CITY OF SAN ANTONIO
DEPARTMENT OF PUBLIC WORKS

SPECIFICATIONS

FOR

2014 - 2015 RECLAMATION CONTRACT PACKAGE 7 (TASK ORDER)

CITY MANAGER
SHERYL L. SCULLEY

INTERIM DIRECTOR OF PUBLIC WORKS
ANTHONY CHUKWUDOLUE

Prepared By:

POZNECKI CAMARILLO INC

5835 CALLAGHAN RD., SUITE 200
SAN ANTONIO, TEXAS 78228
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STATE OF TEXAS
CRYSTAL BENAVIDES
86197
LICENSED
PROFESSIONAL ENGINEER

Poznecki-Camarillo, Inc.
TBPE Reg. No. F-483

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Project Description

Project Duration

The construction time (in calendar days) for each individual site will be negotiated between the City Engineer or Program Manager and the Contractor. The Contractor will be expected to begin construction for each individual site in accordance with Article 1- General Provisions, Section 1.2.4, Notice to Proceed and Commencement of Contract Times in the General Conditions-Heavy/Hwy. The Contractor may also be limited to the amount of individual project sites open at any given time. Liquidated damages for construction time will be assessed should the contractor fail to complete the construction of each individual site in the specified calendar days as negotiated by the City Engineer or Program Manager.

Project Scope

Project construction may include but is not limited to: roadway reclamation, base repair, emulsion treatment, hot mix asphalt placement, milling and overlay, crack sealing, sidewalks, driveways, curbs, wheel chair ramps, concrete retaining wall – combination type, speed humps, topsoil, sodding, striping, adjusting existing manholes and valve boxes, removing and relocating mailboxes, sign relocation, and any other items required due to the site conditions to accomplish the project scope.

Quantities included in this contract, as well as the entire bid amount are not guaranteed. Unit prices established shall remain valid throughout the duration of the contract.

Project Location

The sites shall be assigned by the City Engineer or Program Manager and shall be located throughout the City of San Antonio. Separate Task Orders will be issued for each project site or for multiple sites, and quantities will be provided to the contractor. No changes will be allowed in the contractor's unit bid prices as a result of any project assignment(s).

It is anticipated that some project sites may require working time restrictions. No additional cost will be paid to the contractor for reduced working times.

Important Notes

No direct payment shall be made for the following specification items. Contractor shall include cost of these items in various other bid items:

100.1	Mobilization
100.2	Insurance and Bond
101.1	Preparing Right-of-Way
530.1	Barricades, Signs, and Traffic Handling

Excavation due to construction of curb, sidewalk, driveways, and wheelchair ramps shall not be paid for directly but shall be included in various bid items of which it forms a component part.

CITY OF SAN ANTONIO, TEXAS

GOVERNING SPECIFICATIONS AND SPECIAL PROVISIONS FOR

2014 – 2015 RECLAMATION CONTRACT
PACKAGE 7 (TASK ORDER)

All Standard Specifications, Special Specifications and Special Provisions applicable to this project are identified as follows:

CITY OF SAN ANTONIO STANDARD SPECIFICATIONS FOR CONSTRUCTION JUNE, 2008

ITEM		DESCRIPTION
100	-	Mobilization
101	-	Preparing Right-of-Way
103	-	Remove Concrete
104	-	Street Excavation
107	-	Embankment
200	-	Flexible Base
202	-	Prime Coat
203	-	Tack Coat
205	-	Hot Mix Asphaltic Concrete Pavement
208	-	Salvaging, Hauling & Stockpiling Reclaimable Asphaltic Pavement
209	-	Concrete Pavement
210	-	Rolling
220	-	Blading
230	-	Base and Pavement Replacement
236	-	Full Depth Reclamation
300	-	Concrete
301	-	Reinforcing Steel
303	-	Welded Wire Flat Sheets
307	-	Concrete Structures
311	-	Concrete Surface Finish
400	-	Excavation, Trenching and Backfilling
403	-	Storm Sewer Junction Boxes and Inlets
404	-	Corrugated Metal Pipe
413	-	Flowable Fill
500	-	Concrete Curb, Gutter, and Concrete Curb and Gutter
502	-	Concrete Sidewalks (Special Provision)
503	-	Asphaltic Concrete, Portland Cement Concrete, and Gravel Driveways (Special Provision)
505	-	Concrete Riprap
506	-	Concrete Retaining Wall – Combination Type
512	-	Adjusting Existing Manholes and Valve Boxes

513	-	Removing and Relocating Mailboxes
515	-	Topsoil
516	-	Sodding
522	-	Sidewalk Pipe Railing
523	-	Adjusting of Vehicular & Pedestrian Gates
524	-	Concrete Steps
530	-	Barricades, Signs and Traffic Handling
533	-	Cleaning and Removal of Pavement Markings and Markers (Special Provision)
535	-	Hot Applied Thermoplastic Pavement Markings (Special Provision)
537	-	Raised Pavement Markers
540	-	Temp. Erosion, Sedimentation, and Water Pollution Prevention and Control
550	-	Trench Excavation Safety Protection
552	-	Removing and Relocating Irrigation Systems
556	-	Cast in Place Detectable Warning Surface Tiles
624	-	Ground Boxes
700	-	Cost Loaded Project Schedules
1000	-	Web Portal

TEXAS DEPARTMENT OF TRANSPORTATION STANDARD SPECIFICATIONS FOR CONSTRUCTION AND MAINTENANCE OF HIGHWAYS, STREETS, AND BRIDGES, 2004

ITEM		DESCRIPTION
315	-	Fog Seal (Special Provision)
438	-	Cleaning and Sealing Joint and Cracks (Rigid Pavement and Bridge Decks)
454	-	Bridge Expansion Joints
712	-	Cleaning and Sealing Joints and Cracks (Asphalt Concrete) (Special Provision)

SAN ANTONIO WATER SYSTEM STANDARD SPECIFICATIONS FOR CONSTRUCTION, MARCH 2008

826	-	Valve Box Adjustments
833	-	Meter and Meter Box Installation

SAN ANTONIO WATER SYSTEM STANDARD SPECIFICATIONS FOR CONSTRUCTION, REV. JUNE 2009

851	-	Adjusting Existing Manhole

SPECIAL SPECIFICATIONS FOR CONSTRUCTION

241	-	Emulsion Aggregate Slurry Seal Mix
250	-	Seal Coat
799	-	Speed Humps, Type II, Modular Rubber Cushions
801	-	Tree and Landscape Protection
802	-	Tree Pruning, Soil Amending, and Fertilization
805	-	Trees, Plants and Ground Covers
826A	-	Valve Box Locate and Adjustment (SAWS)
851A	-	Locating and Adjusting Existing Manhole (SAWS)
SP 100	-	Door Hangers
SP 500	-	Police Officer
SP 800	-	Project Signs
SP 900	-	Removing and Relocating Signs
SP 1000	-	Adjusting Metal Beam Guard Fence
SP 2000	-	Railroad Insurance and Permit
SP 3000	-	Adjusting Traffic Pull Box

SPECIAL PROVISIONS TO CITY OF SAN ANTONIO STANDARD SPECIFICATIONS FOR CONSTRUCTION, JUNE 2008

502	-	Concrete Sidewalks
503	-	Asphaltic Concrete, Portland Cement Concrete, and Gravel Driveways
533	-	Cleaning and Removal of Pavement Markings and Markers
535	-	Hot Applied Thermoplastic Pavement Markings

SPECIAL PROVISIONS TO TEXAS DEPARTMENT OF TRANSPORTATION STANDARD SPECIFICATIONS FOR CONSTRUCTION AND MAINTENANCE OF HIGHWAYS, STREETS, AND BRIDGES, 2004

315	-	Fog Seal
712	-	Cleaning and Sealing Joints and Cracks (Asphalt Concrete)

ITEM 241
Special Specification

EMULSION AGGREGATE SLURRY SEAL MIX

241.1 DESCRIPTION: This item shall govern for the asphalt emulsion aggregate slurry seal mix that will be used for pavement preservation. This item shall consist of a mixture of modified emulsified asphalt, ground tire rubber, mineral aggregate, and water. The slurry seal mix shall be produced in an approved centrally located facility and the mix shall be tested and certified by the producer to meet specifications prior to shipment to distribution location(s). The Slurry Seal mix shall be uniform and stable for placement the day of loading when proper agitation is maintained. The aggregates, emulsion, and water should form a creamy-textured slurry that, when spread, will flow ahead of the strike-off squeegee. When cured, the surface shall have a uniform appearance, fill cracks, and adhere to the existing pavement surface. Proportions shall be based on the mix design specifications herein.

