paver thickness shall be 3.125 inches

35.14 Visual Inspection - All units shall be sound and free of defects that would interfere with the proper placing of the unit or impair the strength or permanence of the construction.

35.15 Aggregate Materials - All aggregate materials to conform to ASTM D 448-08. The bedding course and void filler aggregate shall be free of organics and soluble salts or other contaminants likely to cause efflorescence. This material shall be crusher run and washed. The base course aggregate shall be crusher run and washed. The subbase course aggregate shall be crusher run.

35.16 Paver Installation - All edge restraints shall be constructed as shown on the drawings and in place prior to the installation of the pavers, subbase, base and bedding courses. The Contractor shall lay pavers in the pattern as shown on the drawings. Lay pavers away from the existing laying face or edge restraint in such a manner as to ensure that the pattern remains square. Chalk lines shall be used upon the bedding course to maintain straight joint lines. Joint spacing between pavers shall be between 1/8" and 1/4", however, the joint width may be increased to 3/8" if necessary to maintain straight joint lines. Lines and grades shown on the drawings shall be established and maintained during the installation of the pavers.

Where cutting of the pavers is needed, pavers shall be cut using a masonry saw. Splitting shall not be permitted. All cut faces shall be vertical. Dry cutting of the pavers shall be performed utilizing a dust collection system.

Once the pavers have been placed upon the bedding course and all cut pavers have been inserted to provide a full and complete surface, the Contractor shall inspect the pavers for damaged units and remove and replace those units. Once all pattern lines have been straightened, the void filler shall then be placed into the paver openings to the top of the chamfer on the pavers and the surface swept broom clean.

The paver surface shall be compacted to achieve consolidation of the bedding course and paving stones and brought to design levels and profiles by two passes of a suitable plate compactor. Compaction of the pavers shall be accomplished by the use of a vibratory plate compactor capable of a minimum of 4,500 pounds of compaction force. No compaction shall be permitted within three feet of unrestrained edges of the pavement. After compaction, inspect the pavers for damaged units and remove and replace those units.

On completion of vibration after void filling, the surface tolerances shall be plus or minus 1/8" from finish levels. The pavers shall be flush to 1/8" above edge restraints. Additional void filler material shall be swept in the paver voids, as required, to within 1/4" from the bottom of the chamfer on the paving stones. Upon completion, the wearing course surface shall be swept clean of all excess materials. Remove from the site all surplus materials, equipment and debris resulting from these operations.

35.17 Measurement and Payment - No measurement or payment will be made per this section. Measurement and Payment for Pervious Pavers shall be per Section 19.

SECTION 36 - PERVIOUS CONCRETE PAVEMENT

36.1 References -

A. American Concrete Institute (ACI):

1. ACI 522R-10 "Pervious Concrete"

2. ACI522.1-08 "Specification for Pervious Concrete Pavement"

3. ACI Field Technician Certification Program

B. National Ready Mixed Concrete Association (NRMCA):

NRMCA Pervious Concrete Contractor Certification

C. American Society for Testing and Materials (ASTM):

1. ASTMC 1688/1688M-08 "Standard Test Method for Density and Void Content of Freshly Mixed Pervious Concrete"

2. ASTM C 1116 "Standard Specification for Fiber-Reinforced Concrete"

36.2 General — Concrete materials and operations may be tested and inspected by Engineer as work progresses. Failure to detect defective work or material early will not prevent rejection if a defect is discovered later nor shall it obligate Engineer for final acceptance.

36.3 Contractor Qualification - Unless otherwise approved by Engineer, Contractor shall provide evidence of:

A. Employment of one (1) NRMCA certified Pervious Concrete Craftsman who must be on site, overseeing each placement crew, during all concrete placement, or

B. The Contractor shall provide evidence of employment of three (3) NRMCA certified Pervious Concrete Technicians, who have received hands-on training in the construction of pervious concrete pavements, and who must be on site, working as members of each placement crew, during all concrete placement, or

C. With the approval of Engineer, Contractor may provide written evidence of project experience and proficiency in successfully completing pervious concrete pavement construction, and submit evidence of completion of a pervious concrete certification program, or

D. The Contractor must obtain the services of a consultant who has the required NRMCA certification cited in A or B above and who will be on site throughout the concrete placement.

36.4 Concrete Producer Qualification – Unless otherwise approved by Engineer, ready mixed pervious concrete shall be produced and provided by an NRMCA Certified plant. If, rather than ready mixed pervious concrete, a volumetric mobile mixer is used to produce the pervious concrete, the mixer(s) must conform to the standards of the Volumetric Mixer Manufacturers Bureau (VMMB), to be verified by a current VMMB conformance plate affixed to the volumetric mixer equipment.

36.5 Special Equipment - Pervious concrete requires specific equipment for compaction and jointing. The concrete shall be jointed and compacted using the methods listed in this section, or alternatives, as demonstrated and approved by the Engineer.

Rolling compaction shall be achieved using a motorized or hydraulically actuated, rotating, weighted, tube screed that spans the width of the section placed and exerts a minimum vertical pressure of 10 psi on the concrete. Alternately, a steel pipe roller meeting the same criteria may be used. Plate compaction is not recommended, but may be necessary in small areas. When necessary, a standard soil plate compactor with a base area of at least two square feet that exerts a minimum of 10 psi vertical pressure on the pavement surface through a 3/4 inch minimum temporary plywood cover shall be used.

Cross rolling shall be performed using a roller specifically designed to smooth and compact pervious concrete. Lawn rollers are not allowed.

Contraction joints shall be constructed by rolling or forming. Sawed joints shall not be used. Rolled joints shall be formed using a "pizza cutter roller" to which a beveled fin with a minimum depth of 1/4 the thickness of the pavement has been attached around the circumference of the roller.

36.6 Submittals - Prior to commencement of the work the Contractor shall submit the following:

A. Concrete Materials:

1. Proposed concrete mixture proportions including all material weights, volumes, density (unit weight), water-to-cement (cementitious) ratio, and void content.

2. Aggregate type, source, and grading.

3. Cement, supplementary cementitious materials, and chemical admixture manufacturer certifications.

B. Aggregate base materials: washed aggregate type, source, grading, and void content (percent porosity).

C. Project details including a jointing plan, construction details, schedule, construction procedures, and quality control plan.

D. List of all subcontractors, materials suppliers, and testing laboratories to be used on the project.

36.7 Test Panel - Test panel shall be placed prior to construction of the pavement as shown on the drawings and must be approved by the Engineer. Test panel shall be constructed, cored, removed and disposed of at the Contractor's expense.

A. Test panel shall be constructed in accordance with these specifications and shall be placed at a test location within the site as agreed to by the Engineer. Regardless of qualification, the Contractor is to place at minimum one test panel, a minimum of 225 square feet, 8-1/2 inches thick over 8 inches of #57 stone compacted per Section 36.10 of these detailed specifications. Test panel shall be configured such that at least one rolled or formed contraction joint will bisect panel. Test panel shall be consolidated, jointed and cured using materials, equipment, and personnel proposed for the project, to demonstrate to the Engineer's satisfaction that in-place densities can be achieved and a satisfactory pavement can be installed at the site location. In addition, the same ready-mix supplier must be used during the construction of the test panel and final paving to ensure proper delivery of a satisfactory pervious concrete mixture.

B. Test panel shall have acceptable surface finish, joint details, thickness, porosity and curing procedures and shall comply with the testing and acceptance standards listed in this section. The test panel shall be cored by Contractor to obtain a minimum of six (6) testing samples to be provided to Engineer. Test panel will be tested for thickness in accordance with ASTM C 42; fresh density and void content in accordance with ASTM C 1688, and core density in accordance with ASTM C 140, paragraph 9.

C. Satisfactory performance of the test panel shall be determined by:

1. Test panel shall have acceptable surface finish, joint details and curing procedures.

2. Concrete cores shall visually evidence both good adhesion of aggregate (there shall be minimal pop-out of aggregate) and interconnected pore structure.

3. The average of three (3) cores shall show compacted thickness of no less than specified thickness minus 1/4 inch ($T_{compacted} \geq T_{specified} - 1/4$ inch).

4. The average of three (3) core samples shall show void content fifteen percent (15%) minimum; twenty-five percent (25%) maximum.

5. The average of three (3) core samples shall show density ±5 lb/cf of the design density in accordance with ASTM C 140.

6. Ability of panel to freely pass water in simulated rain event.

Failure of test panel to meet any of the criteria specified in this section shall result in Contractor removing and disposing of failed panel. Contractor shall then construct new panel for retesting. Contractor will not be allowed to construct pervious concrete within limits shown on drawings until test panel meets all acceptance criteria. No measurement or payment for the test panel will be made.

36.8 Project Conditions -

A. Weather Restrictions:

The Contractor shall not place pervious concrete pavement when the ambient temperature is predicted by the National Weather Service Point Forecast for the jobsite to rise above 90°F (32.2°C) during the seven days following placement, unless otherwise permitted in writing by the Engineer. If Contractor desires to place pervious concrete pavement when the seven (7) day forecast calls for any daily high temperatures to exceed 90°F maximum, Engineer's approval to proceed will be contingent on Contractor submitting viable plan (in advance of pre-paving conference) detailing what specific measures will be implemented to assure proper curing.

B. Pre-Paving Conference:

A pre-paving conference with the Engineer shall be held within one week prior to beginning placement of test panel. The pervious concrete supplier and the entire concrete crew that will form and place the concrete shall attend this meeting. Contractor shall provide documentation that crew has NRMCA certifications or experience as required in Section 36.3. Meeting emphasis will include how paving with pervious concrete differs from paving with conventional concrete. District will supply agenda at initial project preconstruction meeting. Meeting topics will include installation schedule for test panel and final paving, drawing review, base material compaction, concrete mix design, specifics of installation and curing methods proposed, testing and consequences of failed tests.

36.9 Isolation (Expansion) Joint Material – (See Section 36.14.E.4. for joint locations). Joint material shall be 1/4 inch flexible foam expansion joint with relative density of 1.7 or higher, meeting ASTM D 4819-88, or vinyl expansion joint in compliance with ASTM D 1751 or ASTM D 1752.

36.10 General Requirements, Pervious Concrete Open-Graded Base – Prior to base placement, the Contractor shall verify that the subgrade has been compacted, and the impermeable composite liner and PVC subdrain system has been placed, in conformance to the lines, grades and cross-sections shown on the drawings. Where the full thickness of the base material consists solely of #57 stone, the Contractor shall moisten, spread and compact the stone base in two equal lifts, with a third lift placed as needed and compacted to obtain the full required depth. Where the base material consists of a layer of #57 stone over a layer of Class 2 permeable base over a second layer of #57 stone, the Contractor shall moisten, spread and compact each layer as a single lift, topping off and compacting each layer as needed to obtain the full required layer depth. Compaction of the #57 stone and Class 2 permeable base shall be accomplished by at least 2 passes with a vibratory plate compactor applying approximately 4,500 pounds of compaction force. No compaction shall be permitted within six inches of the edge of the base material or over any PVC subdrain where the depth of base material cover over the top of the subdrain is less than 12". The surface tolerance of the compacted #57 stone shall be 1" over a 10' straightedge. In place density of the base may be checked per ASTM D 4254 or as directed by the Engineer. Compacted density should be ninety-five percent (95%) of the laboratory index density established for the base materials.

36.11 Curing Materials -

A. Polyethylene sheeting - The primary method of curing pervious concrete shall be the placement of a ballasted waterproof covering consisting of a minimum of 6 mil thick polyethylene sheeting.

B. Other moisture loss control - For prevention of moisture loss prior to the primary method of curing:

1. Fogging equipment designed to raise the relative humidity of the ambient air over the slab and reduce evaporation from the concrete must be used. Equipment must include fog nozzles that atomize water using air pressure to create a fog blanket over the slab. Garden hose nozzles are not sufficient to create fog and may wash paste off the aggregate.

2. Monomolecular film (Evaporation Retardant) applied per the manufacturer's instructions.

3. A soybean oil based sealer/water repellant may reduce surface color markings from plastic sheeting, and can enhance strength and durability by preventing evaporation, but does not reduce porosity.

36.12 General Requirements, Pervious Concrete Pavement –

A. Cement shall be Portland cement Type I or Type II conforming to ASTM C 150 or Portland cement Type IP or IS conforming to ASTM C 595.

B. Supplementary Cementitious Materials: Fly ash conforming to ASTM C 618.

C. Admixtures:

1. Air entraining admixtures meeting ASTM C 260.

2. Chemical admixtures shall comply with ASTM C 494.

(a) Water reducing admixtures: Type A. Mid-range water reducing admixtures (MRWRA) or high range water reducing admixtures (HRWRA) Type F or G are permitted due to low water-to-cement (cementitious) ratios specified for pervious concrete.

(b) Hydration stabilizing admixtures meeting requirements of ASTM C 494 Type B Retarding or Type D Water Reducing/Retarding admixtures are required. This stabilizer suspends cement hydration by forming a protective barrier around the cementitious particles, delaying the initial set as the pervious concrete heats up in the truck. A standard retarder will not prevent premature hydration while the stabilizer will. The use of hot water during cold weather will require an increased dosage of Hydration Stabilizer.

D. Aggregates:

1. Coarse Aggregate shall meet the grading and quality requirement of ASTM C 33 for Size 8 coarse aggregate (3/8" to No. 16). Data for proposed alternate material shall be submitted to Engineer for approval.

2. Fine aggregate complying with ASTM C 33 shall provide 6% ± 2% of total aggregate weight.

3. A combined coarse and fine aggregates gradation shall be provided and a minimum of ten percent (10%) of the material shall pass the #4 sieve.

4. Well graded aggregates shall not be used.

5. Natural rounded aggregate, where available, is recommended.

E. Water shall be potable and comply with ASTM C 1602.

F. The Contractor shall construct the fiber reinforced pervious concrete where specified on the drawings consistent with ASTM C1116 requirements for Type II Glass Fiber-Reinforced Concrete. Fiber reinforcement shall be alkali resistant (AR) chopped strand glass fibers per ASTM C1666. Contractor to submit to Engineer for approval recommended fiber length and percent fiber by volume of concrete prior to construction.

G. Recommended Mixture Proportions - The Contractor shall furnish a proposed mixture design, with proportions of materials, or if mixture proportions are proprietary, a written submittal from the concrete supplier, prior to commencement of work. The data shall include densities determined in accordance with ASTM C 1688/C 1688M. The composition of the proposed concrete mixture shall be submitted to the Engineer for review and approval and shall comply with the following provisions unless an alternative composition is demonstrated to comply with the project requirements. Mixture performance will be affected by the properties of the particular materials used. Trial mixtures must be tested to establish proper proportions and determine expected behavior. Concrete producers may have mixture proportions for pervious concrete optimized for performance with local materials. Appendix 6 of ACI 211.3R and ACI 522R-10 provide a guide for pervious concrete mixture proportioning. General mixture recommendations are as follows:

1. Concrete mixture density: Range of 105 lb/cf to 130 lb/cf per ASTM C 1688/1688M.

2. Concrete mixture void content: Range of 15% to 25%, per ASTM C 1688/1688M.

3. Cementitious content: Range of 450 lbs/yd3 to 700 lb/yd3.

4. Supplementary cementitious content: Fly ash twenty percent (20%) maximum. Combined supplementary cementitious content twenty percent (20%) maximum.

5. Water-to-cement (cementitious) ratio: Range from 0.27 to 0.34.

6. Aggregate content: The bulk volume of aggregate per cubic yard shall be equal to 27 cubic feet (cf) when calculated from the density (unit weight) determined in accordance with ASTM C 29 Jigging Procedure.

7. Admixtures: Admixtures shall be used in accordance with the manufacturers' instructions and recommendations.

8. Mixture Water: The quantity of mixing water shall be established to produce a pervious concrete mixture of the desirable workability to facilitate placement, compaction, and finishing to the desired surface characteristics. Mixture water shall be such that the cement paste displays a wet metallic sheen without causing the paste to flow from the aggregate. (A cement paste with a dull-dry appearance has insufficient mixture water for hydration.) Insufficient mix water results in inconsistency in the mix and poor bond strength. High water content may result in the paste sealing

the void system primarily at the bottom and poor bond at the upper surface.

9. Air Entrainment: Not recommended for this climate.

10. Fiber Reinforcement: Will increase toughness, and may help prevent raveling, but may decrease workability.

36.13 Notification - The Engineer shall be notified at least 24 hours prior to all pervious concrete paving work.

36.14 Installation of Pervious Concrete Pavement –

A. Pavement shall be a single-lift placement.

B. Formwork materials are permitted to be of wood or steel and shall be the full depth of the pavement. Caution should be used to protect the impermeable membrane from puncture or tear when placing forms. Form pins shall not be placed into the pavement base material in order to avoid penetrating the impermeable membrane. Forms shall be of sufficient strength and stability to support mechanical equipment without deformation following spreading, strike-off and compaction operations. Forms may have a removable spacer of 1/2 inch to 3/4 inch thickness placed above the depth of pavement. The spacers shall be removed following placement and vibratory strike-off to allow roller compaction. (Removable spacers may not be necessary if other means of strike-off and consolidation are used, such as a motorized or hydraulically actuated weighted pipe roller screed.)

C. Mixing and Transportation:

1. Production: Pervious concrete shall be manufactured and delivered in accordance with ASTM C 94.

2. Mixing: Pervious concrete shall be batched in central mixers or in transit (truck) mixers. When concrete is delivered in agitating or non-agitating units, the concrete shall be mixed in the central mixer for a minimum of 1 minute or until a homogenous mixture is achieved. Concrete mixed in transit mixers shall be mixed at the mixing speed designated by the manufacturer for 70 - 100 revolutions.

3. Transportation: Pervious concrete may be transported or mixed on site and discharge of individual loads shall be completed within one (1) hour of the introduction of mixture water to the cement. Discharge times may be extended beyond one hour when an increased dosage of hydration stabilizer is used to maintain a wet metallic sheen.

4. Discharge: Each truckload shall be visually inspected for moisture consistency. Water addition shall be permitted at the point of discharge to obtain the required mixture consistency, and as needed to maintain a wet metallic sheen. A minimum of 30 revolutions at the manufacturer's designated mixing speed shall be required following the addition of any water to the mixture, prior to further discharge. If water is added more than three times to a load, the dosage rate of hydration stabilizing admixture should be increased in subsequent loads. Discharge shall be a continuous operation and shall be completed as quickly as possible. Concrete shall be deposited as close to its final position as practical and such that discharged concrete is incorporated into previously placed plastic concrete. If consolidation occurs during concrete discharge, placement shall be halted, the mixture shall be addressed, and the consolidated portion removed and replaced immediately.

D. Placing and Finishing:

1. The base shall be in a damp condition at time of concrete placement. Failure to provide a moist base will result in absorption of water from the pervious concrete into the base, consequently reducing the concrete strength and overall quality of the pavement.