241.2 MATERIALS:

A. AGGREGATE: The aggregate shall consist of sound and durable Trap Rock 100% crushed in accordance with these specifications. The aggregate shall be clean and free from vegetable matter, dirt, and other deleterious substances. The aggregate shall have a sand equivalent of not less than 45 percent when tested in accordance with ASTM D 2419. The aggregate shall show a loss of not more than 35 percent when tested in accordance with ASTM C 131. The sodium sulfate soundness loss shall not exceed 12 percent, or the magnesium soundness loss shall not exceed 20 percent after 5 cycles when tested in accordance with ASTM C 88.

The combined aggregate shall conform to the gradation shown in Table 1 when tested in accordance with ASTM C 136 and ASTM C 117.

TABLE 1

GRADATION OF AGGREGATES

Sieve Size	Precent by Weight Passing Sieve
No.4 (4.75 mm)	100
No.8 (2.36 mm)	75 – 85
No.16 (1.18 mm)	30 – 40
No.30 (600 micro m)	10 – 20
No.50 (300 micro m)	3 – 8
No.100 (150 micro m)	0 – 2
No.200 (75 micro m)	0 – 1
Emulsion content by dry weight of aggregate	14% - 17%
Ground tire rubber by dry weight of aggregate	5% Minimum

The mix formula (mix design) shall be run using aggregate within the gradation band shown in Table 1. Once the mix design has been submitted and approved, the aggregate used on the project shall be within the gradation bands in Table 1.

B. **MINERAL FILLER:** If mineral filler, in addition to that naturally present in the aggregate, is necessary, it shall meet the requirements of ASTM D 242 and shall be used in the amounts required by the mix design. The mineral filler shall be considered as part of the aggregate.

C. **GROUND TIRE RUBBER:** The material shall be granulated tire rubber specifically designed for use with the Slurry Seal mixes. The rubber shall have a specific gravity between 1.15 and 1.20. One hundred percent of the granulated tire rubber shall pass a No. 16 sieve, 95% shall pass a No. 20 sieve, and a maximum of 2 percent shall pass a No. 200 sieve.

D. **POLYMER MODIFIER:** Polymer modifier shall be latex and shall be added at a minimum of 2 percent polymer solids by weight of the emulsion.

E. **WATER:** All water used in making the slurry shall be potable and free from harmful soluble salts and chemicals.

F. **EMULSION:** The emulsion shall be a slow-set or a quick-set type of emulsion as approved by the Engineer. The emulsion shall contain ground tire rubber and polymer modifiers and shall conform to the following quality requirements as shown in Table 2:

TABLE 2

TESTS ON EMULSION

Emulsion Property	Test Procedure	Min	Max
Rotational viscosity at 77°F, cP	ASTM D 7226	200	2000
Uniformity	ASTM D 2939	Pass[1]	
Resistance to heat	ASTM D 2939	Pass[2]	
Resistance to water	ASTM D 2939	Pass[3]	
Wet flow, mm	ASTM D 2939	--	0
Residue by evaporation, % by weight	ASTM D 2939	33	--
Tests on residue from evaporation:			
Penetration, 77°F, 100 g, 5 sec.	ASTM D5	15	30
Flash point, Cleveland open cup, °F	ASTM D92	500	
Softening Point, °F [4]	ASTM D36	230	--

1. Product shall be homogenous and show no separation or coagulation that cannot be overcome by moderate stirring.
2. No sagging or slippage of film beyond the initial reference line.
3. No blistering or re-emulsification.
4. Cure the emulsion in the softening point ring in a 200°F ± 5°F oven for 2 hr.

241.3 COMPOSITION AND APPLICATION:

A. **COMPOSITION:** The slurry shall consist of a mixture of polymer emulsified asphalt, mineral aggregate, ground tire rubber, and water.

B. **JOB MIX FORMULA:** The Vendor shall submit to the Engineer for approval a complete mix design on the materials proposed for use, prepared and certified by an approved laboratory.

Compatibility of the aggregate, emulsion, mineral filler, and other additives shall be verified by the mix design. The mix design shall be made with the same aggregate and emulsion that the Vendor will supply. The slurry seal mix shall be produced in an approved centrally located facility and the mix shall be pretested and certified to meet specifications by the producer prior to shipment to distribution location.

C. **APPLICATION RATE:** Unless otherwise specified, the slurry seal shall be applied to at the application rates of 10-15 pounds of mixture per square yard. The rate of application shall not vary more than +/- 2 pounds per square yard.

D. **CERTIFICATE OF ANALYSIS:** The producer of the Slurry Seal Mix shall make available a certificate of analysis (C of A) for the slurry seal mix supplied under the contract. The C of A shall indicate the proportions of aggregates, mineral filler, ground tire rubber, water and emulsion based on the dry aggregate weight. The main items of design in the Emulsion Slurry Seal are aggregate gradation, emulsion content and consistency of the mixture.

The Vendor shall submit to the Engineer for approval a complete mix design on the materials proposed for use, prepared and certified by an approved laboratory. Compatibility of the aggregate, emulsion, mineral filler, and other additives shall be verified by the mix design. The mix design shall be made with the same aggregate and emulsion that the Vendor will supply.

241.4 MEASUREMENT: The Item will be measured by the square yard of Emulsion Aggregate Slurry Seal Mix installed and accepted.

241.5 Payment: The work performed and materials furnished in accordance this Item and measured as provided under "Measurement" will be paid for at the unit price bid for Emulsion Aggregate Slurry Seal Mix. This price shall be full compensation for furnishing and placing materials, surface preparation, and for all labor, tools, equipment and incidentals necessary to complete the work.

241.6 BID ITEM:
Item 241 - Emulsion Aggregate Slurry Seal Mix – per square yard

ITEM 250
Special Specification

SEAL COAT

250.1 DESCRIPTION:

This item shall consist of a single asphalt surface treatment composed of asphalt surface treatment composed of asphalt material covered with aggregate for the purposed of sealing existing pavements in accordance with these specifications.

250.2 MATERIALS:

A. AGGREGATE:

Aggregates shall be of the type as shown on the plans and shall meet all the requirements of the Texas Department of Transportation (TxDOT) Item No. 302, "Aggregate for Surface Treatments" and subsequent revisions thereto. Gradation requirements when tested by TxDOT Test Method Tex-200F, Part I, shall be as shown on the plans.

B. ASPHALTIC MATERIALS:

Asphalt cement, emulsified asphalts, other miscellaneous asphaltic materials, and latex additives shall conform to TxDOT Item No. 300, "Asphalt, Oils, and Emulsions" and subsequent revisions thereto.