2. Concrete may be deposited into the forms by mixer truck chute, conveyor or buggy.

3. Placing, finishing, and tooled jointing must be completed within 20 minutes from the time the pervious concrete is discharged from the truck.

4. Unless otherwise permitted, the Contractor shall utilize a mechanical vibratory screed to strike off the concrete 1/2 inch to 3/4 inch above final elevation, utilizing form spacers as described in this section. An alternative method of strike off and compaction is to use a motorized or hydraulically actuated weighted pipe roller screed, as described under the Special Equipment heading in this section. If approved by the Engineer in writing, the Contractor may place the pervious concrete with either slip form or vibratory form riding equipment followed by a compacting unit that will provide a minimum of 10 psi vertical force to the concrete.

5. Care must be taken to prevent closing the void structure of pervious concrete. Finishing operations not described in this section are not allowed. Internal vibration shall not be permitted. (If surface vibration is applied, it shall be shut off immediately when forward progress is halted for any reason.)

6. Placed concrete shall not be disturbed while in the plastic state including edging. Low spots after the screeding operation shall be over-filled for

surface repair and tamped to the desired elevation with hand tampers or re-screeded with the motorized or hydraulically actuated weighted pipe roller screed.

7. Following strike-off, remove spacers and compact the concrete to the form level utilizing a steel roller, a plate compactor on plywood or other method approved by the Engineer.

8. Freshly compacted concrete shall be protected from evaporation using one or more methods described in this section.

9. Cross rolling should be performed using the minimum number of passes required to achieve an acceptable surface. Over working the concrete surface will close voids and limit porosity.

10. Care shall be taken during compaction that sufficient compaction force is achieved without excessively working the concrete surface that might result in sealing surface porosity.

11. The pervious concrete pavement shall be compacted to the required cross-section and shall not deviate more than ±0.5 inches in 10 feet from profile grade.

E. Jointing:

1. Contraction joints shall be installed at regular intervals not to exceed 20 feet. Slab length shall not exceed 1.5 times slab width. Transverse contraction joints shall be installed at 1/4 the depth of the thickness of the pavement. These joints are to be installed as quickly as possible in the plastic concrete.

2. Jointing plastic concrete: Joints installed in the plastic concrete may be constructed utilizing a small roller as described under the Special Equipment heading in this section. When this option is used it shall be performed immediately after roller compaction and prior to curing. Sawed joints shall not be used.

3. Transverse construction joints: Transverse construction joints shall be installed whenever placement is suspended for 30 minutes or whenever concrete is no longer workable.

4. Isolation joints: The Contractor shall isolate slabs from other structures, such as walls, curbs, footings, columns, valve and cleanout casings, slabs, light poles, and other points of restraint. Isolation joints shall permit independent vertical and horizontal movement between adjoining structures.

5. Edging shall be performed along isolation joints and construction joints in order to reduce potential for raveling under traffic.

F. Curing:

1. Curing procedures shall begin immediately but no later than 20 minutes from the time the pervious concrete is discharged from the truck. Placing, finishing, and tooled jointing must be completed within the 20 minute window after discharge. The pavement surface shall be covered with a minimum of 6 mil thick polyethylene sheet or other approved covering material. The cover shall overlap and be sealed at all edges and shall be secured (without using dirt or stone) to prevent uncovering due to winds or adjacent traffic conditions. For additional guidance on hot weather concreting, see ACI 305; for cold weather concreting see ACI 306.

2. Due to the low water-to-cement (cementitious) ratio and large areas of exposed surface, pervious concrete is especially susceptible to drying out. The surface shall be kept moist and evaporation prevented using some or all of the following methods:

   (a) Fogging must start when the pervious concrete is deposited and must be continued until the plastic curing cover is placed.

   (b) Application of spray applied curing compound, evaporation retarder, monomolecular film, or covering with .5 mil plastic sheet immediately after screeding. Note that .5 mil plastic sheet used to prevent evaporation is not a substitute for the 6 mil polyethylene sheet used for curing.

   (c) Application of water under the plastic covering. If this method is implemented by loosening the edge of the plastic in order to spray water under the plastic cover, care must be taken to properly re-secure the plastic cover to prevent evaporation.

3. Immediately after each transverse jointing, the 6 mil polyethylene sheet curing shall be applied.

4. The curing cover shall remain securely in place, uninterrupted, until the concrete has reached a maturity equivalent to fourteen (14) days of curing at 70°F at ninety-five percent (95%) relative humidity. Maturity shall be determined by an independent testing laboratory. No vehicular traffic shall be permitted on the pavement until curing is complete without written permission from the Engineer.

5. If the polyethylene sheeting has been removed from the finished surface prior to completion of curing, the Contractor is responsible to re-cover the material immediately.

36.15 Measurement and Payment - No measurement or payment will be made per this section. Measurement and Payment for Pervious Concrete Pavement shall be per Section 19.

SECTION 37 – POROUS ASPHALT PAVEMENT

37.1 General Requirements, Porous Asphalt Pavement - Porous asphalt pavement shall be constructed per State Standard Specifications Section 39 as specified for "open graded asphalt". The grade of asphalt binder shall be PG 76-22 or as submitted by Contractor and approved by the Engineer. The aggregate shall be 3/8" maximum per State Standard Specifications Section 39 as specified for "open graded asphalt". Liquid asphalt shall have a liquid anti-stripping agent additive at a concentration of 0.3% (Chevron Pave Bond Special), or equal, or as submitted by the Contractor and approved by the Engineer.

37.2 Contractor Quality Assurance - The Contractor shall provide staff that has performed two successful pervious asphalt pavement projects, each greater than 1,000 sf.

37.3 Submittals - Prior to commencement of the work the Contractor shall provide submittals per Section 39-3.03 of the State Standard Specifications. The Contractor shall provide the additional following submittals:

A. Project details including a jointing plan, construction details, schedule, construction procedures, and quality control plan.

B. List of all subcontractors, materials suppliers, and testing laboratories to be used on the project.

37.4 Test Panel - Test panel shall be placed a minimum of twenty-one (21) days prior to construction of the pavement as shown on the drawings and must be approved by the Engineer. Test panel shall be constructed, tested, removed and disposed of at the Contractor's expense.

A. Test panel shall be constructed in accordance with these specifications and shall be placed at a test location within the site as agreed to by the Engineer. Regardless of qualification, the Contractor is to place at minimum one test panel, a minimum of 225 square feet, at the required project thickness. Test panel shall be consolidated, jointed and cured using materials, equipment, and personnel proposed for the project, to demonstrate to the Engineer's satisfaction that a satisfactory pavement can be installed at the site location. In addition, the same open graded asphalt supplier must be used during the construction of the test panel to ensure proper delivery of a satisfactory mixture.

B. Test panel shall have acceptable surface finish, joint details, thickness, porosity and curing procedures.

C. Satisfactory performance of the test panel shall be determined by:

1. Compacted thickness of no less than specified thickness minus 1/4 inch (Tcompacted ≥ Tspecified – 1/4 inch).

2. Ability of panel to freely pass water in simulated rain event.

37.5 General Requirements, Porous Asphalt Pavement Open-Graded Base – Prior to base placement, the Contractor shall verify that the subgrade has been compacted, and the impermeable composite liner and PVC subdrain system have been placed, in conformance to the lines, grades and cross-sections shown on the drawings. Where the full thickness of the base material consists solely of #57 stone, the Contractor shall moisten, spread and compact the stone base in two equal lifts, with a third lift placed as needed and compacted to obtain the full required depth. Where the base material consists of a layer of #57 stone over a layer of class II permeable base over a second layer of #57 stone, the Contractor shall moisten, spread and compact each layer as a single lift, topping off and compacting each layer as needed to obtain the full required layer depth. Compaction of the #57 stone and class II permeable base shall be accomplished by at least 2 passes with a vibratory plate compactor applying approximately 4,500 pounds of compaction force. No compaction shall be permitted within six inches of the edge of the base material or over any PVC subdrain where the depth of base material cover over the top of the subdrain is less than 12". The surface tolerance of the compacted #57 stone shall be 1" over a 10' straightedge. In place density of the base may be checked per ASTM D 4254 or as directed by the Engineer. Compacted density should be ninety-five percent (95%) of the laboratory index density established for the base materials.

37.6 Measurement and Payment - No measurement or payment will be made per this section. Measurement and Payment for Porous Asphalt Pavement shall be per Section 19.

SECTION 38 – IRRIGATION SYSTEM

38.1 Description – This section covers the contract item Irrigation System as required for the construction of the project and as shown on the Water Efficient Landscape Conversion drawings.

38.2 Irrigation System – The contract item Irrigation System includes all materials, labor, equipment, installation, and fees required to complete the work required as shown on the irrigation drawings and the following work:

1. Contractor shall furnish and place the various items of the Irrigation System as shown on the drawings and as specified herein. This work shall include installation of the main and lateral piping with associated valves, components and fittings, sprinkler heads, pop-up heads, backflow preventers, master valves, remote control valves, ball valves, quick couplers, electrical wiring, fabrications, excavations, backfill, compaction, flushing, disinfecting, testing and connection to existing facilities and any other work associated with the Irrigation System installation. The Irrigation System is designed to operate with a maximum 3.64

gallons per minute (GPM) with thirty (30) pounds per square inch at the last spray head in each zone.

2. The irrigation plan is diagrammatic; the Contractor shall make the necessary adjustments in the field to provide proper spacing and guarantee one hundred percent (100%) coverage. Contractor shall be responsible for the layout and adjustments of all water irrigation sprinklers to eliminate overspray onto non-landscaped areas including, but not limited to, buildings, sidewalks, parking lots, travel ways (paved and unpaved), and trail systems.

3. Contractor shall schedule four (4) check inspections; the first to check layout for trenching; the second for pressure testing all pressure lines prior to trench backfilling; the third for lateral placement; and the fourth for performance coverage. Contractor to contact Engineer 48 hours in advance of required inspections.

4. Unless noted otherwise, all equipment and appurtenances shall be installed as per these drawings, specifications, manufacturer's instructions, and as required by local codes, and ordinances.

5. Connection to the water source shall be at a gate valve provided by the District at the approximate location indicated on the drawings. The Contractor shall be responsible for making the connection after the gate valve.

38.3 System Design – Pressure shall be verified by Contractor at the point of connection to main system and at the last head in the circuit.

Design location is approximate. Contractor shall make minor adjustments, as necessary, to avoid plantings and other obstructions with Engineer's approval. All adjustments shall be done at Contractor's expense. Water coverage for all planting areas shall be one hundred percent (100%). Layout may be modified by Contractor, if necessary, to obtain one hundred percent (100%) coverage to suit manufacturer's standard heads. Contractor shall notify the Engineer before making any changes.

38.4 Trenching and Backfilling - Trench excavation shall be straight and true with bottom uniformly sloped to low points. Provide the following minimum cover over top of installed piping:

- Main Lines, 18" minimum
- Lateral Lines, 12" minimum
- Piping under pavement, 24" minimum
- Sleeves, 18" minimum

Any backfill shall be made with clean material from the excavation, as approved by the Engineer. Contractor shall remove any organic material as well as rocks and debris larger than

1" diameter. Contractor shall place approved backfill material in 6" lifts, compacting each lift and flushing it with water to settle trench, except under pavement.

Where trenching is required across existing lawns, Contractor shall uniformly cut strips of sod 6" wider than the trench width. Contractor shall remove sod in rolls of suitable size for handling and keep them moistened until replanted.

Contractor shall backfill trench to within 6" of finished grade. Contractor shall continue fill with approved topsoil and shall compact it to bring sod even with existing lawn.

Contractor shall replant sod within seven (7) days after removal, roll and water generously.

Any sod areas not in healthy condition equal to adjoining lawns thirty (30) days after replanting shall be reseeded and restored to original condition by Contractor.

38.5 Installation – Unless otherwise indicated, Contractor shall comply with the requirements of the Uniform Plumbing Code.

Connection to existing gate valve is to be made at existing backflow preventer.

Contractor shall maintain uninterrupted water service to building during normal working hours. Contractor shall arrange for temporary water shutoff in consultation with the Engineer.

Existing backflow preventer on site and point of connection is to be made directly downstream (see drawings).

Contractor shall install in valve box, arranged for easy adjustment and removal.

Contractor shall adjust automatic control valves to provide flow rate of rated operating pressure required for each sprinkler circuit.

Contractor shall provide one remote control valve per box. No Exceptions.

Contractor shall lay pipe on solid subbase, uniformly sloped without humps or depressions and install PVC pipe in dry weather when temperature is above 40°F, in strict accordance with manufacturer's instructions. Contractor shall allow joints to cure at least 24 hours at a temperature above 40°F, before testing, unless otherwise recommended by manufacturer.

Contractor shall flush circuit lines with full head of water and install heads after hydrostatic test is completed.

Contractor shall:

a. Install shrub heads at heights indicated;

b. Locate part circle heads to maintain a minimum distance as shown on drawings to maintain a minimum distance from walls and other boundaries, unless otherwise indicated; and
c. Check all sprinkler heads at corners of planters near pedestrian walkways and readjust location so that heads do not obstruct pedestrians cutting corners.

Contractor shall install controller and control wires per details on drawings. Control wiring shall be of the size, type and specification as recommended by the manufacturer of the controller and control valve and meet local requirements.

Contractor shall:

a. Lay control wire from each remote control valve to the controller. Lay wiring from the remote control valve to the controllers beneath the mains where practicable and install control wiring in conduit when passing beneath paving. Tape wire together at 10 foot intervals. Provide an 18 inch expansion wire loop at each valve;
b. Encase above ground control wiring in electrical conduit as required by local code (if necessary);
c. Coat bare wire with an epoxy cement; wrap a minimum of two coats of vinyl electrical tape; apply a second coat of epoxy cement over all. Splices shall be protected in 10" round plastic box with locking lid; and
d. Connect the remote valves to the controller in a clockwise sequence to correspond with the station beginning with Station 1, Station 2, Station 3, etc. Provide schedule in a watertight container showing valve connection to the controller.

Trenches for pipe lines shall be as specified on the drawings. Minor adjustments may be made to fit field conditions. All lateral irrigation pipe shall be installed at a minimum depth of 12" below grade. All pressure lines shall be installed a minimum depth of 18" below grade.

All pipes shall be placed as shown on drawings by dimensions or accurate scaling except where existing conditions require slight changes to better suit field conditions.

Contractor shall be responsible for pre-installing piping through or under structures where pipe is to extend from one planter to another. When pipe is to be installed after such walls and paving have been constructed, Contractor shall obtain approval from Engineer on the methods to be used in installing the pipe. Any damage to existing improvements as a result of Contractor's work shall be repaired or replaced free of cost to District.

Connections to existing facilities shall be scheduled and coordinated to result in a minimum interruption in functioning of existing facilities. The Engineer shall be notified a minimum of 48 hours in advance of such connections, and they shall be made at a time approved by the Engineer.

PVC pipe shall be installed as recommended by the pipe manufacturer. Plastic pipe shall be cut in a manner so as to ensure a square cut. Burrs at cut ends shall be removed prior to installation. Use only the solvent supplied by or as recommended by the manufacturer. Clean pipe and fittings thoroughly of dirt, dust and moisture before applying solvent. Remove excess solvent from joint after joining.

When making plastic to steel connections, work steel connections first. Use Teflon tape on threaded plastic to steel joints.

Adjust all irrigation heads, valves, controller, and other appurtenances to ensure proper operation and coverage.

After installation and prior to backfilling, the sprinkler system including piping, fittings, sprinklers, valves and all appurtenances shall be flushed and tested in the presence of the Engineer.

The premises shall be clear of debris resulting from work at the end of each day. Upon completion of the installation, the project area shall be left in a broom clean manner.

38.6 Testing – Contractor shall notify Engineer at least 48 hours before testing will be conducted. Conduct tests in presence of Engineer.

Contractor shall test all mainline piping, before backfilling trenches, to a hydrostatic pressure of not less than 125 psi for four (4) hours. Piping may be tested in sections to expedite work. Remove and repair piping and connections which do not pass hydrostatic testing.

Contractor shall perform operational testing after hydrostatic testing is completed, backfill is in place, and sprinkler heads adjusted to final position.

Pressure test and coverage test shall be completed and approved prior to soil preparation and planting tasks.

Contractor shall demonstrate to Engineer that the system meets coverage requirements and that all automatic controls function properly. Coverage requirements are based on operation of one circuit at a time.

38.7 Turnover Items and Products – At the completion of construction, prior to maintenance period beginning, Contractor shall supply the following items to the District:

- 1 remote control valve of each size and style
- 10 irrigation heads of each style with nozzle
- 3 quick coupler keys and swivels
- 2 keys for each controller

38.8 Miscellaneous - Contractor shall install in each controller a reduced drawing of the sprinkler plan showing each area operated by a remote control valve. Chart shall be laminated in 4 mil plastic and securely attached to irrigation controller inside lockable lid.

38.9 Measurement and Payment - For the lump sum contract item Irrigation System under this section the Contractor shall submit its Schedule of Values to the Engineer within ten (10) calendar days of issuance of the Notice to Proceed with a breakdown for each trade. Payment for the contract lump sum price for Irrigation System shall be based on the percentage of work completed according to the Schedule of Values and shall include full compensation for all material, labor, and incidental costs incurred under this section.

SECTION 39 – SOIL TESTING AND SOIL PREPARATION

39.1 Description – This section covers the contract item Soil Testing and Soil Preparation as required for the construction of the project.

39.2 Soil Testing and Soil Preparation - The contract item Soil Testing and Soil Preparation includes all materials, labor, equipment, and fees required to complete the work described in this section.

39.3 Soil Analysis Report - Contractor shall provide a Soils Analysis Report for the project site addressing both onsite and any imported soils. The scope of supporting testing and analysis in the report shall include at minimum but not necessarily be limited to the items listed below:

1. Soil Fertility: Half-saturation percent, pH, salinity, nitrate, ammonium, phosphate, potassium, calcium, magnesium.

2. Agricultural Suitability: pH, salinity, boron, Sodium Absorption Ratio (SAR) using saturation paste extract.

3. Particle Size/Appraisal: pH, salinity, organic percent, USDA Particle size.

4. Germination (bio-assay) test.

5. Tendency toward compaction.

The Soil Analysis Report shall make specific quantitative recommendations for any soil amendments or physical processing required to ensure successful establishment of the proposed plantings.

The Soil Analysis Report shall include a statement that the laboratory has reviewed the planting drawings and the planting specifications, and that the supporting soil testing and recommendations therein respond to the specific needs of the project.

39.4 Soil Preparation - Contractor shall perform all site and soil preparation as shown on drawings and as specified herein:

1. Contractor shall provide soil amendments, chemicals, and fertilizers for both imported and approved onsite soils. These are minimum requirements. Provide such additional amendments and chemicals as are required by the Soil Analysis Report.