250.3 EQUIPMENT

A. DISTRIBUTOR:

The distributor shall be a self-propelled pressure type, equipped with an asphaltic material heater and a distributing pump capable of pumping the material at the specified rate through the distributor spray bar. The distributor spray bar shall be capable of fully circulating the asphaltic material. The distributor spray bar shall contain nipples and valves so constructed that the nipples will not become partially plugged with congealing asphaltic material, in order to prevent streaking or irregular distribution of asphaltic material. Distributor equipment shall include a tachometer, pressure gauges, volume measuring devices, and thermometer for reading the temperature of tank contents.

The distributor tank shall have been calibrated within three (3) years from the date it is first used on this project. The tank calibration procedure shall be in accordance with Test Method Tex-922-K, Part 1, and shall be signed and sealed by a registered professional engineer. Unless otherwise shown on the plans, the Contractor shall provide the tank calibration and shall furnish the Engineer an accurate and satisfactory calibration record prior to beginning the work. The Engineer may at any time verify calibration accuracy in accordance with Test Method Tex-922-K, Part II, and may perform the recalibration if the calibration is found to be in error.

B. AGGREGATE SPREADER:

A self-propelled continuous-feed aggregate spreader shall be used which will uniformly spread aggregate at the rate specified by the Engineer.

C. ROLLERS:

Approved rolling equipment shall be of the self-propelled type and shall be so designed such that a 12 ton load may be obtained by ballast loading. The roller shall be equipped with tires that will afford ground contact pressures to 90 psi or more. Individual tire inflation pressures shall be within 5 psi of each other. The operation load and tire air pressure shall be within the range of the manufacture's chart.

D. SWEEPERS:

A rotary, self-propelled power broom shall be acceptable for sweeping existing pavement surfaces.

Vacuum sweepers or other approved equally capable equipment shall be suitable for removing loose aggregate form compacted Seal Coat.

250.4 CONSTRUCTION METHOD:

Prior to Seal Coating, all dirt and other objectionable material shall be removed from the existing pavement by sweeping or other approved methods. All existing raised pavement markings shall be removed daily, as the work progresses, and as approved by the Engineer. All vegetation found in the existing pavement shall be destroyed by an approved chemical killer.

Building paper shall be place over all manholes, valve boxes, grates, etc., so as to protect the surfaces from Asphaltic materials. Asphaltic materials shall not be placed, lapped, or splashed onto adjacent structures.

Seal Coat shall not be applied when the air temperature is below 60^0F and is falling, but it may be applied when the air temperature is 50^0F and is rising, the air temperature being taken in the shade and away from artificial heat. Seal Coat shall not be applied when the roadway surface temperature is below 60^0F or when in the opinion of the Engineer, general weather conditions are not suitable. When latex modified asphalt cement is specified, Seal Coat shall not be applied when the air temperature is below 80^0F and is falling, but may be applied when the air temperature is above 70^0F and is rising and shall not be applied when the temperature of the surface on which the Seal Coat is to be applied is below 70^0F.

Asphalt and aggregate rates as shown on the plans are for estimate purposes only an may be varied as directed by the Engineer.

The width of each application of Asphaltic material shall be such to allow uniform application and immediate covering with aggregate. The contractor shall be responsible for uniform application of asphaltic material at the junction of distributor loads. Paper or other suitable material shall be used to prevent overlapping of transverse joints. Longitudinal joints shall match lane lines unless otherwise authorized by the Engineer. Application of asphaltic material will be measured as necessary to determine the rate of application. In those areas where the asphalt distributor is not accessible, hand spraying may be permitted as directed by the Engineer.

Aggregate shall be immediately and uniformly applied and spread in the same width as the application of asphaltic material. The entire surface shall then be broomed or raked as required by the Engineer.

The aggregate shall be rolled for its width with a minimum of two (2) pneumatic tires rollers which shall be maintained in good repair and operating condition. Rolling shall begin as soon as sufficient aggregate is spread to prevent pick-up and shall begin longitudinally at the outside edge of the mat and progress toward the center of the mat, uniformly lapping each preceding pass by at least 2 the width of the roller. Rolling shall continue until no more aggregate can be worked into the surface.

After all rolling, the finished surface shall be cleared of any surplus aggregate by the Contractor by sweeping. Until the work has been accepted, additional sweeping shall be required as often as necessary so that loose aggregate does not present a hazard to traffic.

The Contractor shall be responsible for the maintenance of the Seal Coat until the work is accepted by the Engineer. All holes or failures in the surface shall be repaired by use of additional asphalt and aggregate. All fat or bleeding surfaces shall covered with approved cover material in such a manner that the asphaltic material will not adhere to or be picked up by the wheels of vehicles.

All parkways, private property, and driveways adjacent to the work shall be cleaned of loose aggregate and other debris as produced from Seal Coat operations.

250.5 MEASUREMENT:

Seal Coat: will be measured by the square yard of completed and accepted work

250.6 PAYMENT:

The work performed as prescribed by this item will be paid for at the contract unit price bid per square yard for "Seal Coat", which price shall be full compensation for furnishing and placing all materials, sweeping, rolling, manipulations, labor, tools, equipment and incidentals necessary to complete the work.

Payment will be made under:

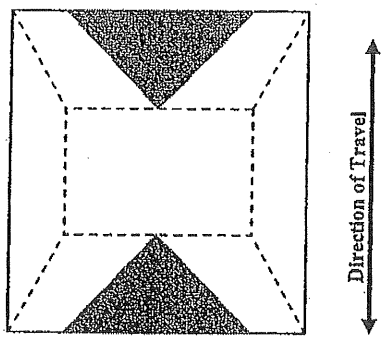
PAY ITEM NO. 250: SEAL COAT - per square yard.

ITEM 799
SPECIAL SPECIFICATION

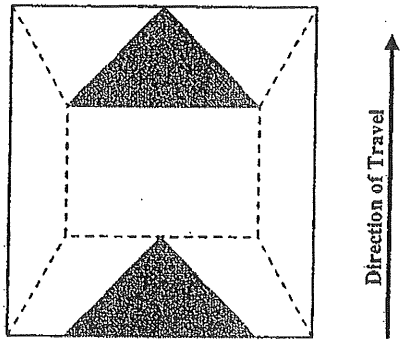
SPEED HUMPS, TYPE II
MODULAR RUBBER CUSHIONS

GENERAL:
This specification sets forth the minimum acceptable requirements for modular rubber cushions for use at approved speed hump locations.

GENERAL REQUIREMENTS:
1. Pre-formed components manufactured from rubber
   All pre-formed rubber components shall be compatible and interchangeable with existing speed hump material in use by the City.
   - 1.1. Each component unit shall be 3" high
   - 1.2. The side gradient shall be between 1:4 and 1:8
   - 1.3. The ramp gradient shall be between 1:8 and 1:10
   - 1.4. The transition from the street shall not exceed ½ inch
   - 1.5. The cushion length shall be a minimum 78 inches
   - 1.6. The cushion width shall be 74 to 75 inches
   - 1.7. The cushions shall be black in color
   - 1.8. The markings shall be white in color, triangular in shape, and integral to the pre-formed rubber components
     - 1.8.1. Type A markings (not to scale)



     - 1.8.2. Type B markings (not to scale)



1.9. Cushion components including but not limited to the rubber cushions, hardware, angle iron, etc., shall be interchangeable with existing material currently in use on City of San Antonio streets.