2. Contractor shall spread soil amendment and fertilizer evenly over all areas designated as "GROUNDCOVERS" by various hatching on Sheets 8 and 9 of the Water Efficient Landscape Conversion drawings at the following rates:

   a. Soil Amendment: 4 cubic yards per 1,000 square feet
   b. Fertilizer: 20 lbs. per 1,000 square feet of 6-20-20, (N-P-K)

3. After approval of amendment and fertilizer applications by the Engineer, Contractor shall apply soil amendments and fertilizers into the top 6 inches of soil by repeated rotary-hoe cultivation.

4. At completion of soil amendment and fertilizer installation, Contractor shall water the soil in all landscaped areas for a period of fourteen (14) days, maintaining sufficient soil moisture at all times to induce weed seed germination, but not to saturate the soil. Soil shall be moist to a minimum depth of 24 inches. In locations where irrigation is by drip or bubblers, the Contractor may, at its option and expense, install a temporary irrigation system to keep the soil moist.

39.5 Herbicide Application – Contractor shall at the end of the watering period, spray the area with an Engineer-approved herbicide. Apply herbicide according to the manufacturer's written application instructions. Alternate weeding methods may be used upon approval of the Engineer. Apply pre-emergent herbicide to all landscaped areas, including plant basins. Apply prior to any mulching. Pre-emergent herbicide shall be applied only when wind speed does not exceed five (5) miles per hour.

39.6 Finish Grading – When weeding and soil conditioning have been completed and soil has been thoroughly water settled all landscaped areas shall be finish graded for placement of plant materials. Grading shall be performed when the soil is at optimum moisture content for working.

Finished grades shall be in accordance with the Parking Lot Renovation drawings. All landscaped areas shall slope uniformly for positive drainage.

Grades not otherwise indicated shall be uniform levels or slopes between points where elevations are given, or between points established by walks, paving, curbs or catch basins. Finish grades shall be smooth, even, and on a uniform plane with no abrupt change of surface and no erosion scars.

Grading shall provide for natural runoff of water without low spots or pockets. Flow line grades shall be accurately set and shall be not less than two percent (2%) gradient unless otherwise indicated or approved by the Engineer.

Finish grade of earth in landscaped areas shall be one inch below the top of adjacent pavement, curbs or headers, with a gradual tapering away from these structures to a uniform depth of 3-1/2 inches below the top of adjacent pavement, curbs or headers, unless indicated otherwise on the drawings. Finish grade of earth shall be 3-1/2 inches below the top of pull and utility boxes or utility structures. Pull and utility boxes shall be adjusted by raising or lowering to conform to grading requirements in landscaped areas.

Tops and toes of all slopes shall be rounded to produce a gradual and natural appearing transition between relatively level areas and slopes.

Protect all areas against compaction by construction equipment.

39.7 Measurement – Measurement for payment for the contract item Soil Testing and Soil Preparation will be the number of square feet of treated soil in areas designated as "GROUNDCOVERS" by various hatching on Sheets 8 and 9 of the Water Efficient Landscape Conversion drawings and required by the Engineer. No separate measurement or payment will be made for the Soil Analysis Report or its supporting testing.

39.8 Payment - The contract price paid for Soil Testing and Soil Preparation shall include full compensation for all material, labor, and incidental costs incurred under this section.

Any change in type or amount of amendment from the amounts specified in this section, required per Soil Analysis Report, shall be considered "Extra Work" and shall be paid pursuant to Section 2.07 of the General Provisions.

SECTION 40 – PLANTING

40.1 Description – This section covers the contract items Mow Curbing; Wood Chips; Decomposed Granite; Crushed Rock; Drivable Grass; Synthetic Turf; Sod; Flats; 1-Gallon; 2-Gallon; 5-Gallon; 15-Gallon; 15-Gallon Citrus; 24" Box; 36" Box; 48" Box; and 6' Brown Trunk Palm as required for the construction of the project, as specified herein and as shown on the Water Efficient Landscape Conversion drawings.

40.2 Mow Curbing – The contract item Mow Curbing includes the complete construction of the concrete mow curbing at the location shown on the drawings and as specified in the details. Concrete shall be a minimum compressive strength of 2,500 psi. Included in the pay item is all earthwork, forming, and reinforcing steel required.

40.3 Wood Chips – The contract item Wood Chips includes the complete placement of "Walk On" wood chips as produced by Earth Works, Riverside, 951.782.0260, or approved equal. Wood Chips shall be placed in all shrub and groundcover areas at a minimum thickness of 3". Included in the pay item is all material, delivery, and installation of the wood chips at the locations shown on the drawings, and as required by the Engineer.

40.4 Decomposed Granite – The contract item Decomposed Granite includes the complete construction of the decomposed granite pathway at the location shown on the drawings and as specified in the details. Decomposed granite shall be California Gold Decomposed Granite (Stabilized) as supplied by Tri State Building Materials, or approved equal. Included in the pay item is all earthwork, mow curbing, and weed cloth required.

40.5 Crushed Rock – The contract item Crushed Rock includes the complete construction of the crushed rock pathway at the location shown on the drawings and as specified in the details. Crushed rock shall be 3/4" "Bark Brown" rock as supplied by Tri State Building Materials, or approved equal. Included in the pay item is all earthwork, mow curbing, and weed cloth required.

40.6 Drivable Grass – The contract item Drivable Grass includes the complete construction of the drivable grass pathway at the location shown on the drawings and as specified in the details. Drivable grass mats product shall be as manufactured by Soil Retention Systems, or approved equal. Included in the pay item are is earthwork, infill, non-woven filter fabric, bedding course, and 3" thick compacted Class 2 Aggregate Base required material.

40.7 Synthetic Turf – The contract item Synthetic Turf includes the complete construction of the synthetic turf adjacent to roadways and in the courtyard at the location shown on the drawings and as specified in the details. Install per drawings. Contractor shall install "Zoysia" synthetic turf as produced by West Coast Grass Distributers, 800.440.9243, or approved equal. Install per manufacturer's specifications. Synthetic turf paver mats (Turfstone) shall be as manufactured by ORCO, or approved equal. Included in the pay item are all earthworks, Class 2 Aggregate Base material, and crushed rock required.

40.8 Sod – The contract item Sod includes the complete installation of certified, machine cut, nursery grown sod at the location shown on the drawings, as specified herein, and as required by the Engineer. Sod specie shall be *Cynodon dactilyon* (Hybrid Bermuda) and shall be genetically pure, free of weeds, pests, and disease, and capable of healthy vigorous growth. Prior to the commencement of the sodding operation, Contractor shall verify that finished grades are as indicated on the drawings; soil has been prepared according to Section 39 of these specifications; and the placing of topsoil, smooth grading, and compaction requirements have been completed. The prepared surface shall be a maximum 1 inch below the adjoining grade. New surfaces shall be blended to existing areas. Contractor shall place sod a maximum of 36 hours after initial harvesting. Included in the pay item is the supply, delivery, storage, handling, and installation of the required Bermuda grass.

40.9 Flats – The contract item Flats includes the complete installation of certified, nursery grown flats at the location shown on the drawings, as specified herein, and as required by the Engineer. Flats species shall be as indicated on the drawings and shall be sound, healthy, vigorous and free of insect pests, plant diseases, sun scalds or other objectionable disfigurements. Prior to the commencement of the installation operation, Contractor shall verify that finished grades are as indicated on the drawings; soil has been prepared according to Section 39 of these specifications; and the placing of topsoil, smooth grading, and compaction requirements have been completed. Flats of plants shall be grown and remain in the flats until transplanted at the

site. The soil and spacing of the plants in the flats shall ensure the minimum disturbance of the root system at the time of transplanting. Included in the pay item is the supply, delivery, handling, and installation of the required flats.

40.10 1-Gallon – The contract item 1-Gallon includes the complete installation of certified, nursery grown one (1) gallon shrubs and groundcover plants at the location shown on the drawings, as specified herein, and as required by the Engineer. One (1) gallon shrubs and groundcover plant species shall be as indicated on the drawings and shall be sound, healthy, vigorous and free of insect pests, plant diseases, sun scalds or other objectionable disfigurements. Prior to the commencement of the installation operation, Contractor shall verify that finished grades are as indicated on the drawings; soil has been prepared according to Section 39 of these specifications; and the placing of topsoil, smooth grading, and compaction requirements have been completed. Groundcover plants shall be grown and remain in the one (1) gallon until transplanted at the site. The soil and spacing of the plants in the one (1) gallon shall ensure the minimum disturbance of the root system at the time of transplanting. Included in the pay item is the supply, delivery, handling, and installation of the required one (1) gallon shrubs and groundcover plants.

40.11 2-Gallon - The contract item 2-Gallon includes the complete installation of certified, nursery grown two (2) gallon shrubs and groundcover plants at the location shown on the drawings, as specified herein, and as required by the Engineer. Two (2) gallon shrubs and groundcover plant species shall be as indicated on the drawings and shall be sound, healthy, vigorous and free of insect pests, plant diseases, sun scalds or other objectionable disfigurements. Prior to the commencement of the installation operation, Contractor shall verify that finished grades are as indicated on the drawings; soil has been prepared according to Section 39 of these specifications; and the placing of topsoil, smooth grading, and compaction requirements have been completed. Groundcover plants shall be grown and remain in the two (2) gallon until transplanted at the site. The soil and spacing of the plants in the two (2) gallon shall ensure the minimum disturbance of the root system at the time of transplanting. Included in the pay item is the supply, delivery, handling, and installation of the required two (2) gallon shrubs and groundcover plants.

40.12 5-Gallon - The contract item 5-Gallon includes the complete installation of certified, nursery grown five (5) gallon shrubs at the location shown on the drawings, as specified herein, and as required by the Engineer. Five (5) gallon shrub species shall be of the specified type as indicated on the drawings and shall be selected from high quality, well-shaped nursery stocks, vigorous and free of insect pests, plant diseases, sun scalds or other objectionable disfigurements. Prior to the commencement of the installation operation, Contractor shall verify that finished grades are as indicated on the drawings; soil has been prepared according to Section 39 of these specifications; and the placing of topsoil, smooth grading, and compaction requirements have been completed. Included in the pay item is the supply, delivery, handling, and installation of the required five (5) gallon shrubs.

40.13 15-Gallon - The contract item 15-Gallon includes the complete installation of certified, nursery grown fifteen (15) gallon trees at the location shown on the drawings, as specified herein, and as required by the Engineer. Fifteen (15) gallon tree species shall be of the specified

type as indicated on the drawings and shall be selected from high quality, well-shaped nursery stocks, vigorous and free of insect pests, plant diseases, sun scalds, fresh bark abrasions or other objectionable disfigurements. Tree trunks shall be sturdy with normal well-developed branch system. Prior to the commencement of the installation operation, Contractor shall verify that finished grades are as indicated on the drawings; soil has been prepared according to Section 39 of these specifications; and the placing of topsoil, smooth grading, and compaction requirements have been completed. Included in the pay item is the supply, delivery, handling, and installation of the required fifteen (15) gallon trees.

40.14 15-Gallon Citrus - The contract item 15-Gallon Citrus includes the complete installation of certified, nursery grown fifteen (15) gallon citrus trees at the location shown on the drawings, as specified herein, and as required by the Engineer. Fifteen (15) gallon citrus tree species shall be of the specified type as indicated on the drawings and shall be selected from high quality, well-shaped nursery stocks, vigorous and free of insect pests, plant diseases, sun scalds, fresh bark abrasions or other objectionable disfigurements. Tree trunks shall be sturdy with normal well-developed branch system. Prior to the commencement of the installation operation, Contractor shall verify that finished grades are as indicated on the drawings; soil has been prepared according to Section 39 of these specifications; and the placing of topsoil, smooth grading, and compaction requirements have been completed. Included in the pay item has the supply, delivery, handling, and installation of the required fifteen (15) gallon citrus trees.

40.15 24" Box - The contract item 24" Box includes the complete installation of certified, nursery grown twenty-four (24) inch box trees at the location shown on the drawings, as specified herein, and as required by the Engineer. Twenty-four (24) inch box tree species shall be of the specified type as indicated on the drawings and shall be selected from high quality, well-shaped nursery stocks, vigorous and free of insect pests, plant diseases, sun scalds, fresh bark abrasions or other objectionable disfigurements. Tree trunks shall be sturdy with normal well-developed branch system. Prior to the commencement of the installation operation, Contractor shall verify that finished grades are as indicated on the drawings; soil has been prepared according to Section 39 of these specifications; and the placing of topsoil, smooth grading, and compaction requirements have been completed. Included in the pay item is the supply, delivery, handling, and installation of the required twenty-four (24) inch box trees.

40.16 36" Box - The contract item 36" Box includes the complete installation of certified, nursery grown thirty-six (36) inch box trees at the location shown on the drawings, as specified herein, and as required by the Engineer. Thirty-six (36) inch box tree species shall be of the specified type as indicated on the drawings and shall be selected from high quality, well-shaped nursery stocks, vigorous and free of insect pests, plant diseases, sun scalds, fresh bark abrasions or other objectionable disfigurements. Tree trunks shall be sturdy with normal well-developed branch system. Prior to the commencement of the installation operation, Contractor shall verify that finished grades are as indicated on the drawings; soil has been prepared according to Section 39 of these specifications; and the placing of topsoil, smooth grading, and compaction requirements have been completed. Included in the pay item is the supply, delivery, handling, and installation of the required thirty-six (36) inch box trees.

40.17 48" Box - The contract item 48" Box includes the complete installation of certified, nursery grown forty-eight (48) inch box trees at the location shown on the drawings, as specified herein, and as required by the Engineer. Forty-eight (48) inch box tree species shall be of the specified type as indicated on the drawings and shall be selected from high quality, well-shaped nursery stocks, vigorous and free of insect pests, plant diseases, sun scalds, fresh bark abrasions or other objectionable disfigurements. Tree trunks shall be sturdy with normal well-developed branch system. Prior to the commencement of the installation operation, Contractor shall verify that finished grades are as indicated on the drawings; soil has been prepared according to Section 39 of these specifications; and the placing of topsoil, smooth grading, and compaction requirements have been completed. Included in the pay item is the supply, delivery, handling, and installation of the required forty-eight (48) inch box trees.

40.18 6' Brown Trunk Palm - The contract item 6' Brown Trunk Palm includes the complete installation of certified, nursery grown six foot brown trunk palm trees (*Trachycarpus fortunes)* at the location shown on the plans, as specified herein, and as required by the Engineer. Six foot brown trunk palm tree species shall be of the specified type as indicated on the drawings and shall be selected from high quality, well-shaped nursery stocks, vigorous and free of insect pests, plant diseases, sun scalds, fresh bark abrasions or other objectionable disfigurements. Tree trunks shall be sturdy with normal well-developed branch system. Prior to the commencement of the installation operation, Contractor shall verify that finished grades are as indicated on the drawings; soil has been prepared according to Section 39 of these specifications; and the placing of topsoil, smooth grading, and compaction requirements have been completed. Included in the pay item is the supply, delivery, handling, and installation of the required six foot brown trunk palm trees.

40.19 Planting - The contract items include all materials, labor, equipment, tools, delivery, installation and fees required to complete the work required as shown on the Water Efficient Landscape Conversion drawings and the following work.

40.20 Soil – Soil used within landscaped areas shall be a friable condition at time of displacement including during transportation, placement, cultivation, and planting.

Friable in these specifications refers to the structure and moisture content of soil. Friable soil shall be understood to mean soil that crumbles easily in the hand, does not stick to the hand, and does not form a ball when squeezed. Friable soil is not wet or muddy but is moist and damp. Obtain Engineer's determination of soil condition acceptability prior to installation and working of soils.

Soils in landscape areas that are worked when not friable shall be removed and replaced with the specifications for topsoil herein.

40.21 Submittals -

1. General: Submit shop drawings, product data, and samples for review and approval by the Engineer.

2. Soil Analysis Report: Submit a Soil Analysis Report of the proposed topsoil from a California-licensed soil-testing laboratory. The Soil Analysis Report shall include requirements as set forth in Section 39.3 and requirements of the Engineer. Topsoil shall not be incorporated in the landscape planting work until the Engineer has approved the Soil Analysis Report. Contractor shall be required to follow all recommendations in the Soil Analysis Report.

3. Submit manufacturer's product data for the following: Root barrier, tree stakes and ties.

4. Submit California-licensed Pest Control Advisor's program and manufacturer's literature, including toxicity levels for each pesticide and herbicide proposed for use in the landscape planting work.

5. Prior to delivery of materials, Contractor shall submit certificates of compliance attesting that materials meet the specified requirements. Submit three samples and manufacturer's guaranteed analysis and certified copies of the material certificates including the following:

   a. Plant material: classification, botanical name, common name, size, quantity by species, and location where grown;
   b. Imported topsoil, particle size, pH, organic matter content, textural class, soluble salts, chemical, mechanical and plant growth analyses, including source of topsoil;
   c. Fertilizers, nitrogen stabilized organic amendment, and chemicals: chemical analysis, composition percent and source;
   d. Top dressing: composition and source;
   e. Root barrier: composition and source; and
   f. Landscape fabric: composition and source.

6. Plant substitutions will not be permitted unless the Contractor furnishes the Engineer with written evidence from no less than three (3) nurseries that the plants specified are not obtainable. Such evidence shall be submitted within thirty (30) calendar days after the effective date of the Notice to Proceed.

40.22 Quality Assurance -

1. Installer's Qualifications: Installer shall be a specialist in installing and planting landscape products, with documented experience in performing landscape work of comparable size, scope, and quality.

2. Supervision: Contractor shall provide the services of at least one qualified person who shall be present at all times during execution of the work of this section. That individual, who shall direct the work, shall be thoroughly familiar with the types of materials being installed and the proper methods for their installation.

3. Engineer's Observance: It is required that the work specified herein be observed by the Engineer. The Contractor shall request observance at least 24 hours in advance of the time such observance is required. Observance is required on the following portions of the work:

   a. During preliminary grading and soil preparation;
   b. When shrubs and trees are spotted for planting, before planting holes are excavated;
   c. When finish grading has been completed, and before installation of plants; and
   d. When planting and other work has been completed.

The Contractor shall require the supervisor of the landscape planting work to be on the site at the time of each such observance.

40.23 Product Delivery, Storage and Handling – A delivery schedule shall be provided by Contractor to the Engineer at least ten (10) calendar days prior to the first day of delivery.

Refer to Product Requirements per manufacturer and local laws/regulations.

Deliver fertilizer and soil conditioner to the site in original unopened containers bearing manufacturer's guarantied chemical analysis, weight, manufacturer's name, trademark, and conformance with State law.

Deliver plant materials to the jobsite no earlier than three (3) calendar days prior to planting. Deliver plants with attached, durable, weather-resistant ink, waterproof legible identification labels, as follows:

- Label trees, evergreens, bundles, or containers of like species or groundcover plants
- State correct botanical plant name and size indicated on the plant list

Plant material shall be protected during delivery to prevent desiccation and damage to the branches, trunk, root system, or earth ball.