1.10. Shore hardness shall be a minimum of 65. The manufacturer shall provide test data from an independent test lab confirming the product meets the minimum criteria with the bid submittal. Test data shall be provided for each shipment. An outline of the testing procedures shall be provided for review and approval with the bid submittal.

1.11. Tensile strength shall be a minimum of 500 psi. The manufacturer shall provide test data from an independent test lab confirming the product meets the minimum criteria with the bid submittal. Test data shall be provided for each shipment. An outline of the testing procedures shall be provided for review and approval with the bid submittal.

1.12. Deformation rate under compression shall be zero with 100% recovery.

1.13. The riding surface shall be smooth in texture for the duration of the warranty period, at a minimum, as determined by the City Inspector.

2. Rigid reinforcement perpendicular to the flow of traffic

3. Sufficient stainless/galvanized steel mounting bolts or hex head screws/fasteners per cushion
   3.1. Minimum 10mm x 100mm or equivalent

4. Plastic or nylon screw anchors
   4.1. Minimum 14mm x 75mm or equivalent

5. Metal washers
   5.1. Minimum 10mm or equivalent

6. Quick-set, two component epoxy/adhesive. Contractor shall submit manufacturer's material specifications for review and approval with the bid submittal.

7. Heavy duty rubber/nylon caps/plugs

WARRANTY:

The speed cushion and all associated equipment shall be fully warranted against defects and/or failure in design, material and workmanship in accordance with the manufacturer's standard warranty, or for a minimum of two (2) years from the date of final acceptance, whichever is greater. All material supplied shall have no less than one hundred percent (100%) of the manufacturer's standard warranty remaining on the date that the material invoices are submitted for payment. Any material with less than 100 percent (100%) of its warranty remaining will not be accepted by the City.

ITEM 801

TREE AND LANDSCAPE PROTECTION

This item shall govern the placing of protection for trees and other landscape plant material or natural areas to be protected during construction. No site preparation work shall begin in areas where tree preservation and treatment measures have not been completed and approved. *Where removal of trees is indicated on the drawings, they shall be marked as directed by the engineer or designated representatives.* This item shall also govern the excavation, filling, *trenching and boring* around trees described on the plans, and for furnishing all materials, water, labor, tools, equipment and supplies required as specified by this item or as indicated on the plans.

Reference Standards: City of San Antonio Tree Preservation ordinance # 85262

MATERIALS:

LEVEL I FENCE PROTECTION (Detail 1.1.2):

Fabric: Fabric (4 foot height or 1.2 m) shall consist of orange plastic fencing as shown on the plans and shall be woven with 2-inch (50 mm) mesh openings such that in a vertical dimension of 23 inches (584 mm) along the diagonals of the openings there shall be at least seven meshes.

1. Installation Posts: Installation posts shall be a minimum of *72* inches (1.5 m) long and steel "T" shaped with a minimum weight of 1.3 pounds per linear foot (6.3 kg per meter).
2. Tie Wire: Wire for attaching the fabric to the t-posts shall be not less than No. 12 gauge galvanized wire. Sufficient fastening material shall be furnished to provide for the securing of the fabric to the "T" line posts.
3. Used Materials: Previously-used materials, meeting the above requirements and when approved by the Engineer, may be used.

LEVEL IIA FENCE PROTECTION (Detail 1.1.3):

Materials same as Level I -OR-

LEVEL IIB FENCE PROTECTION (Detail 1.1.4):

1. Sleeve: 2x4 lumber to a height of 4 feet above the root crown.
2. 2x4 shall be utilized as called for on plan.
3. Tie Wire: Wire for securing the 2x4s shall not be less than No. 12 gauge.

OTHER MATERIALS:

1. Tree Dressing - Asphaltic Tree Wound Paint

CONSTRUCTION METHODS:

LEVEL I FENCE PROTECTION:

All trees and shrubs in the proximity of the construction site shall be protected prior to beginning any development activity.

Protective fencing shall be erected outside the dripline at locations shown in the plans or as directed by the Inspector and/or City Arborist or in accordance with the details shown on the plans at the drip line of trees (Root Protection Zone, RPZ) and/or landscape plant material including natural areas. Fencing shall be maintained and repaired by the contractor during site construction.

Protective fence locations in close proximity to street intersections or drives shall adhere to the City of San Antonio's site distance criteria.

The protective fencing shall be erected before site work commences and shall remain in place during the entire construction phase. Access to fenced areas will be permitted only with the approval of the engineer.

The installation posts will be placed every 6 feet (2 m) around the drip line or RPZ and embedded to 18 inches (457 mm) deep. Fabric attachment shall be attached to the installation posts by the use of sufficient wire ties to securely fasten the fabric to the "T" posts as to hold the fabric in a stable and upright position.

1. Do not clear, fill or grade in the RPZ of any tree.

2. Do not store, stockpile or dump any job material, soil or rubbish under the spread of the tree branches.

3. Do not park or store any equipment or supplies under the spread of the tree branches.

4. Do not set up any construction operations under the spread of the tree branches. (E.g. pipe cutting and threading, mortar mixing, painting or lumber cutting)

5. Do not nail or attach temporary signs, meters, switches, wires, bracing or any other item to the trees.

6. Do not permit runoff from waste materials including solvents, concrete washouts, asphalt tack coats (MC-30 oil), etc. to enter the RPZ. Barriers are to be provided to prevent such runoff substances from entering the RPZ whenever possible, including in an area where rain or surface water could carry such materials to the root system of the tree.

The contractor shall avoid cutting roots larger than one inch in diameter when excavation occurs near existing trees. Excavation in the vicinity of trees shall proceed with caution. The contractor shall contact the city inspector.

Remove all trees, shrubs or bushes to be cleared from protected root zone areas as directed by engineer by hand.

Trees damaged or lost due to contractor's negligence during construction shall be mitigated at the contractor's expense and to the engineer's satisfaction.

Any tree removal shall be approved by the city arborist prior to its removal.

Cover exposed roots at the end of each day with soil, mulch or wet burlap.

In critical root zone areas that cannot be protected during construction and where heavy traffic is anticipated, cover those areas with (8) inches of organic mulch to minimize soil compaction. This (8) inch depth of mulch shall be maintained throughout construction.

Water all trees, most heavily impacted by construction activities, deeply once a week during periods of hot dry weather. Spray tree crowns with water periodically to reduce dust accumulation on the leaves.

When installing concrete adjacent to the root zone of a tree, use a plastic vapor barrier behind the concrete to prohibit leaching of lime into the soil. See related specifications.

When an excavation or embankment is placed within the dripline of any tree greater than (8) inches in diameter, a Tree well shall be constructed to protect the tree as indicated, when the cut or fill exceeds (8) inches. See related specifications.

Where paving or filling is necessary within the dripline of any tree (8) inches or greater, a permeable pavement and aeration system must be installed as indicated. See related specifications.

CONSTRUCTION METHODS:

LEVEL II A FENCE PROTECTION:

Protective fencing shall be erected within the RPZ at locations shown in the plans or as directed by the Inspector and/or City Arborist or in accordance with the details shown on the plans at the drip line of trees (Root Protection Zone, RPZ) and/or landscape plant material including natural areas. Fencing shall be maintained and repaired by the contractor during site construction.

Fabric: Fabric (4 foot height or 1.2 m) shall consist of orange plastic fencing as shown on the plans and shall be woven with 2-inch (50 mm) mesh openings such that in a vertical dimension of 23 inches (584 mm) along the diagonals of the openings there shall be at least seven meshes.

1. Installation Posts: Installation posts shall be a minimum of *72* inches (1.5 m) long and steel "T" shaped with a minimum weight of 1.3 pounds per linear foot (6.3 kg per meter).
2. Tie Wire: Wire for attaching the fabric to the t-posts shall be not less than No. 12 gauge galvanized wire. Sufficient fastening material shall be furnished to provide for the securing of the fabric to the "T" line posts.
3. Used Materials: Previously-used materials, meeting the above requirements and when approved by the Engineer, may be used.

LEVEL II B FENCE PROTECTION:

Trunk protection shall be erected at locations shown in the plans or as directed by the Inspector and/or City Arborist shall be maintained and repaired by the contractor during site construction.

1. Installation Sleeve: 2x4 lumber to a height of 4 feet above the root crown.
2. Tie Wire for securing the 2x4s shall not be less than No. 12 gauge

MEASUREMENT:

Protective fencing will be measured by the linear foot of accepted work, complete in place for the duration of construction activity.

PAYMENT:

Tree and Landscape Protective Fencing will be paid for at the unit price bid per linear foot (meter), which price shall be full compensation for furnishing and placing all materials, manipulation, labor, tools, equipment and incidentals necessary to complete the work.

BID ITEMS

Item 801.1: Level I Protective Fencing - per linear foot (meter)

Item 801.2: Level IIA Protective Fencing - per linear foot (meter)

Item 801.3: Level IIB Protective Fencing - per linear foot (meter)

ITEM 802

TREE PRUNING, SOIL AMENDING AND FERTILIZATION

PART 1 GENERAL

1.01 DESCRIPTION:

The purpose of this specification is to describe a procedure for maintaining preserved trees before, during and after construction and for furnishing all materials, water, labor, tools, equipments and supplies required as specified by this item or as indicated on the plans.

1.02 REFERENCE STANDARDS:

The contractor shall comply with the applicable provisions and recommendations of the publication listed below and these shall be utilized as reference standards, and form a part of this specification to the extent indicated by reference:

American National Standard Institute - ANSI A300-2002

PART 2 PRODUCTS

2.01 MATERIALS:

1. Tree pruning paint: Any latex, oil or asphalt base wound dressing.
2. Soil amendment: Organic soil amendment with nitrogen content 10% or less.
3. Commercial fertilizer: Urea form based liquid suspension, which is soil injected. Salt Index is less than 3.5 (True Green, Boost) and a longevity period of up to 2 years.
4. Mulch: Shredded wood residue with size of pieces not more than 6 inches in length.
5. Water-By truck for trees.

PART 3 EXECUTION

3.01 CARE OF TREES PRIOR TO AND DURING CONSTRUCTION:

1. Prior to erecting tree enclosure and the start of any phase of construction, arborist will provide mycorrhizal inoculation and deep root fertilization to the tree roots, using 3 lbs. of actual nitrogen per 1000 square feet of root area in a slow release soil injection method. Then a certified arborist will perform pruning before construction to remove dead wood, improve the health of the trees to better tolerate the stresses endured during construction activities. In addition all pruning shall adhere to the standard practices in the American National Standard Institute ANS/A300-1995, and to improve the level of safety

   a. Crown Cleaning – shall consist of the removal of dead, dying, and diseased wood one inch in diameter and greater. Many of the existing trees are above and within the proposed walkway. This dead wood shall be removed to improve safety and liability issues.

2. No site preparation work shall begin in areas where tree preservation and treatment measures have not been completed and approved.

   a. Crown Raising – shall consist of removing lower limbs to provide a clearance specification of 8 feet over walkways and 13 feet over the

main road for vehicle clearance. Branches may be tied back instead of removed, in order to alleviate conflict. These specifications should protect the existing trees. Tree contractor is to be briefed by Project Engineer/Arborist prior to project commencement. All pruning and removals shall be overseen by a Certified Arborist. The awarded company shall have a Certified Arborist on staff to be able to bid on this Project.

3. No pruning or removal of limbs shall be allowed to provide clearance for work unless approved by the engineer.

4. Removal of limbs which are 6 inches in diameter or greater is prohibited without consent of the City Arborist. Occasional branches, up to 1/4 inch in diameter, which are dead, dying, diseased may remain when it is not practical to remove it.

5. Oak wounds must be painted with wound paint within 30 minutes to prevent infection of the Oak Wilt fungal organism.

6. Soil amendments will be applied within the drip line (RPZ).

7. Soil fertilization will be completed by a soil injection method, which will occur at a spacing of 3 feet on center around the tree within the drip line (Root Protection Zone, RPZ) only for those trees specified.

8. Excavate within drip line of trees only where required. Where excavating for new construction is required within drip line of trees, hand excavate to minimize damage to root systems. Use narrow spading forks and comb soil to expose roots. Relocate roots back into backfill areas wherever possible. If large main lateral roots are encountered, expose beyond excavation limits as required to bend and relocate without breaking. If root relocation is not practical, then contact Client representative for approval to cut roots 1/2" or greater. If approved, clean cut roots using handsaw or chainsaw approximately 3 inches back from new construction. Where existing grade is above new finish grade, carefully excavate within the drip line to the new finish grade. Carefully hand excavate an additional 8 inch below the finish grade. Use narrow line spading forks to comb the soil to expose the roots and prune the exposed root structure as recommended by the Arborist. After pruning and treatment is complete, backfill to within the finish grade with 8" of approved landscape fill material. Temporarily support and protect roots against damage until permanently relocated and do not allow exposure of root to air to occur beyond 12 hours. Cover with damp soil, peat moss, 8”bark or gunny sacks in order to keep moist so as not to dry out and permanently cover roots as soon as possible. Where it has been determined that trenching for utilities can seriously impact the roots of a desirable tree, then bore or tunnel under tree to minimize root impact.

9. The Contractor shall be responsible for coordinating all construction activities that may impact trees with clients representative and the Arborist, who will do the necessary pruning and deep root fertilization deemed necessary by the Arborist.

3.02 POST CONSTRUCTION CARE OF TREES:

1. The Contractor shall water when it is necessary to supplement natural rainfalls required preventing excess drying of the tree root area.

2. The Contractor is responsible for a fall and spring fertilization of the following year using a deep root fertilization method on trees deemed necessary by the Client.

3. The Contractor shall perform post construction care under the supervision of the arborist.

3.03 QUALITY ASSURANCE:

All tree pruning and fertilization work shall be performed by a single firm specializing in tree pruning work, with a minimum of 3 years experience in the acceptable performance of similar work to that specified. Pruning is to be performed by personnel who, by training and on the job experience, are familiar with the techniques and hazards of this work. The firm performing the work shall have the following minimum qualifications and certifications.

NAA - National Arborist Association Certified or
ISA - International Society of Arborists Certification
Be licensed for application and use of pesticides
Meet state requirements for insurance
Must be bonded

The Arborist shall:

a. Establish lines of communication for all work which may potentially impact trees, under story, or areas that are to be protected from construction activity.
b. Locate and properly identify or mark in the field trees, under story and areas that are to be protected from construction activity and are the responsibility of the Prime Contractor to protect.
c. Identify limits and extent of protective fencing around these trees, under story vegetation and other areas.

LEVEL II:

3.04 CARE OF TREES PRIOR TO AND DURING CONSTRUCTION:

1. Prior to erecting tree enclosure and the start of any phase of construction; provide mycorrhizal inoculation and deep root fertilization to the tree roots, using 3 lbs. of actual nitrogen per 1000 square feet of root area. Then pruning will be performed by a certified arborist before construction to remove dead wood, improve the health of the trees to better tolerate the stresses endured during construction activities. In addition all pruning shall adhere to the standard practices in the American National Standard Institute ANS/A300-1995, and to improve the level of safety

2. No site preparation work shall begin in areas where tree preservation and treatment measures have not been completed and approved.