Transport plants in enclosed trucks. If trees are too large for enclosed trucks and are transported in open trucks, trees shall be wrapped to prevent damage and windburn. Adequate protection shall be placed between trees so that trunks are not scarred in transport and branches are not broken. Tree trunks shall be wrapped at the time of plant materials inspection at the job site.

Notify the Engineer at least five (5) days in advance of delivery of plant materials, and submit an itemized list of the plants in each delivery.

Exercise care in handling, loading, unloading, and storing of plant materials. Plant materials damaged in any way shall be discarded and replaced with undamaged materials.

Plant material shall not be stored longer than thirty (30) days. Storage of plant material shall consist of the following and any nursery/manufacturer's instructions:

1. Protect plant materials from wind, excessive sun, and drying out. All plant material shall be kept in a moist condition by watering with a fine spray until installed.

2. Fertilizer and lime shall not be stored with any other landscape material. Herbicides and pesticides shall not be stored with any other landscape material.

Plant material shall not be injured during handling. Cracking or breaking the earth ball of plant material shall be avoided. Plant material shall not be handled by the trunk or stems. Material shall not be dropped from vehicles.

40.24 Environmental Requirements - Planting shall not be performed during weather conditions that may adversely affect landscape materials, plants, and planting conditions.

40.25 Site Conditions and Scheduling - Landscape work shall not begin until structures, utilities, paving, and other improvements, which require access to or through planting areas, have been installed and accepted by the Engineer. Planting work shall not begin until the landscape irrigation system is installed in place, tested, and accepted by the Engineer.

40.26 Plant Establishment Period – The Plant Establishment Period shall be Type 1, as defined in the State Standard Specifications, Section 20-4.08, "Plant Establishment Work", except that it shall be for a period of ninety (90) calendar days following the Engineer's written acceptance of the work.

Upon completion of all planting and clean-up operations, notify the Engineer, in writing, a minimum of three (3) days in advance, to request a final inspection. The Plant Establishment Period may begin only after the Engineer has given written acceptance of the landscape irrigation system installation.

Calendar days during which no work will be required, as determined by the Engineer, will be credited as plant establishment calendar days, regardless of whether or not the Plant Establishment Work has been performed.

Calendar days when the Plant Establishment Work has not been adequately performed, including watering plants, replacing unsuitable plants, repairing erosion damage, and performing weed, rodent, and other pest control as determined necessary by the Engineer, will not be credited as plant establishment calendar days.

Upon completion of the Plant Establishment Period, submit a written request for inspection by the Engineer for job completion confirmation.

40.27 Guaranty – Guaranty that furnished trees, shrubs, groundcovers, and other plant materials will take root and grow vigorously within one (1) year after final acceptance of plantings, when such plants have received normal care and maintenance.

The Guaranty shall include replacement of trees and other plant materials that die back and lose the form and size as originally specified, even though they may have taken root and are growing after the die-back.

Corrective work shall include removal and replacement of all guarantied plant materials which, for any reason, fail to meet the requirements of the Guaranty. Replacements shall meet the same requirements as specified for the original materials. Replacements shall carry the same Guaranty period that shall start from the time the replacements are planted and accepted.

40.28 Plant Stock – Plant Stock and materials are indicated in the Planting List or Schedule on the drawings. Provide trees and plants of the varieties, sizes, and quantities indicated. Provide nursery-grown stock only, which is free from insect pests and diseases.

Plants shall comply with Federal and State laws requiring inspection for plant diseases and infestations. Inspection certificates required by law shall accompany each shipment of plants, and the certificates shall be delivered to the Engineer. Plants shall be true to species, varieties, and the sizes indicated, and shall be labeled in accordance with the recommended practice of the American Association of Nurserymen.

Label trees and bundles, containers or flats of the same shrub, groundcover and vine with durable waterproof labels and weather resistant ink. Labels shall state the correct plant name and size as specified in the Plant List on the drawings, and shall be legible for sixty (60) days after delivery to the planting site. Plant material that is not labeled will be rejected.

Plants shall be healthy, shapely, and well-rooted. Roots shall show no evidence of having been root bound, restricted, or deformed. Plant material that has just been upgraded in container size will be rejected. Root condition of plants in containers will be inspected by the Engineer by removal of earth from the roots of not less than two plants of each species or variety from each source. Plant materials requiring inspection by the Engineer shall be assembled and available for such inspections. If the sample plants inspected are found to be defective, the Engineer reserves the right to reject the entire lot or lots of plants represented by the defective samples.

Trees shall have straight trunks with the leader intact, undamaged, and uncut. Old abrasions and cuts shall be completely calloused over. Trees shall be measured when their branches are in their normal position. The height of a tree shall be measured from root crown to top of plant. The width of a tree shall be measured at branching at the widest point. Sizes shown on the drawings are before pruning. Trees shall not be pruned prior to delivery except upon approval of the Engineer.

Trees shall be well tapered in the trunk so that when the nursery stake is removed, the tree supports itself upright without further staking. Trees shall have a main leader. The main

branches shall be spaced vertically and alternately along the trunk. Branching shall not be concentrated in one location and there shall be no severe crossing of branches. Branches shall be smaller in diameter than the trunk. Branch attachments shall be free of embedded bark. Branching along the lower two-thirds of the trunk shall have at least one half of the foliage of the tree.

Rejected plant materials shall be removed from the site and replaced with materials that conform to specified requirements.

Plant material shall be grown under similar climatic conditions to those found at the project site.

Groundcover and vines shall be rooted plants, grown in flats unless indicated otherwise on the drawings, or as approved by the Engineer.

40.29 Topsoil – Topsoil shall be obtained from sources within the site of the work, or shall consist of imported topsoil obtained from sources outside the site, or from both such sources. Stripped site soil, if used as topsoil, shall meet the requirements specified herein.

Topsoil shall consist of fertile, friable soil of loamy character, and shall contain organic matter in amounts normal to the region. Imported topsoil shall be obtained from well-drained arable and fertile agricultural land and shall be free from refuse, roots, heavy or stiff clay, stones larger than one inch in size, coarse sand, noxious seeds, sticks, brush, litter, grasses, weeds, toxic waste, and other deleterious substances detrimental to the health of plants, animals, and humans. Imported topsoil shall be capable of sustaining healthy plant life. Imported topsoil shall be delivered and amended as recommended by the soil test for the plant material specified.

Topsoil shall have no inherent tendency toward compaction due to texture or soil structure or both as indicated in the Soils Analysis Report.

40.30 Organic Soil Amendment – Organic Soil Amendment shall consist of Commercial fertilizer, uniform in composition, free-flowing, suitable for application with specified equipment, and delivered to the site in unopened containers, each fully labeled according to applicable fertilizer laws and bearing the name or mark of the manufacturer. Gro-Power Plus, or approved equal, shall consist of the following ingredients by weight:

- Nitrogen 5 percent
- Phosphoric Acid 3 percent
- Potash 1 percent
- Humus 50 percent
- Humic Acids 15 percent

40.31 Fertilizer – Fertilizer shall be a commercial inorganic fertilizer in a granular and pelleted form. Fertilizer shall be delivered to the site in containers labeled in accordance with the applicable State of California, Department of Agriculture regulations, bearing the warranty of the producer for the grade furnished.

Pelleted type, with analysis of 6-20-20 (N-P-K), and granular type 16-6- 8 (N-P-K) per manufacturer's recommendations.

Planting Holes: Agriform Tablets, 21-gram size, with an analysis of 20-10-5 (N-P-K) per manufacturer's recommendations.

Soil amendments and methods shall be determined by results from a Soil Suitability Test. Test shall be performed by Soil and Plant Lab of Santa Ana or Wallace Laboratories, Hawthorne.

40.32 Herbicides – Herbicides shall be environmentally friendly material such as "Treflan, Oust, and Casoram" or approved equal. Herbicide shall be currently registered and approved by the California State Department of Agriculture and the EPA.

Thoroughly water soak surface to be treated. Avoid excessive water runoff. Apply the specified herbicide over the entire area to be paved, in strict accordance with the manufacturer's recommendations after placement of aggregate base course. Apply in spray form at rate as allowable by State of California and recommended by the manufacturer.

Herbicides shall not sterilize the soil.

40.33 Top Dressing - Contractor shall provide and install a minimum of 3" of "walk on chips" as produced by Earthworks Soil Amendment, Inc., 951.782.0260 or approved equal.

40.34 Backfill - Backfill material for planting holes shall be topsoil or excavated soil that complies with topsoil specifications herein.

40.35 Tree Stakes and Ties – Tree Stakes to be treated 3-inch diameter by 10 feet, straight, close-grained, lodge pole pine, pointed at one end free from knots, rot, or other defects that would impair their strength. Tree ties shall be corded rubber tire strips – 1 inch wide by 1/4 inch to 1/2 inch thick by length as required. Strips shall not contain steel within or have wire tie ends.

Guy Wire No. 12 gage galvanized soft steel wire.

40.36 Root Barriers – Provide commercially available manufactured root barriers, consisting of polyvinyl chloride or polypropylene sheeting having ultraviolet inhibitors and a minimum thickness of 0.085 inch. Barriers shall be either factory preformed into the circular shape shown, or have an integrated joining system for instant assembly into the final shape. Glued joints will not be acceptable.

Root barrier sheeting shall have horizontal tabs to prevent root growth from lifting the barrier. These tabs shall be spaced vertically not less than 8 inches on centers, and horizontally not less than 8 inches on centers. Depth of these tabs shall not be less than 3/8 inch at its widest point.

Root barrier sheeting shall have vertical fins running the full length on the inside face of the barrier at 90 degrees to the inside face, to direct root growth downward. These fins shall not be less than 6 inches on center, and its width shall not be less than 1/2 inch.

Sheeting shall have continuously reinforced top no less than 3/8 inch wide.

40.37 Watering Holes - Provide schedule 40 polyvinyl-chloride (PVC) pipe as indicated for watering holes.

40.38 Landscape Filter Fabric - Geotechnical landscape filter fabric with ultraviolet ray protection. Landscape filter fabric shall provide soil stabilization and drainage through the fabric. Include steel or plastic soil anchorage staples for holding fabric in place during the Plant Establishment Period.

40.39 Decomposed Granite Mulch - Decomposed granite mulch shall be crushed granite rock screenings, graded from 1/4-inch particles to dust, with uniform tan or buff color.

The decomposed granite mulch shall be thoroughly blended with organic binder material at a rate of 10 pounds of binder material per ton of crushed granite screenings. Blending shall be done with a cement mixer, pug mill, or similar equipment prior to placing and spreading the blended decomposed granite mulch over the hand-compacted backfill.

The mulch shall be placed in two, 1-1/2-inch deep lifts compacted to a minimum 3-inch depth. Each lift shall be thoroughly moistened with water and then mechanically compacted to a minimum eight-five percent (85%) relative density, with the finish surface of decomposed granite flush with surrounding curb and sidewalk.

Do not install decomposed granite mulch in tree watering basins.

40.40 Vitamin B-1 Solution - Provide Vitamin B-1 solution for reducing shock to plants when transplanting.

40.41 Source Quality Control – The Engineer or his designee will inspect the source of supply (landscape nursery) of the proposed plant materials prior to shipment to the site. Trees must be tagged and pictures of shrubs supplied before shipment to site.

Plant materials shall be properly labeled as herein before specified, before the Engineer's inspection of proposed plant materials. Plant materials which do not conform with specified requirements will be rejected, and shall be replaced with Engineer approved plants.

Notify the Engineer at least five (5) days before shipment of any plant materials from the source of supply.

40.42 Coordination - Coordinate layout and installation of plant materials with installation of the irrigation system to ensure that there will be complete and full irrigation coverage of the

planted areas. Contractor shall protect in place tagged existing trees, shrubs, and plant beds that are to be preserved during planting operation.

40.43 Excavation and Backfill – Excavate and backfill areas to be landscaped as indicated and specified herein.

Excavation for soil removal shall be within 6 inches of back of curb or edge of walk. The Contractor shall be responsible for protecting and maintaining the integrity of compacted base rock and sub grade materials under paving and curbs, and for protecting all other structures in the excavated areas. Review with the Engineer, the distance to remain away from other structures within the excavated areas. Do not undercut sides of excavation. Damage to base rock, sub grade, paving, curbs or structures shall be repaired or replaced. Remove and dispose of asphalt debris, concrete, base rock, and existing soil in landscaped areas from the site.

In landscaped areas that were previously paved, excavate to a minimum depth of 24 inches measured from the former pavement surface, but not less than 18 inches below the indicated finish grade.

In planting areas not previously paved, excavate the existing soil to a depth of 18 inches and remove from the site. Measurement of depth is from the top of the adjacent curb or paving.

Backfill excavated tree and shrub planting areas with topsoil. Prior to installing topsoil, scarify the bottom of the excavation to a 6-inch depth. Do not scarify or undercut sides of excavations. The Contractor shall be responsible for protecting base rock and sub grade compaction under adjacent paving and curbs. Provide topsoil backfill in 6-inch lifts. Incorporate the first 6-inch lift of topsoil into the existing soil at the bottom of the excavation.

40.44 Rough Grading – Prior to any planting, grade all areas to be landscaped. Fill as needed or remove surplus dirt and float areas to a smooth uniform grade. Slope all planting areas to drain. Roll, scarify, rake, and level as necessary to obtain true, even planting surfaces. Rough grading shall be inspected and approved by the Engineer before any amendments and fertilizers are added.

Planting areas shall be thoroughly wetted down. Allow soil to dry so as to be workable, after which thoroughly cultivate to a depth of 6 inches using a rotary hoe.

Compact soil in planting beds to seventy-five percent (75%) relative compaction to prevent future settling.

40.45 Planting of Trees and Shrubs – Mark tree and shrub locations on site using stakes or similar means. Have approved by the Engineer before plant holes are dug.

Dig pits with vertical sides as indicated. After pits are dug, break the sides to open the wall of the pit for root penetration, and loosen the bottom of the pit to a depth of 3 inches. Perform a drainage test, as determined by the Engineer or his designee, where required. Construct foot-tamped mound in the bottom of the pit to support the plant at the proper level.

Install root barriers as indicated.

Install watering holes as indicated.

Install landscape filter fabric under all path areas. Secure against movement with jute pins at 2' on center.

Planting and placement of plant material shall be as follows and per nursery instruction:

1. Do not handle container plants by the tops, stems, or trunks at any time. Lift all plants so that the rootball is supported from the underside. Plants that do not have a satisfactory root system will be rejected.

2. Cut the rootball vertically in a few places to encourage new feeder root development along the perimeter of the rootball.

3. All plants shall be planted immediately after rootballs are cut.

4. Place each plant in an upright and plumb position. One (1) and five (5) gallon size plants shall be set so that the top of the rootball is one inch above the finish grade. Fifteen (15) gallon size plants shall be set so that the top of the rootball will be 2 inches above the finish grade. Twenty-four (24) inch and thirty-six (36) inch box size trees shall have the top of the rootball set 4 inches above the finish grade. Fifteen (15) gallon, twenty-four (24) inch box, and thirty-six (36) inch box trees in planting areas less than 6 feet wide shall have the top of the rootball set 2 inches above the finish grade.

5. Groundcover shall be installed at spacing indicated on the drawings, and shall be evenly spaced and staggered in rows. Place each plant in a pit so that the root system lies free without doubling and so that the roots are planted vertically. Firm the soil around each plant and water the area immediately to avoid drying out.

Place Agriform 21 gram fertilizer tablets in the following quantities around the perimeter of plant hole:

Plant Size	Quantity Fertilizer
1 gallon plant	2 tablets
5 gallon plant	5 tablets
15 gallon plant	5 tablets
24" box tree	8 tablets
36" box tree	12 tablets
48" box tree	16 tablets
6' b.t. palm	8 tablets

Backfill holes and pits with topsoil. Ensure that proper irrigation will be maintained to the rootball. Taper backfill around sides and up to the top of the rootball so that sides of the rootball are not exposed.

Backfill for planting in areas where topsoil has been placed earlier shall be topsoil excavated from the planting hole. Backfill for plants in areas where existing site soil remains shall be the topsoil amended in accordance with the soil report.

Construct a 4-inch high berm (watering basin) around plant holes and fill the watering basin with Vitamin B-1 solution. Mix and apply the Vitamin B-1 solution in accordance with the manufacturer's written instructions.

Backfill shall be watered until the backfill material is moist to the full depth of the hole.

Pruning shall not be performed unless specifically requested or approved by the Engineer. Examine trees requiring pruning with the Engineer. Trees that are damaged due to improper pruning or wind damage shall be replaced.

Staking of trees shall consist of the following:

1. Remove the nursery stakes and install specified tree stakes along the sides of the rootball and one foot into undisturbed ground. Stakes shall not go through the rootball.

2. Ties shall be placed as low on the trunk as possible, but high enough so that the tree will return to the upright position after deflection.

3. Ties shall form a loose loop around the tree trunk, and shall be staked so that the trunk cannot work toward the support stakes. Tree ties shall be secured in position in accordance with the manufacturer's recommendations.

4. Support stakes shall not be higher than 6 inches above the tie locations. A flexible auxiliary stake shall be attached to those trees needing extra trunk support as determined by the Engineer.

5. One tree of each size shall be staked and approved by the Engineer prior to continued staking.

Adjustment of Plants:

1. Plants that settle deeper than specified shall be raised to the correct level.

2. Plants that go out of plumb shall be straightened and re-staked.

3. Install a 3-inch layer of mulch in all landscaped areas. Mulch shall be kept away from stems and trunks of plants, and shall be kept off the foliage of groundcover, off buildings, sidewalks and other facilities. Install in tree watering basins. The placement of mulch shall occur a maximum 48 hours after planting.

40.46 Drainage Test and Auger Holes – After tree pits are dug and before planting operations, tree pits shall be water tested for drainage. One location per 80 square feet of tree pit shall be tested. In addition, test all tree pits in any area where a test tree pit does not drain within 24 hours, such as in hardpan areas, rocky ground, construction backfill, compacted areas, flat ground, low spots, and the like, in order to ensure that pits in those areas will drain properly.

Fill tree pits with water. Check holes after 24 hours to determine if water has drained out. If the water has not drained out, bring this to the attention of the Engineer for remedial course of action. Adjustment of pit size, adjustment of pit location, or addition of auger holes will be required by the Engineer if a drainage problem exists.

Auger one 6-inch diameter hole through the bottom of each excavated plant hole that does not drain within the specified 24-hour period. Depth of the drill measured from the bottom of the excavation to the bottom of the drill hole shall be 4 feet. Backfill auger holes with 3/4-inch diameter, well-graded drain rock up to bottom of the plant hole. Cover the drain rock in the auger hole with a 2 feet by 2 feet piece of landscape filter fabric.