3. No pruning or removal of limbs shall be allowed to provide clearance for work unless approved by the engineer.

4. Removal of limbs which are 6 inches in diameter or greater is prohibited without consent of the City Arborist. Occasional branches, up to 1/4 inch in diameter, which are dead, dying, diseased may remain when it is not practical to remove it.

5. Oak wounds must be painted with wound paint within 30 minutes to prevent infection of the Oak Wilt fungal organism.

6. Excavate within drip line of trees only where required. Where excavating for new construction is required within drip line of trees, hand excavate to minimize damage to root systems. Use narrow spading forks and comb soil to expose roots. Relocate roots back into backfill areas wherever possible. If large main lateral roots are encountered, expose beyond excavation limits as required to bend and relocate without breaking. If root relocation is not practical, then contact Client representative for approval to cut roots 1/2" or greater. If approved, clean cut roots using a handsaw or chainsaw approximately 3 inches back from new construction. Where existing grade is above new finish grade, carefully excavate within the drip line to the new finish grade. Carefully hand excavate an additional 8 inch below the finish grade. Use narrow line spading forks to comb the soil to expose the roots and prune the exposed root structure as recommended by the Arborist. After pruning and treatment is complete, backfill to within the finish grade with 8" of approved landscape fill material. Temporarily support and protect roots against damage until permanently relocated and do not allow exposure of root to air to occur beyond 12 hours. Cover with damp soil, peat moss, bark or gunny sacks in order to keep moist so as not to dry out and permanently cover roots as soon as possible. Where it has been determined that trenching for utilities can seriously impact the roots of a desirable tree, then bore or tunnel under tree to minimize root impact.
7. Water deeply trees that are substantially trimmed or within drip line of excavation work for the duration of this contract.

8. Water deeply trees that show signs of stress and are located in areas where the groundwater table has been lowered due to construction activities.

9. The Contractor shall be responsible for coordinating all construction activities that may impact trees with clients representative and the Arborist, who will do the necessary pruning and deep root fertilization deemed necessary by the Architect.

3.05 POST CONSTRUCTION CARE OF TREES:

1. The Contractor shall water when it is necessary to supplement natural rainfalls required preventing excess drying of the tree root area. Barring natural rainfall, the Contractor should apply 1” per week over entire root protection zone.

2. The Arborist shall monitor and authorize for removal the trees which show symptoms of stress, which might be indicated by branch die back chlorosis or fringe browning of the leaves. This would indicate that the crown is not in equilibrium with roots and additional pruning would be necessary. Subsequent pruning should remove only as much green wood as deemed necessary to reestablish equilibrium. If trees die during construction due to contractor negligence up to a one year post construction period, the Contractor will be required to replace trees at his or her own expense as called for in Paragraph 3.6.

3. The Contractor shall perform post construction care under the supervision of an arborist.

3.06 QUALITY ASSURANCE:

Same as Level I

3.07 MEASUREMENT:

"Maintenance Pruning" Soil Amendment, and Fertilization" , ½" or larger of dead, diseased wood.

"Maintenance Pruning" 1" or larger of dead, diseased wood.

3.08 PAYMENT:

Work performed and materials furnished as prescribed by this item and measured as provided under "Measurement" will be paid for as follows:

"Level I Pruning, Soil Amendment, and Fertilization" Will be paid for at the unit price bid per each tree receiving "Level I Pruning, Soil Amendment, and Fertilization" of the size
called for , which price shall be full compensation for furnishing all materials; preparation, hauling, handling charges, placement, labor, tools, and incidentals necessary to complete the work.

Level II Pruning will be paid for at the contract lump sum price bid, which price shall be full compensation for work herein specified, including the furnishing of all materials, equipment, tools, labor, and incidentals necessary to complete the work.

3.09 BID ITEM:

Item 802.1 - Level I Pruning, Soil Amendment, and Fertilization - per each tree

Item 802.2 - Level II Pruning - per Lump Sum

ITEM 805

TREES, PLANTS AND GROUND COVERS

PART 1 GENERAL

1.01 The requirements of Division 0, “Bidding Requirements, Contract Forms, And Conditions of the Contract”, and Division 1, “General Requirements”, shall apply to all work required by this Section.

1.02 **SECTION INCLUDES:**
The Contractor shall provide trees, plants and ground covers as shown and specified. The work includes:

A. Soil preparation.

B. Large specimen trees, small flowering trees, plants and ground covers.

C. Planting mixes.

D. Mulch and planting accessories.

E. Existing tree care.

F. Maintenance.

G. Backfill for large and small trees.

1.03 **RELATED SECTIONS:**

Item 800 – Tree Survey
Item 801 – Tree and Landscape Protection
Item 802 – Tree Pruning, Soil Amending & Fertilization
Item 803 - Tree Transplanting
Item 804 – Sodding & Seeding

1.04 **QUALITY ASSURANCE:**

A. Comply with Division 2 "Site Work".

B. Plant names indicated comply with "Standardized Plant Names" as adopted by the latest edition of the American Joint Committee of Horticultural Nomenclature. Names of varieties not listed conform generally with names accepted by the nursery trade. The Contractor shall provide stock true to botanical name and legibly tagged.

C. The Contractor shall comply with sizing and grading standards of the latest edition of "American Standard for Nursery Stock". A plant shall be dimensioned as it stands in its natural position.

D. All plants shall be nursery grown under climatic conditions similar to those in the locality of the project for a minimum of two (2) years.

E. Stock furnished shall be at least the minimum size indicated. Larger stock is acceptable, at no additional cost to the Owner, and providing that the larger

plants will not be cut back to sizes indicated. Provide plants indicated by two measurements so that only a maximum of 25% are of the minimum size indicated and 75% are of the maximum size indicated.

F. The Contractor shall provide "specimen" plants with a special height, shape, or character of growth. Tag specimen trees or shrubs at the source of supply. The Engineer will inspect specimen selections at the source of supply for suitability and adaptability to selected location. When specimen plants cannot be purchased locally, provide sufficient photographs of the proposed specimen plants for approval.

G. Plants may be inspected and approved at the place of growth, for compliance with specification requirements for quality, size and variety.

Such approval shall not impair the right of inspection and rejection upon delivery at the site or during the progress of the work.

1.05 **SUBMITTALS:**

A. The Contractor shall submit the following materials certification: Topsoil source and pH value.

B. The Contractor shall provide plant material record drawings:

1. Legibly mark drawings to record actual construction.

2. Indicate horizontal and vertical locations, referenced to permanent surface improvements.

3. Identify field changes of dimension and detail and changes made by Change Order.

1.06 **DELIVERY, STORAGE AND HANDLING:**

A. The Contractor shall take all precautions customary in good trade practice in preparing plants for moving. Workmanship that fails to meet the highest standards will be rejected. Dig, pack, transport and handle plants with care to ensure protection against injury. Inspection certificates required by law shall accompany each shipment invoice or order to stock and on arrival, the certificate shall be filed with the Engineer. Protect all plants from drying out. If plants cannot be planted immediately upon delivery, properly protect them with soil, wet peat moss, or in a manner acceptable to the Landscape Architect. Water heeled-in plantings daily. No plant shall be bound with rope or wire in a manner that could damage or break the branches.

B. The Contractor shall cover plants transported on open vehicles with a protective covering to prevent wind burn.

C. The Contractor shall provide dry, loose friable topsoil for planting bed mixes. Frozen or muddy topsoil is not acceptable.