40.47 Cleanup – Contractor to maintain cleanliness of all work areas on a daily basis. All debris shall be removed from site and disposed of in a legal manner. Contractor shall comply with General Conditions and all conditions as set forth by the Engineer.

Neatly dress and finish all landscaped areas.

Broom clean all pavements.

40.48 Preliminary to Final Inspection – At completion of Planting, the Contractor shall request a preliminary inspection to determine the condition of the landscaped areas. Inspection shall be requested two (2) working days in advance. The Contractor and Engineer shall be represented at the inspection.

Construction considered ready for inspection shall conform to the following requirements:

1. All planting shall be healthy and free of infestations.

2. All landscaped areas shall be free of weeds.

3. Stakes and ties shall be as specified.

4. Mulch shall be raked to a uniform surface.

Debris shall be removed from the landscaped area, pavements shall be broom clean, and foliage shall be washed clean.

All plants shall be installed in place as indicated and specified.

40.49 Final Inspection and Acceptance – Final inspection will be conducted at the end of the Plant Establishment Period. Notice requesting final inspection shall be submitted by the Contractor to the Engineer at least seven (7) calendar days prior to the anticipated date.

Five (5) days prior to the final inspection, 16-6-8 (N-P-K) granular form commercial fertilizer shall be applied to trees and shrubs, in the presence of the Engineer, as follows:

Plant Size	Quantity Fertilizer
Specimen, 24" and larger	6 tablespoons
15 gallon	4 tablespoons
3 and 5 gallon	2 tablespoons
1 and 2 gallon	1 tablespoon
Groundcover and vines	6 lbs. per 1,000 square feet

Care shall be taken to prevent the deposit of fertilizer on stems or leaves. Fertilizer shall be spread with a mechanical spreader wherever possible. Fertilizer shall be applied only during favorable weather conditions to prevent dissipation by wind. All plants shall be thoroughly watered after fertilizer has been applied.

Mulch shall be raked away from around plant bases. Fertilizer shall be spread around each plant base and worked into the top 2 inches of soil. Mulch shall then be replaced.

Prior to final inspection, the Contractor shall also have performed weeding and a thorough cleaning of the landscaped areas.

The irrigation system shall be tested at the final inspection.

At the final inspection, the Engineer will determine the condition of the plants and improvements. Acceptance of this work will be contingent upon proper maintenance and the establishment of vigorous plant materials. Plants which are dead, unhealthy, or missing, whether by disease, neglect, vandalism, or any other reason, shall be replaced with the same species and sizes originally specified and following these same specifications for installation.

Provide plant replacements within two (2) weeks after final inspection, and extend the Plant Establishment Period for an additional thirty (30) calendar days after replacement planting has been accepted by the Engineer. The Engineer will then repeat the final inspection for the replaced plants at the end of the extended Plant Establishment Period.

40.50 Measurement – Measurement for payment for the contract item Mow Curbing will be the number of lineal feet of constructed curb, measured parallel to the top of the curb.

Measurement for payment for the contract items Wood Chips; Decomposed Granite; Crushed Rock; Drivable Grass; and Synthetic Turf will be the number of square feet constructed as specified, measured to the neat lines as shown on the drawings.

Measurement for payment for the contract item Sod will be the number of square feet installed as specified, measured to the neat lines as shown on the drawings.

Measurement for payment for the contract items Flats; 1-Gallon; 2-Gallon; 5-Gallon; 15-Gallon; 15-Gallon Citrus; 24" Box; 36" Box; 48" Box; and 6' Brown Trunk Palm will be the number of each installed plant species as specified.

40.51 Payment - The contract prices paid for Mow Curbing; Wood Chips; Decomposed Granite; Crushed Rock; Drivable Grass; Synthetic Turf; Sod; Flats; 1-Gallon; 2-Gallon; 5-Gallon; 15-Gallon; 15-Gallon Citrus; 24" Box; 36" Box; 48" Box; and 6' Brown Trunk Palm shall include full compensation for all costs incurred under this section.

SECTION 41 – AMENITIES

41.1 Description – This section covers the contract items Tree Grate; Picnic Table; Waste Container; Fountain; Flag Pole; various classes of Concrete Pot; and the various classes of Concrete Bench.

41.2 Tree Grate – The contract item Tree Grate includes the furnishing and complete installation of the tree grate at the location shown on the drawings, as specified herein, and as required by the Engineer. Tree grate shall conform to the dimensions shown on the drawings and shall be fabricated in a workmanlike manner according to practice in modern commercial shops. Burrs, rough and sharp edges, and other flaws shall be removed. Tree grate product shall be as manufactured by South Bay Foundry, Inc., or approved equal. Included in the pay item is the supply, delivery, handling, and installation of the required tree grate.

41.3 Picnic Table – The contract item Picnic Table consist of furnishing and installing picnic tables as shown on the drawings or as directed by the Engineer, and as specified in these specifications and the manufacturer specifications. Picnic tables shall conform to the dimensions shown on the drawings and shall be fabricated in a workmanlike manner according to practice in modern commercial shops. Picnic table product shall be as manufactured by Quick Crete Products Corporation, or approved equal. Included in the pay item is the supply, delivery, handling, and installation of the required picnic tables.

41.4 Waste Container – The contract item Waste Container consist of furnishing and installing waste containers as shown on the drawings or as directed by the Engineer, and as specified in these specifications and the manufacturer specifications. Waste containers shall conform to the dimensions shown on the drawings and shall be fabricated in a workmanlike manner according to practice in modern commercial shops. Waste container product shall be as manufactured by Quick Crete Products Corporation, or approved equal. Included in the pay item is the supply, delivery, handling, and installation of the required waste containers.

41.5 Fountain – The contract item Fountain consist of furnishing and installing fountain as shown on the drawings or as directed by the Engineer, and as specified in these specifications and the manufacturer specifications. Fountain shall conform to the following dimensions: 40 inches in height, 40 inches in diameter, basin width 40 inches, and shall be fabricated in a workmanlike manner according to practice in modern commercial shops. Fountain product shall be as manufactured by Al's Garden Art; Dealer: Unique Designs, 2000 W. Frontage Road, Corona, CA 92882, or approved equal. Style: Jardine Fountain with Basin; color: Chateau (CU). Included in the pay item is the supply, delivery, handling, and installation of the required fountain.

41.6 Flag Pole - The contract item Flag Pole consist of furnishing and installing two (2) flag poles as shown on the drawings or as directed by the Engineer, and as specified in these specifications and the manufacturer specifications. Flag poles shall conform to the dimensions shown on the drawings and shall be fabricated in a workmanlike manner according to practice in modern commercial shops. Flag pole product shall be as manufactured by Jon's Flags & Poles, or approved equal. Included in the pay item is the supply, accessories, and installation of the required flag poles.

41.7 Concrete Pot - The contract item Concrete Pot consist of furnishing and installing concrete pots of the various classes as shown on the drawings or as directed by the Engineer, and as specified in these specifications and the manufacturer specifications. Concrete pots shall conform to the dimensions shown on the drawings and shall be fabricated in a workmanlike manner according to practice in modern commercial shops. Concrete pot product shall be as manufactured by Quick Crete Products Corporation, or approved equal. Included in the pay item is the supply, delivery, handling, and installation of the required concrete pots.

41.8 Concrete Bench - The contract item Concrete Bench consist of furnishing and installing concrete benches of the various classes as shown on the drawings or as directed by the Engineer, and as specified in these specifications and the manufacturer specifications. Concrete benches shall conform to the dimensions shown on the drawings and shall be fabricated in a workmanlike manner according to practice in modern commercial shops. Concrete bench product shall be as manufactured by Quick Crete Products Corporation, or approved equal. Included in the pay item is the supply, delivery, handling, and installation of the required concrete benches.

41.9 Measurement - Measurement for payment for the contract items Tree Grate; Picnic Table; Waste Container; Fountain; Flag Pole; various classes of Concrete Pot; and the various classes of Concrete Bench will be the number of each product installed as specified.

41.10 Payment - The contract prices paid for Tree Grate; Picnic Table; Waste Container; Fountain; Flag Pole; various classes of Concrete Pot; and the various classes of Concrete Bench shall include full compensation for all costs incurred under this section.

SECTION 42 – LANDSCAPE MAINTENANCE

42.1 Description – The contract item Landscape Maintenance covers all labor, materials and equipment necessary to maintain the landscaped area, within the project limits of work, for the specified duration period. This work shall start upon final inspection and written approval by Engineer of the irrigation system and planting work as specified in Section 3.10 of the General Provisions.

42.2 General - The following work is required to complete the contract item Landscape Maintenance:

1. Contractor shall maintain plant materials from the time of planting until the plant materials are well established and are exhibiting a vigorous growth. Landscape maintenance shall continue until the end of the Plant Establishment Period specified in Section 40.26 of these specifications.

2. Landscape maintenance shall include watering, cultivating, weeding, re-mulching, repair of stakes, fertilizing, cultivation, spraying, and pruning as required to keep the plant material in a healthy growing condition and to keep the planted areas neat and attractive in appearance throughout the maintenance period. Landscape Maintenance shall also include treatment for fungus, diseases, rodents, insects, and repair of vandalism.

3. All plants shall be watered not less than twice a week. Each watering shall be of such quantity as to provide optimum growing conditions. Rinse foliage of all plant materials as often as necessary to keep foliage free of dust.

4. Rocks, clods, and debris that appear on the surface shall be removed. Heaved, settled, or eroded areas shall be restored by excavating, addition of topsoil, filling, finish grading, and rolling as required.

5. Gravel, surplus earth, papers, trash and debris, which accumulate in the landscaped areas and the areas directly adjacent to the paved areas, shall be removed and disposed of weekly. Such areas shall be cared for as required to present a neat and clean condition at all times.

6. Provide weeding of all areas, at intervals of not more than fourteen (14) days, as follows:

    a. Weeds which appear in asphalt, concrete, or paved areas within contract limits shall be killed before they exceed 2 inches in height or spread, by spraying with a contact herbicide which shall not stain the surfacing.

    b. Weeds in groundcover shall be killed by spraying with a contact herbicide, approved by the Engineer, before they exceed 2 inches in height or spread,

or shall be removed by pulling with roots intact before they exceed 4 inches in height or spread.

c. Weeds between basins in areas planted with trees and shrubs shall be removed by pulling before they exceed 4 inches in height or spread. Weeds shall be removed from within basins, including basin walls, and from within planter boxes. Any weed not killed by spraying shall be pulled with its roots intact.

d. Before using any herbicide or pesticide, the Contractor shall obtain approval from the Engineer for the proposed material and for the rate of application.

7. The Contractor shall submit for approval by the Engineer material safety data sheets for all herbicides and pesticides with a listing of all product requirements.

8. The Contractor shall be responsible for protecting all plants, on or off the site, from damage by spraying operations. Weed control shall be performed as often as required to maintain the project in a neat and weed-free condition at all times.

9. Watering shall be adequate to provide maintenance of healthy plant growth, and shall be controlled to prevent over saturation of soil leading to plant failure. Basins, where required, and basin walls shall be kept well formed.

10. Trees, shrubs, and groundcover shall be maintained by regular watering, cultivating, and weeding. Stakes and ties shall be repaired as needed. Plants shall be sprayed for insect pests and pruned as necessary or when requested by the Engineer. All damaged, unhealthy or dead trees, shrubs and groundcover shall, upon discovery of loss or damage, be replaced immediately with new stock of a size to match the remaining healthy plants of the same variety.

11. Until the end of the Plant Establishment Period, any plants which are damaged by herbicide, diseased, dead, or which are in an unhealthy condition exhibiting weakness and the probability of dying, shall be replaced within two (2) weeks after notification from the Engineer. Replacements of plants shall be made in the same manner as specified for the original planting.

12. On the last day of the Plant Establishment Period, complete the weeding and raking of all planting areas. The site shall be cleared of debris and presented in a neat and orderly condition. All plants shall be in a healthy, thriving condition. Stakes shall be vertical. Paved areas shall be broom cleaned, and areas damaged by erosion shall be repaired, including the replacement of plants.

13. During the Plant Establishment Period, Contractor shall maintain one (1) full size set of drawings and upon which Contractor will record and annotate:

a) all modifications and/or adjustments or irrigation system during Plant Establishment Period;

b) any plant materials replaced in-kind or with substitutions during Plant Establishment Period;

c) any other modifications relevant to District's future maintenance effort. Original copy of the annotated drawings shall be turned over to the engineer at conclusion of the Plant Establishment Period;

Final payment of this contract item will not be made until satisfactorily annotated drawings are delivered to the Engineer.

42.3 Payment - The contract lump sum price paid for Landscape Maintenance shall include full compensation for all costs incurred under this section.

Landscape Maintenance work shall be subject to monthly progress payments.

SECTION 43 – ELECTRICAL

43.1 Description – This section covers the contract items Electrical Lighting Fixture A; Electrical Lighting Fixture B; Electrical Lighting Fixture C; Electrical Lighting Fixture D; Electrical Lighting Fixture E; and Electrical Conduit and Wire as required for the construction of the project.

43.2 Electrical Lighting Fixture A – The contract item Electrical Lighting Fixture A consists of furnishing and installing electrical lighting as shown on the drawings or as directed by the Engineer, and as specified on the drawings, these specifications and the manufacturer specifications. Electrical lighting product shall be of the exterior grade mount landscape floodlight type, or approved equal. Included in the pay item is the labor, material, equipment, accessories, and installation required.

43.3 Electrical Lighting Fixture B – The contract item Electrical Lighting Fixture B consists of furnishing and installing electrical lighting as shown on the drawings or as directed by the Engineer, and as specified on the drawings, these specifications and the manufacturer specifications. Electrical lighting product shall be of the exterior grade mount architectural floodlight type, or approved equal. Included in the pay item is the labor, material, equipment, accessories, and installation required.

43.4 Electrical Lighting Fixture C – The contract item Electrical Lighting Fixture C consists of furnishing and installing electrical lighting as shown on the drawings or as directed by the Engineer, and as specified on the drawings, these specifications and the manufacturer specifications. Electrical lighting product shall be of the exterior pole mount decorative "shoebox" type fixture, or approved equal. Included in the pay item is the labor, material, equipment, accessories, and installation required.

43.5 Electrical Lighting Fixture D – The contract item Electrical Lighting Fixture D consists of furnishing and installing electrical lighting as shown on the drawings or as directed by the Engineer, and as specified on the drawings, these specifications and the manufacturer specifications. Electrical lighting product shall be of the high exterior pole mount high intensity discharge "shoebox" type area lights, or approved equal. Included in the pay item is the labor, material, equipment, accessories, and installation required.

43.6 Electrical Lighting Fixture E – The contract item Electrical Lighting Fixture E consists of furnishing and installing electrical lighting as shown on the drawings or as directed by the Engineer, and as specified on the drawings, these specifications and the manufacturer specifications. Electrical lighting product shall be of the exterior grade mount landscape sign/wall lighter, or approved equal. Included in the pay item is the labor, material, equipment, accessories, and installation required.

43.7 Electrical Conduit and Wire – The contract item Electrical Conduit and Wire consists of furnishing and installing all required conduits, wires, device and junction boxes as shown on the drawings or as directed by the Engineer, and as specified on the drawings and these specifications. Electrical conduits and fittings shall be galvanized by the hot-dip, electrodepositing, or metalizing process and shall be of the sizes indicated on the drawings. Wires shall be copper and the sizes as specified by American Wire Gauge (AWG). Wire sizes #10 and smaller shall be solid conductor. Included in the pay item is all labor, material, tools, fittings, equipment and installation required.

43.8 Measurement – Measurement for payment for the contract items Electrical Lighting Fixture A; Electrical Lighting Fixture B; Electrical Lighting Fixture C; Electrical Lighting Fixture D; and Electrical Lighting Fixture E will be the number of each lighting fixture as specified.

Measurement for payment for the contract item Electrical Conduit and Wire will be the number of lineal feet of installed conduits and wires as specified.

43.9 Payment - The contract prices paid for Electrical Lighting Fixture A; Electrical Lighting Fixture B; Electrical Lighting Fixture C; Electrical Lighting Fixture D; Electrical Lighting Fixture E; and Electrical Conduit and Wire shall include full compensation for furnishing all material, labor, tools, equipment and incidental costs incurred under this section, including any necessary pull boxes; excavation and backfill; concrete foundations and making all required tests.

Full compensation for all additional materials and labor, not shown on the drawings or specified, which are necessary to complete the installation of the various fixtures, shall be considered as included in the prices paid for the fixtures, or units thereof, and no additional compensation will be allowed.

APPENDIX "A"

SOUTH COAST AIR QUALITY MANAGEMENT DISTRICT

RULE 403

(Adopted May 7, 1976) (Amended November 6, 1992)
(Amended July 9, 1993) (Amended February 14, 1997)
(Amended December 11, 1998)(Amended April 2, 2004)
(Amended June 3, 2005)

RULE 403. FUGITIVE DUST

(a) Purpose

The purpose of this Rule is to reduce the amount of particulate matter entrained in the ambient air as a result of anthropogenic (man-made) fugitive dust sources by requiring actions to prevent, reduce or mitigate fugitive dust emissions.

(b) Applicability

The provisions of this Rule shall apply to any activity or man-made condition capable of generating fugitive dust.

(c) Definitions

(1) ACTIVE OPERATIONS means any source capable of generating fugitive dust, including, but not limited to, earth-moving activities, construction/demolition activities, disturbed surface area, or heavy- and light-duty vehicular movement.

(2) AGGREGATE-RELATED PLANTS are defined as facilities that produce and / or mix sand and gravel and crushed stone.

(3) AGRICULTURAL HANDBOOK means the region-specific guidance document that has been approved by the Governing Board or hereafter approved by the Executive Officer and the U.S. EPA. For the South Coast Air Basin, the Board-approved region-specific guidance document is the Rule 403 Agricultural Handbook dated December 1998. For the Coachella Valley, the Board-approved region-specific guidance document is the Rule 403 Coachella Valley Agricultural Handbook dated April 2, 2004.

(4) ANEMOMETERS are devices used to measure wind speed and direction in accordance with the performance standards, and maintenance and calibration criteria as contained in the most recent Rule 403 Implementation Handbook.

(5) BEST AVAILABLE CONTROL MEASURES means fugitive dust control actions that are set forth in Table 1 of this Rule.

(6) BULK MATERIAL is sand, gravel, soil, aggregate material less than two inches in length or diameter, and other organic or inorganic particulate matter.

(7) CEMENT MANUFACTURING FACILITY is any facility that has a cement kiln at the facility.

(8) CHEMICAL STABILIZERS are any non-toxic chemical dust suppressant which must not be used if prohibited for use by the Regional Water Quality Control Boards, the California Air Resources Board, the U.S. Environmental Protection Agency (U.S. EPA), or any applicable law, rule or regulation. The chemical stabilizers shall meet any specifications, criteria, or tests required by any federal, state, or local water agency. Unless otherwise indicated, the use of a non-toxic chemical stabilizer shall be of sufficient concentration and application frequency to maintain a stabilized surface.

(9) COMMERCIAL POULTRY RANCH means any building, structure, enclosure, or premises where more than 100 fowl are kept or maintained for the primary purpose of producing eggs or meat for sale or other distribution.

(10) CONFINED ANIMAL FACILITY means a source or group of sources of air pollution at an agricultural source for the raising of 3,360 or more fowl or 50 or more animals, including but not limited to, any structure, building, installation, farm, corral, coop, feed storage area, milking parlor, or system for the collection, storage, or distribution of solid and liquid manure; if domesticated animals, including horses, sheep, goats, swine, beef cattle, rabbits, chickens, turkeys, or ducks are corralled, penned, or otherwise caused to remain in restricted areas for commercial agricultural purposes and feeding is by means other than grazing.

(11) CONSTRUCTION/DEMOLITION ACTIVITIES means any on-site mechanical activities conducted in preparation of, or related to, the building, alteration, rehabilitation, demolition or improvement of property, including, but not limited to the following activities: grading, excavation, loading, crushing, cutting, planing, shaping or ground breaking.

(12) CONTRACTOR means any person who has a contractual arrangement to conduct an active operation for another person.

(13) DAIRY FARM is an operation on a property, or set of properties that are contiguous or separated only by a public right-of-way, that raises cows or

produces milk from cows for the purpose of making a profit or for a livelihood. Heifer and calf farms are dairy farms.

(14) DISTURBED SURFACE AREA means a portion of the earth's surface which has been physically moved, uncovered, destabilized, or otherwise modified from its undisturbed natural soil condition, thereby increasing the potential for emission of fugitive dust. This definition excludes those areas which have:

(A) been restored to a natural state, such that the vegetative ground cover and soil characteristics are similar to adjacent or nearby natural conditions;

(B) been paved or otherwise covered by a permanent structure; or

(C) sustained a vegetative ground cover of at least 70 percent of the native cover for a particular area for at least 30 days.

(15) DUST SUPPRESSANTS are water, hygroscopic materials, or non-toxic chemical stabilizers used as a treatment material to reduce fugitive dust emissions.

(16) EARTH-MOVING ACTIVITIES means the use of any equipment for any activity where soil is being moved or uncovered, and shall include, but not be limited to the following: grading, earth cutting and filling operations, loading or unloading of dirt or bulk materials, adding to or removing from open storage piles of bulk materials, landfill operations, weed abatement through disking, and soil mulching.

(17) DUST CONTROL SUPERVISOR means a person with the authority to expeditiously employ sufficient dust mitigation measures to ensure compliance with all Rule 403 requirements at an active operation.

(18) FUGITIVE DUST means any solid particulate matter that becomes airborne, other than that emitted from an exhaust stack, directly or indirectly as a result of the activities of any person.

(19) HIGH WIND CONDITIONS means that instantaneous wind speeds exceed 25 miles per hour.

(20) INACTIVE DISTURBED SURFACE AREA means any disturbed surface area upon which active operations have not occurred or are not expected to occur for a period of 20 consecutive days.

(21) LARGE OPERATIONS means any active operations on property which contains 50 or more acres of disturbed surface area; or any earth-moving operation with a daily earth-moving or throughput volume of 3,850 cubic

meters (5,000 cubic yards) or more three times during the most recent 365-day period.

(22) OPEN STORAGE PILE is any accumulation of bulk material, which is not fully enclosed, covered or chemically stabilized, and which attains a height of three feet or more and a total surface area of 150 or more square feet.

(23) PARTICULATE MATTER means any material, except uncombined water, which exists in a finely divided form as a liquid or solid at standard conditions.

(24) PAVED ROAD means a public or private improved street, highway, alley, public way, or easement that is covered by typical roadway materials, but excluding access roadways that connect a facility with a public paved roadway and are not open to through traffic. Public paved roads are those open to public access and that are owned by any federal, state, county, municipal or any other governmental or quasi-governmental agencies. Private paved roads are any paved roads not defined as public.

(25) PM_{10} means particulate matter with an aerodynamic diameter smaller than or equal to 10 microns as measured by the applicable State and Federal reference test methods.

(26) PROPERTY LINE means the boundaries of an area in which either a person causing the emission or a person allowing the emission has the legal use or possession of the property. Where such property is divided into one or more sub-tenancies, the property line(s) shall refer to the boundaries dividing the areas of all sub-tenancies.

(27) RULE 403 IMPLEMENTATION HANDBOOK means a guidance document that has been approved by the Governing Board on April 2, 2004 or hereafter approved by the Executive Officer and the U.S. EPA.

(28) SERVICE ROADS are paved or unpaved roads that are used by one or more public agencies for inspection or maintenance of infrastructure and which are not typically used for construction-related activity.

(29) SIMULTANEOUS SAMPLING means the operation of two PM_{10} samplers in such a manner that one sampler is started within five minutes of the other, and each sampler is operated for a consecutive period which must be not less than 290 minutes and not more than 310 minutes.

(30) SOUTH COAST AIR BASIN means the non-desert portions of Los Angeles, Riverside, and San Bernardino counties and all of Orange

County as defined in California Code of Regulations, Title 17, Section 60104. The area is bounded on the west by the Pacific Ocean, on the north and east by the San Gabriel, San Bernardino, and San Jacinto Mountains, and on the south by the San Diego county line.

(31) STABILIZED SURFACE means any previously disturbed surface area or open storage pile which, through the application of dust suppressants, shows visual or other evidence of surface crusting and is resistant to wind-driven fugitive dust and is demonstrated to be stabilized. Stabilization can be demonstrated by one or more of the applicable test methods contained in the Rule 403 Implementation Handbook.

(32) TRACK-OUT means any bulk material that adheres to and agglomerates on the exterior surface of motor vehicles, haul trucks, and equipment (including tires) that have been released onto a paved road and can be removed by a vacuum sweeper or a broom sweeper under normal operating conditions.

(33) TYPICAL ROADWAY MATERIALS means concrete, asphaltic concrete, recycled asphalt, asphalt, or any other material of equivalent performance as determined by the Executive Officer, and the U.S. EPA.

(34) UNPAVED ROADS means any unsealed or unpaved roads, equipment paths, or travel ways that are not covered by typical roadway materials. Public unpaved roads are any unpaved roadway owned by federal, state, county, municipal or other governmental or quasi-governmental agencies. Private unpaved roads are all other unpaved roadways not defined as public.

(35) VISIBLE ROADWAY DUST means any sand, soil, dirt, or other solid particulate matter which is visible upon paved road surfaces and which can be removed by a vacuum sweeper or a broom sweeper under normal operating conditions.

(36) WIND-DRIVEN FUGITIVE DUST means visible emissions from any disturbed surface area which is generated by wind action alone.

(37) WIND GUST is the maximum instantaneous wind speed as measured by an anemometer.

(d) Requirements

(1) No person shall cause or allow the emissions of fugitive dust from any active operation, open storage pile, or disturbed surface area such that:

(A) the dust remains visible in the atmosphere beyond the property line of the emission source; or

(B) the dust emission exceeds 20 percent opacity (as determined by the appropriate test method included in the Rule 403 Implementation Handbook), if the dust emission is the result of movement of a motorized vehicle.

(2) No person shall conduct active operations without utilizing the applicable best available control measures included in Table 1 of this Rule to minimize fugitive dust emissions from each fugitive dust source type within the active operation.

(3) No person shall cause or allow PM_{10} levels to exceed 50 micrograms per cubic meter when determined, by simultaneous sampling, as the difference between upwind and downwind samples collected on high-volume particulate matter samplers or other U.S. EPA-approved equivalent method for PM_{10} monitoring. If sampling is conducted, samplers shall be:

(A) Operated, maintained, and calibrated in accordance with 40 Code of Federal Regulations (CFR), Part 50, Appendix J, or appropriate U.S. EPA-published documents for U.S. EPA-approved equivalent method(s) for PM_{10}.

(B) Reasonably placed upwind and downwind of key activity areas and as close to the property line as feasible, such that other sources of fugitive dust between the sampler and the property line are minimized.

(4) No person shall allow track-out to extend 25 feet or more in cumulative length from the point of origin from an active operation. Notwithstanding the preceding, all track-out from an active operation shall be removed at the conclusion of each workday or evening shift.

(5) No person shall conduct an active operation with a disturbed surface area of five or more acres, or with a daily import or export of 100 cubic yards or more of bulk material without utilizing at least one of the measures listed in subparagraphs (d)(5)(A) through (d)(5)(E) at each vehicle egress from the site to a paved public road.

(A) Install a pad consisting of washed gravel (minimum-size: one inch) maintained in a clean condition to a depth of at least six inches and extending at least 30 feet wide and at least 50 feet long.

(B) Pave the surface extending at least 100 feet and at least 20 feet wide.

(C) Utilize a wheel shaker/wheel spreading device consisting of raised dividers (rails, pipe, or grates) at least 24 feet long and 10 feet wide to remove bulk material from tires and vehicle undercarriages before vehicles exit the site.

(D) Install and utilize a wheel washing system to remove bulk material from tires and vehicle undercarriages before vehicles exit the site.

(E) Any other control measures approved by the Executive Officer and the U.S. EPA as equivalent to the actions specified in subparagraphs (d)(5)(A) through (d)(5)(D).

(6) Beginning January 1, 2006, any person who operates or authorizes the operation of a confined animal facility subject to this Rule shall implement the applicable conservation management practices specified in Table 4 of this Rule.

(e) Additional Requirements for Large Operations

(1) Any person who conducts or authorizes the conducting of a large operation subject to this Rule shall implement the applicable actions specified in Table 2 of this Rule at all times and shall implement the applicable actions specified in Table 3 of this Rule when the applicable performance standards can not be met through use of Table 2 actions; and shall:

(A) submit a fully executed Large Operation Notification (Form 403 N) to the Executive Officer within 7 days of qualifying as a large operation;

(B) include, as part of the notification, the name(s), address(es), and phone number(s) of the person(s) responsible for the submittal, and a description of the operation(s), including a map depicting the location of the site;

(C) maintain daily records to document the specific dust control actions taken, maintain such records for a period of not less than three years; and make such records available to the Executive Officer upon request;

(D) install and maintain project signage with project contact signage that meets the minimum standards of the Rule 403 Implementation Handbook, prior to initiating any earthmoving activities;

(E) identify a dust control supervisor that:

(i) is employed by or contracted with the property owner or developer;

(ii) is on the site or available on-site within 30 minutes during working hours;

(iii) has the authority to expeditiously employ sufficient dust mitigation measures to ensure compliance with all Rule requirements;

(iv) has completed the AQMD Fugitive Dust Control Class and has been issued a valid Certificate of Completion for the class; and

(F) notify the Executive Officer in writing within 30 days after the site no longer qualifies as a large operation as defined by paragraph (c)(18).

(2) Any Large Operation Notification submitted to the Executive Officer or AQMD-approved dust control plan shall be valid for a period of one year from the date of written acceptance by the Executive Officer. Any Large Operation Notification accepted pursuant to paragraph (e)(1), excluding those submitted by aggregate-related plants and cement manufacturing facilities must be resubmitted annually by the person who conducts or authorizes the conducting of a large operation, at least 30 days prior to the expiration date, or the submittal shall no longer be valid as of the expiration date. If all fugitive dust sources and corresponding control measures or special circumstances remain identical to those identified in the previously accepted submittal or in an AQMD-approved dust control plan, the resubmittal may be a simple statement of no-change (Form 403NC).

(f) Compliance Schedule

The newly amended provisions of this Rule shall become effective upon adoption. Pursuant to subdivision (e), any existing site that qualifies as a large operation will have 60 days from the date of Rule adoption to comply with the notification and recordkeeping requirements for large operations. Any Large Operation

Notification or AQMD-approved dust control plan which has been accepted prior to the date of adoption of these amendments shall remain in effect and the Large Operation Notification or AQMD-approved dust control plan annual resubmittal date shall be one year from adoption of this Rule amendment.

(g) Exemptions

(1) The provisions of this Rule shall not apply to:

(A) Dairy farms.

(B) Confined animal facilities provided that the combined disturbed surface area within one continuous property line is one acre or less.

(C) Agricultural vegetative crop operations provided that the combined disturbed surface area within one continuous property line and not separated by a paved public road is 10 acres or less.

(D) Agricultural vegetative crop operations within the South Coast Air Basin, whose combined disturbed surface area includes more than 10 acres provided that the person responsible for such operations:

(i) voluntarily implements the conservation management practices contained in the Rule 403 Agricultural Handbook;

(ii) completes and maintains the self-monitoring form documenting sufficient conservation management practices, as described in the Rule 403 Agricultural Handbook; and

(iii) makes the completed self-monitoring form available to the Executive Officer upon request.

(E) Agricultural vegetative crop operations outside the South Coast Air Basin whose combined disturbed surface area includes more than 10 acres provided that the person responsible for such operations:

(i) voluntarily implements the conservation management practices contained in the Rule 403 Coachella Valley Agricultural Handbook; and

(ii) completes and maintains the self-monitoring form documenting sufficient conservation management practices, as described in the Rule 403 Coachella Valley Agricultural Handbook; and

(iii) makes the completed self-monitoring form available to the Executive Officer upon request.

(F) Active operations conducted during emergency life-threatening situations, or in conjunction with any officially declared disaster or state of emergency.

(G) Active operations conducted by essential service utilities to provide electricity, natural gas, telephone, water and sewer during periods of service outages and emergency disruptions.

(H) Any contractor subsequent to the time the contract ends, provided that such contractor implemented the required control measures during the contractual period.

(I) Any grading contractor, for a phase of active operations, subsequent to the contractual completion of that phase of earth-moving activities, provided that the required control measures have been implemented during the entire phase of earth-moving activities, through and including five days after the final grading inspection.

(J) Weed abatement operations ordered by a county agricultural commissioner or any state, county, or municipal fire department, provided that:

(i) mowing, cutting or other similar process is used which maintains weed stubble at least three inches above the soil; and

(ii) any discing or similar operation which cuts into and disturbs the soil, where watering is used prior to initiation of these activities, and a determination is made by the agency issuing the weed abatement order that, due to fire hazard conditions, rocks, or other physical obstructions, it is not practical to meet the conditions specified in clause (g)(1)(H)(i). The provisions this clause shall not exempt the owner of any property from stabilizing, in accordance with paragraph (d)(2), disturbed surface areas which have been created as a result of the weed abatement actions.

(K) sandblasting operations.

(2) The provisions of paragraphs (d)(1) and (d)(3) shall not apply:

(A) When wind gusts exceed 25 miles per hour, provided that:

(i) The required Table 3 contingency measures in this Rule are implemented for each applicable fugitive dust source type, and;

(ii) records are maintained in accordance with subparagraph (e)(1)(C).

(B) To unpaved roads, provided such roads:

(i) are used solely for the maintenance of wind-generating equipment; or

(ii) are unpaved public alleys as defined in Rule 1186; or

(iii) are service roads that meet all of the following criteria:

(a) are less than 50 feet in width at all points along the road;

(b) are within 25 feet of the property line; and

(c) have a traffic volume less than 20 vehicle-trips per day.

(C) To any active operation, open storage pile, or disturbed surface area for which necessary fugitive dust preventive or mitigative actions are in conflict with the federal Endangered Species Act, as determined in writing by the State or federal agency responsible for making such determinations.

(3) The provisions of (d)(2) shall not apply to any aggregate-related plant or cement manufacturing facility that implements the applicable actions specified in Table 2 of this Rule at all times and shall implement the applicable actions specified in Table 3 of this Rule when the applicable performance standards of paragraphs (d)(1) and (d)(3) can not be met through use of Table 2 actions.

(4) The provisions of paragraphs (d)(1), (d)(2), and (d)(3) shall not apply to:

(A) Blasting operations which have been permitted by the California Division of Industrial Safety; and

(B) Motion picture, television, and video production activities when dust emissions are required for visual effects. In order to obtain this exemption, the Executive Officer must receive notification in writing at least 72 hours in advance of any such activity and no nuisance results from such activity.

(5) The provisions of paragraph (d)(3) shall not apply if the dust control actions, as specified in Table 2, are implemented on a routine basis for

each applicable fugitive dust source type. To qualify for this exemption, a person must maintain records in accordance with subparagraph (e)(1)(C).

(6) The provisions of paragraph (d)(4) shall not apply to earth coverings of public paved roadways where such coverings are approved by a local government agency for the protection of the roadway, and where such coverings are used as roadway crossings for haul vehicles provided that such roadway is closed to through traffic and visible roadway dust is removed within one day following the cessation of activities.

(7) The provisions of subdivision (e) shall not apply to:

(A) officially-designated public parks and recreational areas, including national parks, national monuments, national forests, state parks, state recreational areas, and county regional parks.

(B) any large operation which is required to submit a dust control plan to any city or county government which has adopted a District-approved dust control ordinance.

(C) any large operation subject to Rule 1158, which has an approved dust control plan pursuant to Rule 1158, provided that all sources of fugitive dust are included in the Rule 1158 plan.

(8) The provisions of subparagraph (e)(1)(A) through (e)(1)(C) shall not apply to any large operation with an AQMD-approved fugitive dust control plan provided that there is no change to the sources and controls as identified in the AQMD-approved fugitive dust control plan.

(h) Fees

Any person conducting active operations for which the Executive Officer conducts upwind/downwind monitoring for PM_{10} pursuant to paragraph (d)(3) shall be assessed applicable Ambient Air Analysis Fees pursuant to Rule 304.1. Applicable fees shall be waived for any facility which is exempted from paragraph (d)(3) or meets the requirements of paragraph (d)(3).