1.07 **PROJECT CONDITIONS:**

A. Work notification: The Contractor shall notify Engineer at least seven (7) working days prior to installation of plant material.

B. The Contractor shall protect existing utilities, paving and other facilities from damage caused by landscaping operations.

C. A complete list of plants, including a schedule of sizes, quantities, and other requirements is shown on the plans. In the event that quantity discrepancies or material omissions occur in the plant materials list, the planting plans shall govern. It is the Contractor's responsibility to verify all quantities.

D. The irrigation system will be installed prior to planting. The Contractor shall locate, protect and maintain the irrigation system during planting operations. Repair irrigation system components damaged during planting operations at the Contractor's expense.

1.08 **WARRANTY:**

A. The Contractor shall warrant plant material to remain alive and be in healthy, vigorous condition for a period of one (1) year after completion and acceptance of entire project for operation and maintenance.

Inspection of plants will be made by the Landscape Architect at completion of planting.

B. The Contractor shall replace, in accordance with the plans and specifications, all plants that are dead or, as determined by the Landscape Architect, are in an unhealthy or unsightly condition, and have lost their natural shape due to dead branches, or other causes due to the Contractor's negligence. Until issuance of the Certificate of Substantial Completion the Contractor shall replace all damage or loss to trees, plants or ground covers caused by fires, floods, freezing rains, lightning storms, or winds over 75 mph, winter kill caused by extreme cold and severe winter conditions, acts of vandalism or negligence. The cost of such replacement(s) is at the Contractor's expense. The Contractor shall warrant all replacement plants for one (1) year after completion and acceptance of the entire project for operation and maintenance.

C. Warranty shall not include damage or loss to trees, plants or ground covers caused by fires, floods, freezing rains, lightning storms, or winds over 75 mph, winter kill caused by extreme cold and severe winter conditions not typical of planting area; acts of vandalism or negligence on the part of the Owner.

D. The Contractor shall remove and immediately replace all plants, as determined by the Landscape Architect, to be unsatisfactory during the initial planting installation.

1.09 M**EASUREMENT AND PAYMENT:**

Measurement and payment will be as outlined in Section "Measurement and Payment" of Part 1, General Provisions.

PART 2 PRODUCTS

2.01 **MATERIALS:**

A. Plants: The Contractor shall provide plants typical of their species or variety; with normal, densely-developed branches and vigorous, fibrous root systems. Provide only sound, healthy, vigorous plants free from defects, disfiguring knots, sun scald injuries, frost cracks, abrasions of the bark, plant diseases, insect

eggs, borers, and all forms of infestation. All plants shall have a fully developed form without voids and open spaces. Plants held in storage will be rejected if they show signs of growth during storage.

1. The Contractor shall dig balled and burlapped plants with firm, natural balls of earth of sufficient diameter and depth to encompass the fibrous and feeding root system necessary for full recovery of the plant. Provide ball sizes complying with the latest edition of the "American Standard for Nursery Stock". Cracked or mushroomed balls are not acceptable. All trees shall be nursery grown.

2. Container-grown stock: Plants shall be grown in a container for sufficient length of time for the root system to have developed to hold its soil together, firm and whole.

    a. No plants shall be loose in the container.

    b. Container stock shall not be pot bound.

3. The Contractor shall provide tree species that mature at heights over 25'-0" with a single main trunk unless multitrunks are specified. Trees that have the main trunk forming a "Y" shape are not acceptable.

4. Plants planted in rows shall be matched in form.

5. Plants larger than those specified in the plant list may be used when acceptable to the Landscape Architect.

    If the use of larger plants is acceptable, increase the spread of roots or root ball in proportion to the size of the plant.

6. The height of the trees, measured from the crown of the roots to the top of the top branch, shall not be less than the minimum size designated in the plant list.

7. Shrubs and small plants shall meet the requirements for spread and height indicated in the plant list.

    a. The measurements for height shall be taken from the ground level to the average height of the top of the plant and not the longest branch.

    b. Single stemmed or thin plants will not be accepted.

    c. Side branches shall be generous, well twigged, and the plant as a whole well-bushed to the ground.

    d. Plants shall be in a moist, vigorous condition, free from dead wood, bruises, or other root or branch injuries.

2.02 **ACCESSORIES:**

A. A minimum of six (6) inches of topsoil, after settling occurs, shall be furnished in all shrub beds and raised planters shall be filled with good friable topsoil as

called for on the plans. Topsoil furnished shall be natural, fertile, friable soil, possessing characteristics of representative productive soils in the vicinity. It shall be obtained from naturally well drained areas. Topsoil shall be without admixture of sub-soil and free from nut grass (Cyperus rotundus) and other objectionable grass, weeds and toxic substances. Topsoil shall be approved by the Landscape Architect.

B. Commercial fertilizer shall be Carefree, Vertagreen, or approved equal, organic fertilizer containing the following minimum percentages of available plant food by weight: 15-5-5 or 16-8-8 Nitrogen-Phosphorus. Mixed Nitrogen, not less than 50% from organic source. Inorganic chemical nitrogen shall not be derived from the sodium form of nitrate or from the ammonia nitrate. It shall be delivered to the site in unopened containers, each bearing the manufacturer's guaranteed analysis. Any fertilizer which becomes caked or otherwise damaged, making it unsuitable for use, will not be accepted.

C. Soil conditioner shall be two (2") inches of compost or approved equivalent as provided by Garden-Ville/Horticultural Products, Route 3, Box 210 TA, San Antonio, Texas 78218, (210) 651-6115 or Landscape Architect approved equal. Compost is to be worked into the first four (4") inches of topsoil.

D. Sand shall be sharp, clean sand.

E Mulch shall be four (4) inches of native bark for surface dressing of shrub beds as provided by Garden-Ville/Horticultural Products, Route 3, Box 210 TA, San Antonio, Texas 78218, (210) 651-6115 or Landscape Architect approved equal or that shall be furnished from the onsite stockpile.

F. Water shall be free of substances harmful to plant growth. Hoses or other methods of transportation furnished by Contractor.

G. Backfill shall be provided for each new large specimen tree and small tree as called out on the planting plan and shall be landscape Garden Mix as provided by Curlex Erosion Control Matting or equivalent as provided by Garden-Ville/Horticultural Products, Route 3, box 210 TA, San Antonio, Texas 78218, (210) 651-6115 or Landscape Architect approved equal.

H. Edging shall be Shawtown Root Barrier Panels by NDS or equivalent to be provided on
all sides of Bamboo Planting. For more information call (800) 726-1994.

PART 3 EXECUTION

3.01 INSPECTION:

A. The Contractor shall examine proposed planting areas and conditions of installation. The Contractor shall not start planting work until unsatisfactory conditions are corrected.

B. Any ground cover or shrub plantings that are having existing infestation of nut grass, Bermuda grass, Johnson grass or other objectionable grasses or weeds shall be first treated with "round up" as manufactured by Monsanto, or Landscape Architect approved equal. Treatment shall be in strict accordance to manufacturer's specifications and shall be accomplished to allow sufficient time

for a complete kill prior to starting any soil preparation and planting in treated planting areas.

C. Planting shall be performed only by experienced workmen familiar with planting procedures under the supervision of a qualified supervisor.

D. Locate plants as indicated or as approved in the field after staking by the Contractor. If obstructions are encountered that are not shown on the plans, do not proceed with planting operations until alternate plant locations have been selected.

E. The Contractor shall excavate circular plant pits with vertical sides, except for plants specifically indicated to be planted in beds. Provide shrub pits at least 12" greater than the diameter of the root system and 24" greater for trees. Depth of pit shall accommodate the root system. Scarify the bottom of the pit to a depth of 4". Remove excavated materials from the site.