TABLE 1
BEST AVAILABLE CONTROL MEASURES
(Applicable to All Construction Activity Sources)

Source Category	Control Measure	Guidance
Backfilling	01-1 Stabilize backfill material when not actively handling; and 01-2 Stabilize backfill material during handling; and 01-3 Stabilize soil at completion of activity.	✓ Mix backfill soil with water prior to moving ✓ Dedicate water truck or high capacity hose to backfilling equipment ✓ Empty loader bucket slowly so that no dust plumes are generated ✓ Minimize drop height from loader bucket
Clearing and grubbing	02-1 Maintain stability of soil through pre-watering of site prior to clearing and grubbing; and 02-2 Stabilize soil during clearing and grubbing activities; and 02-3 Stabilize soil immediately after clearing and grubbing activities.	✓ Maintain live perennial vegetation where possible ✓ Apply water in sufficient quantity to prevent generation of dust plumes
Clearing forms	03-1 Use water spray to clear forms; or 03-2 Use sweeping and water spray to clear forms; or 03-3 Use vacuum system to clear forms.	✓ Use of high pressure air to clear forms may cause exceedance of Rule requirements
Crushing	04-1 Stabilize surface soils prior to operation of support equipment; and 04-2 Stabilize material after crushing.	✓ Follow permit conditions for crushing equipment ✓ Pre-water material prior to loading into crusher ✓ Monitor crusher emissions opacity ✓ Apply water to crushed material to prevent dust plumes

TABLE 1
BEST AVAILABLE CONTROL MEASURES
(Applicable to All Construction Activity Sources)

Source Category	Control Measure	Guidance
Cut and fill	05-1 Pre-water soils prior to cut and fill activities; and 05-2 Stabilize soil during and after cut and fill activities.	✓ For large sites, pre-water with sprinklers or water trucks and allow time for penetration ✓ Use water trucks/pulls to water soils to depth of cut prior to subsequent cuts
Demolition – mechanical/manual	06-1 Stabilize wind erodible surfaces to reduce dust; and 06-2 Stabilize surface soil where support equipment and vehicles will operate; and 06-3 Stabilize loose soil and demolition debris; and 06-4 Comply with AQMD Rule 1403.	✓ Apply water in sufficient quantities to prevent the generation of visible dust plumes
Disturbed soil	07-1 Stabilize disturbed soil throughout the construction site; and 07-2 Stabilize disturbed soil between structures	✓ Limit vehicular traffic and disturbances on soils where possible ✓ If interior block walls are planned, install as early as possible ✓ Apply water or a stabilizing agent in sufficient quantities to prevent the generation of visible dust plumes
Earth-moving activities	08-1 Pre-apply water to depth of proposed cuts; and 08-2 Re-apply water as necessary to maintain soils in a damp condition and to ensure that visible emissions do not exceed 100 feet in any direction; and 08-3 Stabilize soils once earth-moving activities are complete.	✓ Grade each project phase separately, timed to coincide with construction phase ✓ Upwind fencing can prevent material movement on site ✓ Apply water or a stabilizing agent in sufficient quantities to prevent the generation of visible dust plumes

TABLE 1
BEST AVAILABLE CONTROL MEASURES
(Applicable to All Construction Activity Sources)

Source Category	Control Measure	Guidance
Importing/exporting of bulk materials	09-1 Stabilize material while loading to reduce fugitive dust emissions; and 09-2 Maintain at least six inches of freeboard on haul vehicles; and 09-3 Stabilize material while transporting to reduce fugitive dust emissions; and 09-4 Stabilize material while unloading to reduce fugitive dust emissions; and 09-5 Comply with Vehicle Code Section 23114.	✓ Use tarps or other suitable enclosures on haul trucks ✓ Check belly-dump truck seals regularly and remove any trapped rocks to prevent spillage ✓ Comply with track-out prevention/mitigation requirements ✓ Provide water while loading and unloading to reduce visible dust plumes
Landscaping	10-1 Stabilize soils, materials, slopes	✓ Apply water to materials to stabilize ✓ Maintain materials in a crusted condition ✓ Maintain effective cover over materials ✓ Stabilize sloping surfaces using soil binders until vegetation or ground cover can effectively stabilize the slopes ✓ Hydroseed prior to rain season
Road shoulder maintenance	11-1 Apply water to unpaved shoulders prior to clearing; and 11-2 Apply chemical dust suppressants and/or washed gravel to maintain a stabilized surface after completing road shoulder maintenance.	✓ Installation of curbing and/or paving of road shoulders can reduce recurring maintenance costs ✓ Use of chemical dust suppressants can inhibit vegetation growth and reduce future road shoulder maintenance costs

TABLE 1
BEST AVAILABLE CONTROL MEASURES
(Applicable to All Construction Activity Sources)

Source Category	Control Measure	Guidance
Screening	12-1 Pre-water material prior to screening; and 12-2 Limit fugitive dust emissions to opacity and plume length standards; and 12-3 Stabilize material immediately after screening.	✓ Dedicate water truck or high capacity hose to screening operation ✓ Drop material through the screen slowly and minimize drop height ✓ Install wind barrier with a porosity of no more than 50% upwind of screen to the height of the drop point
Staging areas	13-1 Stabilize staging areas during use; and 13-2 Stabilize staging area soils at project completion.	✓ Limit size of staging area ✓ Limit vehicle speeds to 15 miles per hour ✓ Limit number and size of staging area entrances/exists
Stockpiles/ Bulk Material Handling	14-1 Stabilize stockpiled materials. 14-2 Stockpiles within 100 yards of off-site occupied buildings must not be greater than eight feet in height; or must have a road bladed to the top to allow water truck access or must have an operational water irrigation system that is capable of complete stockpile coverage.	✓ Add or remove material from the downwind portion of the storage pile ✓ Maintain storage piles to avoid steep sides or faces

TABLE 1
BEST AVAILABLE CONTROL MEASURES
(Applicable to All Construction Activity Sources)

Source Category	Control Measure	Guidance
Traffic areas for construction activities	15-1 Stabilize all off-road traffic and parking areas; and 15-2 Stabilize all haul routes; and 15-3 Direct construction traffic over established haul routes.	✓ Apply gravel/paving to all haul routes as soon as possible to all future roadway areas ✓ Barriers can be used to ensure vehicles are only used on established parking areas/haul routes
Trenching	16-1 Stabilize surface soils where trencher or excavator and support equipment will operate; and 16-2 Stabilize soils at the completion of trenching activities.	✓ Pre-watering of soils prior to trenching is an effective preventive measure. For deep trenching activities, pre-trench to 18 inches soak soils via the pre-trench and resuming trenching ✓ Washing mud and soils from equipment at the conclusion of trenching activities can prevent crusting and drying of soil on equipment
Truck loading	17-1 Pre-water material prior to loading; and 17-2 Ensure that freeboard exceeds six inches (CVC 23114)	✓ Empty loader bucket such that no visible dust plumes are created ✓ Ensure that the loader bucket is close to the truck to minimize drop height while loading
Turf Overseeding	18-1 Apply sufficient water immediately prior to conducting turf vacuuming activities to meet opacity and plume length standards; and 18-2 Cover haul vehicles prior to exiting the site.	✓ Haul waste material immediately off-site

TABLE 1
BEST AVAILABLE CONTROL MEASURES
(Applicable to All Construction Activity Sources)

Source Category	Control Measure		Guidance
Unpaved roads/parking lots	19-1	Stabilize soils to meet the applicable performance standards; and	✓ Restricting vehicular access to established unpaved travel paths and parking lots can reduce stabilization requirements
	19-2	Limit vehicular travel to established unpaved roads (haul routes) and unpaved parking lots.	
Vacant land	20-1	In instances where vacant lots are 0.10 acre or larger and have a cumulative area of 500 square feet or more that are driven over and/or used by motor vehicles and/or off-road vehicles, prevent motor vehicle and/or off-road vehicle trespassing, parking and/or access by installing barriers, curbs, fences, gates, posts, signs, shrubs, trees or other effective control measures.	

Table 2
DUST CONTROL MEASURES FOR LARGE OPERATIONS

FUGITIVE DUST SOURCE CATEGORY	CONTROL ACTIONS	
Earth-moving (except construction cutting and filling areas, and mining operations)	(1a)	Maintain soil moisture content at a minimum of 12 percent, as determined by ASTM method D-2216, or other equivalent method approved by the Executive Officer, the California Air Resources Board, and the U.S. EPA. Two soil moisture evaluations must be conducted during the first three hours of active operations during a calendar day, and two such evaluations each subsequent four-hour period of active operations; OR
	(1a-1)	For any earth-moving which is more than 100 feet from all property lines, conduct watering as necessary to prevent visible dust emissions from exceeding 100 feet in length in any direction.
Earth-moving: Construction fill areas:	(1b)	Maintain soil moisture content at a minimum of 12 percent, as determined by ASTM method D-2216, or other equivalent method approved by the Executive Officer, the California Air Resources Board, and the U.S. EPA. For areas which have an optimum moisture content for compaction of less than 12 percent, as determined by ASTM Method 1557 or other equivalent method approved by the Executive Officer and the California Air Resources Board and the U.S. EPA, complete the compaction process as expeditiously as possible after achieving at least 70 percent of the optimum soil moisture content. Two soil moisture evaluations must be conducted during the first three hours of active operations during a calendar day, and two such evaluations during each subsequent four-hour period of active operations.

Table 2 (Continued)

FUGITIVE DUST SOURCE CATEGORY		CONTROL ACTIONS
Earth-moving: Construction cut areas and mining operations:	(1c)	Conduct watering as necessary to prevent visible emissions from extending more than 100 feet beyond the active cut or mining area unless the area is inaccessible to watering vehicles due to slope conditions or other safety factors.
Disturbed surface areas (except completed grading areas)	(2a/b)	Apply dust suppression in sufficient quantity and frequency to maintain a stabilized surface. Any areas which cannot be stabilized, as evidenced by wind driven fugitive dust must have an application of water at least twice per day to at least 80 percent of the unstabilized area.
Disturbed surface areas: Completed grading areas	(2c)	Apply chemical stabilizers within five working days of grading completion; OR
	(2d)	Take actions (3a) or (3c) specified for inactive disturbed surface areas.
Inactive disturbed surface areas	(3a)	Apply water to at least 80 percent of all inactive disturbed surface areas on a daily basis when there is evidence of wind driven fugitive dust, excluding any areas which are inaccessible to watering vehicles due to excessive slope or other safety conditions; OR
	(3b)	Apply dust suppressants in sufficient quantity and frequency to maintain a stabilized surface; OR
	(3c)	Establish a vegetative ground cover within 21 days after active operations have ceased. Ground cover must be of sufficient density to expose less than 30 percent of unstabilized ground within 90 days of planting, and at all times thereafter; OR
	(3d)	Utilize any combination of control actions (3a), (3b), and (3c) such that, in total, these actions apply to all inactive disturbed surface areas.

Table 2 (Continued)

FUGITIVE DUST SOURCE CATEGORY	CONTROL ACTIONS	
Unpaved Roads	(4a)	Water all roads used for any vehicular traffic at least once per every two hours of active operations [3 times per normal 8 hour work day]; OR
	(4b)	Water all roads used for any vehicular traffic once daily and restrict vehicle speeds to 15 miles per hour; OR
	(4c)	Apply a chemical stabilizer to all unpaved road surfaces in sufficient quantity and frequency to maintain a stabilized surface.
Open storage piles	(5a)	Apply chemical stabilizers; OR
	(5b)	Apply water to at least 80 percent of the surface area of all open storage piles on a daily basis when there is evidence of wind driven fugitive dust; OR
	(5c)	Install temporary coverings; OR
	(5d)	Install a three-sided enclosure with walls with no more than 50 percent porosity which extend, at a minimum, to the top of the pile. This option may only be used at aggregate-related plants or at cement manufacturing facilities.
All Categories	(6a)	Any other control measures approved by the Executive Officer and the U.S. EPA as equivalent to the methods specified in Table 2 may be used.

TABLE 3
CONTINGENCY CONTROL MEASURES FOR LARGE OPERATIONS

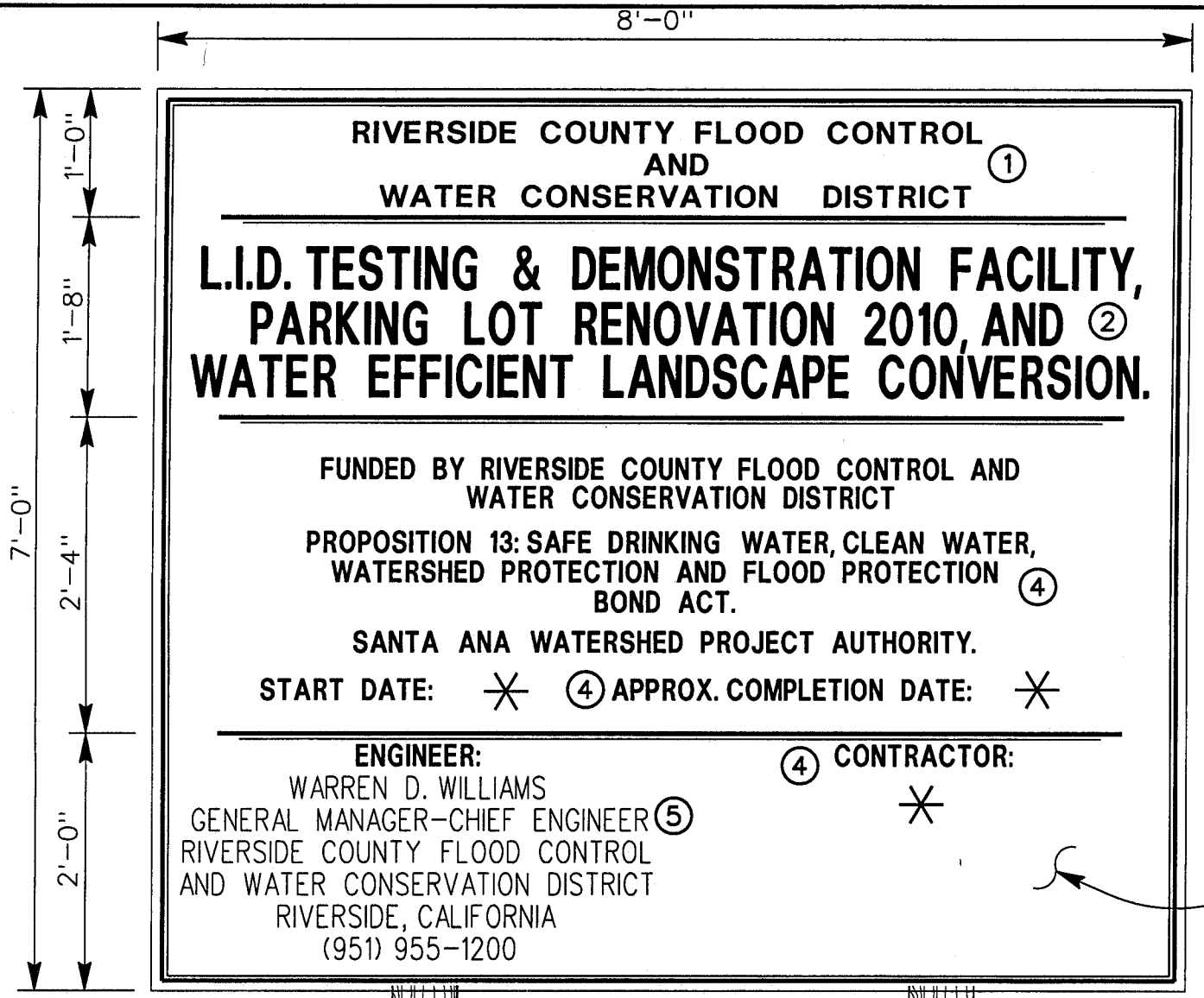
FUGITIVE DUST SOURCE CATEGORY	CONTROL MEASURES
Earth-moving	(1A) Cease all active operations; OR (2A) Apply water to soil not more than 15 minutes prior to moving such soil.
Disturbed surface areas	(0B) On the last day of active operations prior to a weekend, holiday, or any other period when active operations will not occur for not more than four consecutive days: apply water with a mixture of chemical stabilizer diluted to not less than 1/20 of the concentration required to maintain a stabilized surface for a period of six months; OR (1B) Apply chemical stabilizers prior to wind event; OR (2B) Apply water to all unstabilized disturbed areas 3 times per day. If there is any evidence of wind driven fugitive dust, watering frequency is increased to a minimum of four times per day; OR (3B) Take the actions specified in Table 2, Item (3c); OR (4B) Utilize any combination of control actions (1B), (2B), and (3B) such that, in total, these actions apply to all disturbed surface areas.
Unpaved roads	(1C) Apply chemical stabilizers prior to wind event; OR (2C) Apply water twice per hour during active operation; OR (3C) Stop all vehicular traffic.
Open storage piles	(1D) Apply water twice per hour; OR (2D) Install temporary coverings.
Paved road track-out	(1E) Cover all haul vehicles; OR (2E) Comply with the vehicle freeboard requirements of Section 23114 of the California Vehicle Code for both public and private roads.
All Categories	(1F) Any other control measures approved by the Executive Officer and the U.S. EPA as equivalent to the methods specified in Table 3 may be used.

Table 4
(Conservation Management Practices for Confined Animal Facilities)

SOURCE CATEGORY	CONSERVATION MANAGEMENT PRACTICES
Manure Handling **(Only applicable to Commercial Poultry Ranches)**	(1a) Cover manure prior to removing material off-site; AND (1b) Spread the manure before 11:00 AM and when wind conditions are less than 25 miles per hour; AND (1c) Utilize coning and drying manure management by removing manure at laying hen houses at least twice per year and maintain a base of no less than 6 inches of dry manure after clean out; or in lieu of complying with conservation management practice (1c), comply with conservation management practice (1d). (1d) Utilize frequent manure removal by removing the manure from laying hen houses at least every seven days and immediately thin bed dry the material.
Feedstock Handling	(2a) Utilize a sock or boot on the feed truck auger when filling feed storage bins.
Disturbed Surfaces	(3a) Maintain at least 70 percent vegetative cover on vacant portions of the facility; OR (3b) Utilize conservation tillage practices to manage the amount, orientation and distribution of crop and other plant residues on the soil surface year-round, while growing crops (if applicable) in narrow slots or tilled strips; OR (3c) Apply dust suppressants in sufficient concentrations and frequencies to maintain a stabilized surface.
Unpaved Roads	(4a) Restrict access to private unpaved roads either through signage or physical access restrictions and control vehicular speeds to no more than 15 miles per hour through worker notifications, signage, or any other necessary means; OR (4b) Cover frequently traveled unpaved roads with low silt content material (i.e., asphalt, concrete, recycled road base, or gravel to a minimum depth of four inches); OR (4c) Treat unpaved roads with water, mulch, chemical dust suppressants or other cover to maintain a stabilized surface.
Equipment Parking Areas	(5a) Apply dust suppressants in sufficient quantity and frequency to maintain a stabilized surface; OR (5b) Apply material with low silt content (i.e., asphalt, concrete, recycled road base, or gravel to a depth of four inches).

APPENDIX "B"

PROJECT SIGN



LETTER SCHEDULE

	SIZE	COLOR
1	2"	BLACK
2	4"	ROYAL
3	3"	ROYAL
4	2"	ROYAL
5	2"	BLACK

APPENDIX "B" PROJECT SIGN

NOTES:

1. MINIMUM SPACING BETWEEN LINES 1".
2. ✳ -INFO. FURNISHED BY ENGINEER
3. ALL LETTERS FILLED AND CENTERED
4. THE STRIPES ARE GOLD AND BLACK ON WHITE BACKGROUND.

APPENDIX "C"

LOG OF SOIL BORINGS

GEOTECHNICAL BORING LOG B-1

Project No.	602540-001	**Date Drilled**	3-25-09
Project	RCFC & WCD	**Logged By**	JDH
Drilling Co.	Whitcomb Drilling	**Hole Diameter**	8"
Drilling Method	Hollow Stem Auger - 140lb - Autohammer - 30" Drop	**Ground Elevation**	787'
Location	Retention basin	**Sampled By**	JDH

Elevation Feet	Depth Feet	Graphic Log (N S)	Attitudes	Sample No.	Blows Per 6 Inches	Dry Density pcf	Moisture Content, %	Soil Class. (U.S.C.S.)	SOIL DESCRIPTION	Type of Tests
	0								Grass at surface. **Quaternary Alluvium (Qal)**	
785				R-1	4 4 5			SP	SAND (SP), loose, light brown, moist, fine to medium sand, friable	
	5			R-2	1 2 3			ML	SILT (ML), soft, olive, wet	
780				R-3	1 2 4			ML SM	SILT (ML), soft, dark olive gray, moist to wet SILTY SAND (SM), very loose, dark olive gray, moist, fine sand	
	10			R-4	2 2 3			ML	SANDY SILT (ML), soft, dark olive gray, wet	
775				R-5	5 11 17			SP	SAND with Gravel (SP), medium dense, light olive brown, wet, fine gravel	
	15 ▽			R-6	13 16 19			SW	SAND (SW), medium dense, light olive brown, wet	
770									**Total depth of boring 16.5 feet.** **Groundwater encountered at 15.0 feet during drilling.** **Boring backfilled with native cuttings. 3/25/09.**	
	20									
765										
	25									
760										
	30									

SAMPLE TYPES:

S	SPLIT SPOON	G	GRAB SAMPLE
R	RING SAMPLE	C	CORE SAMPLE
B	BULK SAMPLE		
T	TUBE SAMPLE		

TYPE OF TESTS:

DS	DIRECT SHEAR	SA	SIEVE ANALYSIS	-200	% FINES PASSING
MD	MAXIMUM DENSITY	SE	SAND EQUIVALENT	AL	ATTERBERG LIMITS
CN	CONSOLIDATION	EI	EXPANSION INDEX	CO	COLLAPSE
CR	CORROSION	RV	R VALUE	PP	POCKET PENETROMETER

*** This log is a part of a report by Leighton and should not be used as a stand-alone document. ***

Riverside County Flood Control

Logged By: JDH
Sampled By: JDH

Project No. 602540-001

Test Pit TP-1

Date Excavated: 03/26/200

Location: Retention basin, near double ring infiltrometer testing

Depth Top (ft)	Depth Bottom (ft)	Soil symbol (USCS)	Description	Geologic Unit
SURFACE			Grass, abundant rootlets	
0.0	2.0	SP	POORLY GRADED SAND with SILT (5-10%), light gray, moist to very moist, friable, few rootlets, trace pockets of silty sanc	Qal
2.0	2.2	SM	SILTY SAND	
2.2	3.0	SP	POORLY GRADED SAND, trace silt, tan, moist to very moist, friable, fine grained san	
3.0	3.5	ML	SANDY SILT, dark olive, very mois	
3.5	4.0	SW	WELL GRADED SAND, fine to coarse grained sand, very moist	
4.0	6.0	ML	SILT, some fine grained sand, dark olive, wet, soft, mottlec	
6.0	8.0	ML	SANDY SILT, nonplastic	
8.0	11.0	SM	SILTY SAND, very fine grained sand, layers of sandy silt	
12.0	+/-		*Groundwater encountered during excavation*	
11.0	13.0	ML	SILT, dark olive, we	
13.0	13.2	SW	WELL GRADED SAND, cannot dig deeper due to caving.	

Total Depth (ft): 13.2
Groundwater encountered at 12' +/- during excavation. Rose to 10.3 feet after 1.5 hrs. Continual caving of walls covered groundwater after 2 hrs.
Test pit backfilled with native soil

Test Pit TP-2

Date Excavated: 03/26/200

Location: by traffic circle

Depth Top (ft)	Depth Bottom (ft)	Soil symbol (USCS)	Description	Geologic Unit
SURFACE			Grass	
0.0	2.0	ML	SANDY SILT, fine grained sand, 75% fines, moist, brown, rootlets	Qal

Total Depth (ft): 2
No ground water encountered.
Test pit backfilled with native so

(note: percent fines is visual estimate)

Riverside County Flood Control

Logged By: JDH

Sampled By: JDH

Project

Test Pit TP-3

Date Excavated: 03/26/200

Location: Eastern corner of site

Depth Top (ft)	Depth Bottom (ft)	Soil symbol (USCS)	Description	Geologic Unit
SURFACE			Grass	
0.0	3.0	SM	SILTY SAND, fine grained sand, ~20% fines, moist, light gray, rootlets down to 1', roots down to 4'	
3.0	4.0	SM	SILTY SAND, olive gray, moist to very moist, soft to medium stifl	
4.0	4.3	SP	POORLY GRADED SAND, tan, friable	
4.3	4.5	ML	SANDY SILT, olive gray	
4.5	5.0	SM	SILTY SAND, fine grained sand, dark gray, mois	

Total Depth (ft): 5.0
No ground water encountered.
Test pit backfilled with native so

Test Pit TP-4

Date Excavated: 03/26/200

Location: Adjacent to Market Street, in front of entrance

Depth Top (ft)	Depth Bottom (ft)	Soil symbol (USCS)	Description	Geologic Unit
SURFACE			Dirt area	
0.0	1.0	SM	SILTY SAND, brown, moist, medium dense to dense	Afu
1.0	3.0	SM	SILTY SAND, fine grained sand, light brown, moist, medium dense, ~40% fines	Qal
3.0	3.5	ML	SANDY SILT, fine grained sand, light brown, moist, medium dense, less fines	
3.5	5.0	SW	WELL GRADED SAND with gravel, light grayish brown, gravel to 1", clean river sand and grav	

Total Depth (ft): 5.0
No ground water encountered.
Test pit backfilled with native soil

(note: percent fines is visual estimate)

Riverside County Flood Control

Logged By: JDH
Sampled By: JDH

Test Pit TP-5

Date Excavated: 03/26/200
Location: south of office bldg

Depth Top (ft)	Depth Bottom (ft)	Soil symbol (USCS)	Description	Geologic Unit
SURFACE			Grass	
0.0	2.0	ML	SANDY SILT or SANDY CLAY, fine grained sand, 70% fines, moist, brown, rootlets	Qal
Total Depth (ft): 2 No ground water encountered. Test pit backfilled with native so				

Test Pit TP-6

Date Excavated: 03/26/200
Location: East side of retention basin

Depth Top (ft)	Depth Bottom (ft)	Soil symbol (USCS)	Description	Geologic Unit
SURFACE			Grass, rootlets	
0.0	1.0	SP	POORLY GRADED SAND, tan, very moist, friable	Qal
1.0		ML	SANDY SILT, very fine grained sand, olive brown, mottled, ~50-60% fines	
2.0	2.3	ML	SANDY SILT, very fine grained sand, olive brown, mottled, ~80% fines	
2.3	3.0	SM	SILTY SAND, orange brown with blue, very moi	
3.0	3.5	SP	POORLY GRADED SAND, fine to medium grained sand, light brown, very moist, friabl	
3.5	4.0	ML	SANDY SILT, very fine grained sand, dark olive, very moist, ~80% fines	
4.0	6.5	CL	CLAY, olive brown, very moist to wet, so	
6.5	6.6	ML	SILT, wet	
Total Depth (ft): 6.6 No ground water encountered. Test pit backfilled with native soil				

(note: percent fines is visual estimate)

APPENDIX "D"

SWPPP CERTIFICATION

SWPPP Certification

Project Name:_____

Project Number:_____

"I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system or those persons directly responsible for gathering the information, to the best of my knowledge and belief, the information submitted is true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations."

_____ _____

Contractor's Signature Date

_____ _____

Contractor's Name and Title Telephone Number

APPENDIX "E"

RAIN EVENT ACTION PLAN (REAP)

Rain Event Action Plan (REAP)

Date:		**WDID Number:**	
Date Rain Predicted to Occur:		**Predicted % chance of rain:**	

Site Information:

Site Name, City and Zip Code Project Risk Level: ☐ Risk Level 2 ☐ Risk Level 3

Site Stormwater Manager Information:

Name, Company, Emergency Phone Number (24/7)

Erosion and Sediment Control Contractor – Labor Force contracted for the site:

Name, Company, Emergency Phone Number (24/7)

Stormwater Sampling Agent:

Name, Company, Emergency Phone Number (24/7)

Current Phase of Construction

Check ALL the boxes below that apply to your site.

☐ Grading and Land Development	☐ Vertical Construction	☐ Inactive Site
☐ Streets and Utilities	☐ Final Landscaping and Site Stabilization	☐ Other:

Activities Associated with Current Phase(s)

Check ALL the boxes below that apply to your site (some apply to all Phases).

Grading and Land Development:

☐ Demolition	☐ Vegetation Removal	☐ Vegetation Salvage-Harvest
☐ Rough Grade	☐ Finish Grade	☐ Blasting
☐ Soil Amendment(s):	☐ Excavation (_____ ft)	☐ Soils Testing
☐ Rock Crushing	☐ Erosion and Sediment Control	☐ Surveying
☐ Equip. Maintenance/Fueling	☐ Material Delivery and Storage	☐ Other:

Streets and Utilities:

☐ Finish Grade	☐ Utility Install: water-sewer-gas	☐ Paving Operations
☐ Equip. Maintenance/Fueling	☐ Storm Drain Installation	☐ Material Delivery & Storage
☐ Curb and Gutter/Concrete Pour	☐ Masonry	☐ Other:

Vertical Construction:

☐ Framing	☐ Carpentry	☐ Concrete/Forms/Foundation
☐ Masonry	☐ Electrical	☐ Painting
☐ Drywall/Interior Walls	☐ Plumbing	☐ Stucco
☐ Equip. Maintenance/Fueling	☐ HVAC	☐ Tile
☐ Exterior Siding	☐ Insulation	☐ Landscaping & Irrigation
☐ Flooring	☐ Roofing	☐ Other:

Final Landscaping & Site Stabilization:

☐ Stabilization	☐ Vegetation Establishment	☐ E&S Control BMP Removal
☐ Finish Grade	☐ Storage Yard/ Material Removal	☐ Landscape Installation
☐ Painting and Touch-Up	☐ Irrigation System Testing	☐ Other:
☐ Drainage Inlet Stencils	☐ Inlet Filtration	☐ Perm. Water Quality Ponds
☐ Other:	☐ Other:	☐ Other:

Inactive Construction Site:

☐ E & S Control Device Installation	☐ Routine Site Inspection	☐ Trash Removal
☐ E & S Control Device Maintenance	☐ Street Sweeping	☐ Other:

Rain Event Action Plan (REAP)

Date:		WDID Number:	

Trades Active on Site during Current Phase(s)

Check ALL the boxes below that apply to your site

❑	Storm Drain Improvement	❑	Grading Contractor	❑	Surveyor- Soil Technician
❑	Street Improvements	❑	Water Pipe Installation	❑	Sanitary Station Provider
❑	Material Delivery	❑	Sewer Pipe Installation	❑	Electrical
❑	Trenching	❑	Gas Pipe Installation	❑	Carpentry
❑	Concrete Pouring	❑	Electrical Installation	❑	Plumbing
❑	Foundation	❑	Communication Installation	❑	Masonry
❑	Demolition	❑	Erosion and Sediment Control	❑	Water, Sewer, Electric Utilities
❑	Material Delivery	❑	Equipment Fueling/Maintenance	❑	Rock Products
❑	Tile Work- Flooring	❑	Utilities, e.g., Sewer, Electric	❑	Painters
❑	Drywall	❑	Roofers	❑	Carpenters
❑	HVAC installers	❑	Stucco	❑	Pest Control: e.g., termite prevention
❑	Exterior Siding	❑	Masons	❑	Water Feature Installation
❑	Insulation	❑	Landscapers	❑	Utility Line Testers
❑	Fireproofing	❑	Riggers	❑	Irrigation System Installation
❑	Steel Systems	❑	Utility Line Testers	❑	Other:

Trade Contractor Information Provided

Check ALL the boxes below that apply to your site.

❑	Educational Material Handout	❑	Tailgate Meetings	❑	Training Workshop
❑	Contractual Language	❑	Fines and Penalties	❑	Signage
❑	Other:	❑	Other:	❑	Other:

Continued on next page.

Rain Event Action Plan (REAP)

Date of REAP		**WDID Number:**	
Date Rain Predicted to Occur:		**Predicted % chance of rain:**	

Predicted Rain Event Triggered Actions

Below is a list of suggested actions and items to review for this project. Each active Trade should check all material storage areas, stockpiles, waste management areas, vehicle and equipment storage and maintenance, areas of active soil disturbance, and areas of active work to ensure the proper implementation of BMPs. Project-wide BMPs should be checked and cross-referenced to the BMP progress map.

Trade or Activity	Suggested action(s) to perform / item(s) to review prior to rain event
☐ Information & Scheduling	☐ Inform trade supervisors of predicted rain ☐ Check scheduled activities and reschedule as needed ☐ Alert erosion/sediment control provider ☐ Alert sample collection contractor (if applicable) ☐ Schedule staff for extended rain inspections (including weekends & holidays) ☐ Check Erosion and Sediment Control (ESC) material stock ☐ Review BMP progress map ☐ Other:_____ ☐ _____ ☐ _____
☐ Material storage areas	☐ Material under cover or in sheds (ex: treated woods and metals) ☐ Perimeter control around stockpiles ☐ Other:_____ ☐ _____ ☐ _____
☐ Waste management areas	☐ Dumpsters closed ☐ Drain holes plugged ☐ Recycling bins covered ☐ Sanitary stations bermed and protected from tipping ☐ Other:_____ ☐ _____ ☐ _____
☐ Trade operations	☐ Exterior operations shut down for event (e.g., no concrete pours or paving) ☐ Soil treatments (e.g.,: fertilizer) ceased within 24 hours of event ☐ Materials and equipment (ex: tools) properly stored and covered ☐ Waste and debris disposed in covered dumpsters or removed from site ☐ Trenches and excavations protected ☐ Perimeter controls around disturbed areas ☐ Fueling and repair areas covered and bermed ☐ Other:_____ ☐ _____ ☐ _____
☐ Site ESC BMPs	☐ Adequate capacity in sediment basins and traps ☐ Site perimeter controls in place ☐ Catch basin and drop inlet protection in place and cleaned ☐ Temporary erosion controls deployed ☐ Temporary perimeter controls deployed around disturbed areas and stockpiles ☐ Roads swept; site ingress and egress points stabilized ☐ Other:_____ ☐ _____ ☐ _____
☐ Concrete rinse out area	☐ Adequate capacity for rain ☐ Wash-out bins covered ☐ Other:_____ ☐ _____ ☐ _____
☐ Spill and drips	☐ All incident spills and drips, including paint, stucco, fuel, and oil cleaned ☐ Drip pans emptied ☐ Other:_____ ☐ _____ ☐ _____

Continued on next page.

☐ Other / Discussion / Diagrams	☐ _____ ☐ _____ ☐ _____ ☐ _____ ☐ _____ ☐ _____ ☐ _____ ☐ _____ ☐ _____ ☐ _____ ☐ _____ ☐ _____ ☐ _____

Attach a printout of the weather forecast from the NOAA website to the REAP.

I certify under penalty of law that this Rain Event Action Plan (REAP) will be performed in accordance with the General Permit by me or under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gathered and evaluated the information submitted. Based on my inquiry of the persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

_____ Date: _____

Qualified SWPPP Practitioner (Use ink please)

APPENDIX "F"

RISK LEVEL 1 AND 2
VISUAL INSPECTION FIELD LOG SHEET

Risk Level 1 and 2
Visual Inspection Field Log Sheet

Date and Time of Inspection:	Report Date:

Inspection Type:	☐ Weekly	☐ Before predicted rain	☐ During rain event	☐ Following qualifying rain event	☐ Contained stormwater release	☐ Quarterly non-stormwater

Site Information

Construction Site Name:	
Construction stage and completed activities:	Approximate area of exposed site:

Weather and Observations

Date Rain Predicted to Occur:	Predicted % chance of rain:

Estimate storm beginning: _____ (date and time)	Estimate storm duration: _____ (hours)	Estimate time since last storm: _____ (days or hours)	Rain gauge reading: _____ (inches)

Observations: If yes identify location		
Odors	Yes ☐	No ☐
Floating material	Yes ☐	No ☐
Suspended Material	Yes ☐	No ☐
Sheen	Yes ☐	No ☐
Discolorations	Yes ☐	No ☐
Turbidity	Yes ☐	No ☐

Site Inspections

Outfalls or BMPs Evaluated	**Deficiencies Noted**
(add additional sheets or attached detailed BMP Inspection Checklists)	

Photos Taken:	Yes ☐	No ☐	Photo Reference IDs:

Corrective Actions Identified (note if SWPPP/REAP change is needed)

Inspector Information

Inspector Name:	Inspector Title:
Signature:	Date:

Summary of Risk Level 1 and 2 Monitoring Requirements for Visual Inspections

Type of Monitoring	When
Non-stormwater inspection	Quarterly for each drainage area.
Qualifying rain event: Pre-rain inspection	All drainage areas, BMPs, and stormwater containments within two business days of each qualifying rain event.
Qualifying rain event: Post-rain inspection	All discharge locations within two business days after each qualifying rain event. Visually observe discharge of contained stormwater when discharged.
During rain inspection	See BMP inspection below.
BMP	Weekly and every 24 hours during extended storm events.

APPENDIX "G"

RISK LEVEL 2
EFFLUENT SAMPLING FIELD LOG SHEETS

Risk Level 2
Effluent Sampling Field Log Sheets

Construction Site Name:	Date:	Time Start:
Sampler:		

Sampling Event Type:	☐ Stormwater	☐ Non-stormwater	☐ Non-visible pollutant

Field Meter Calibration

pH Meter ID No./Desc.: Calibration Date/Time:	Turbidity Meter ID No./Desc.: Calibration Date/Time:

Field pH and Turbidity Measurements

Discharge Location Description	pH	Turbidity	Time

Grab Samples Collected

Discharge Location Description	Sample Type	Time

Additional Sampling Notes:

Time End:

Summary of Risk Level 2 Monitoring Requirements

Type of Monitoring	When
Effluent sampling: Turbidity	Collect a minimum of three samples per day. Collect runoff samples representative of site discharges.
Effluent sampling: pH	During construction phases with high risk of high pH discharge. Collect a minimum of three samples per day. Collect runoff samples representative of site discharges.
Non-visible pollutants: spill/BMP failure based on pollutant source assessment	Within first two hours of discharge from site. Collect samples of runoff affected by the spilled or released material(s) and runoff unaffected by the spilled or released material(s).
Contained rain water	At time of discharge.
Non-stormwater	At locations where discharged off the site.
Particle size	When sediment basins are used. If needed to justify site specific sediment risk using RUSLE.
Other	Other