F. Soil Preparation: Soil used in planting shall be topsoil as hereinbefore specified, or suitable existing soil either of which shall be thoroughly mixed with the following materials and in the proper proportions: 1 cu. yd. topsoil; 6 cu. ft. shredded pine bark; 1/4 cu. yd. sand; 3 lbs sulphur; 6 lbs. fertilizer, as specified.

3.02 **INSTALLATION:**

A. The Contractor shall set plant material in the planting pit to proper grade and alignment. Set plants upright, plumb, and faced to give the best appearance or relationship to each other or adjacent structure. No filling will be permitted around trunks or stems. Backfill the pit with planting mixture. Do not use frozen or muddy mixtures for backfilling. Form a ring of soil around the edge of each planting pit to retain water.

B. After balled and burlapped plants are set, muddle planting soil mixture around bases of balls and fill all voids.

Remove all burlap, ropes and wires from the tops of balls.

C. The planting beds for ground cover areas, outline of which are shown on the plans, shall be prepared in the following manner. Apply 6 lbs. of hereinbefore specified fertilizer per 100 sq. ft. area, 2" sand, 2" shredded native bark and then thoroughly till the area to a depth of 8" using a roto tiller or similar equipment that will thoroughly pulverize the soil and evenly mix in the fertilizer. Roots, stones, grade stakes or other objects 1" in maximum dimension or larger shall be removed from the beds and disposed of off the site.

The Contractor shall space ground cover plants in accordance with indicated dimensions. Adjust spacing as necessary to evenly fill planting bed with indicated quantity of plants. Plant to within 12" of the trunks of trees and shrubs within planting bed and to within 6" of edge of bed.

D. Mulching:

1. The Contractor shall mulch existing trees, new trees and shrub planting pits and shrub beds with required mulching material three (3) inches deep immediately after planting. Thoroughly water mulched areas. After watering, rake mulch to provide a uniform finished surface.

2. The Contractor shall mulch ground cover beds with required pine bark material 2" deep immediately after planting.

E. Pruning:

The Contractor shall prune branches of deciduous stock, after planting, to balance the loss of roots and preserve the natural character appropriate to the particular plant requirements. In general, remove 1/4 to 1/3 of the leaf bearing buds, proportion in all cases shall be acceptable to the Landscape Architect. Remove or cut back broken, damaged, and unsymmetrical growth of new wood.

F. Care of Existing Trees:

Item 801 – Tree & Landscape Protection
Item 802 – Tree Pruning, Soil Amending & Fertilization

3.03 **MAINTENANCE:**

A. The Contractor shall maintain plantings until completion and acceptance of the entire project.

B. Maintenance shall include pruning, cultivating, weeding, watering and application of appropriate insecticides and fungicides necessary to maintain plants free of insects and disease.

1. The Contractor shall re-set settled plants to proper grade and position. Restore planting saucer and adjacent material and remove dead material.

2. The Contractor shall tighten and repair guy wires and stakes as required.

3. The Contractor shall correct defective work as soon as possible after deficiencies become apparent and weather and season permit.

4. The Contractor shall water trees, plants and ground cover beds within the first twenty four (24) hours of initial planting, and not less than twice per week until final acceptance for operation and maintenance.

3.04 **ACCEPTANCE:**

A. Site visit to determine acceptance of planted areas will be made by the Landscape Architect, upon the Contractor's request. **Provide notification at least ten (10) working days before requested inspection date.**

Planted areas will be accepted provided all requirements, including maintenance, have been complied with and plant materials are alive and in a healthy, vigorous condition.

B. Upon acceptance, the Owner will assume plant maintenance.

3.05 **CLEANING:**

A. The Contractor shall perform cleaning during installation of the work and upon completion of the work. Remove from site all excess materials, soil, debris and equipment. Repair damage resulting from planting operations.

END OF SECTION

ITEM NO. 826 A
Valve Box Locate and Adjustments

826A.1 Description:
This item shall consist of locating covered valve boxes, cutting asphalt, replacing asphalt, and adjusting existing valve boxes in accordance with these applications and as directed by the Engineer.

826A.2 Materials:
The materials for valve boxes shall conform to the specifications contained within the latest revision of SAWS Material Specifications, Item 10-20 "Valve Boxes".

1. Construction Methods: Locate valve box using maps and metal detectors. Cut and replace asphalt as necessary. The valve box shall be placed in such a manner to prevent shock or stress from being transmitted to the valve. It shall be centered and plumb over the operating nut of the valve with the box cover flush with the surface of the finished pavement or at such other level as may be directed by the Engineer.

   Valve boxes located in streets or other area subject to vehicular traffic shall be provided with concrete collars as shown in the Standard Drawings DD-828 Series. Collars around such valve boxes shall be formed and finished off neatly and to a workmanlike manner. Valve box shall be located so that the valve operating nut is readily accessible for operation through the opening to the valve box. The valve box shall be set flush with the surface of the finished pavement or at such other elevations as may be specified. Pits shall be constructed to permit trainer valve repairs and to afford protection to the valve and pipe from impact where they pass through the pit walls.

2. Existing Valve Box: Existing covered valve boxes shall be defined as those boxes which are located within the right-of-way of the specified area of construction operations which are covered by asphalt. These boxes shall be adjusted to match proposed finished grades.

   Valve boxes installed as part of a new valve and mainline construction project are considered "new valves". Adjustments to "new valves" are incidental to the installation of the valve and are paid for as part of items 828, 830 or 832 of these Specifications. Separate pay shall not be given to adjust "new valves" to finished grade.

826A.3 Measurement:
Locating and adjusting of valve boxes will be measured by the unit of valve boxes located and adjusted to the finished grades.

826A.4 Payment:
Payment for "valve box locate and adjustment" shall be made at the contract unit price.

ITEM NO. 851-a
LOCATING AND ADJUSTING EXISTING MANHOLES

851.a. 1. DESCRIPTION: This item shall consist of the locating manholes, cutting asphalt, replacing asphalt, and adjustment of all existing manholes to include the replacing of existing manhole covers and rings regardless of type shown on the plans and in conformity with the provisions of these specifications.

851.a. 2. CONSTRUCTION: Locate manholes using maps and metal detectors. Cut and replace asphalt as necessary. Manholes shall be lowered below subgrade placing base materials and openings shall be protected by hatch covers. Existing manhole rings and covers which are determined by the SAWS inspector to be in an unacceptable condition, will be removed and replaced with new rings and cover. Contractor shall take all necessary measures to prevent damage to existing or new rings, cover, or cone from equipment and materials used in or taken through the work area. If no existing or new manhole cover, ring, or cone is damaged by the Contractor, it shall be replaces (as directed by SAWS inspector) by the Contractor at his expense. Manholes shall be adjusted after the base material has been laid and before placing of the surface course. Manholes that are going to be adjusted on an existing surface course not being replaced will be in accordance with City of San Antonio Utility Excavation Criteria Manual Standard Drawing No. 8.8. All manholes shall then be raised, or lowered a sufficient height so as to be level with the finished surface course. Adjustment in height will be made be addition or removal of "throat rings" above the manhole "cone" where feasible. A minimum of two and a maximum of six throat rings shall be used at each manhole. Material excavation from around the manholes shall be replaced with concrete in accordance with Standard Drawings, and select materials from the excavation (as shown on the plans or specified by the SAWS). All excess materials shall be disposed of by the Contractor at his own expense in an approved location.

851.a. 3. MEASUREMENT: Manholes located and completely adjusted, as prescribed above, will be measured by the unit of each manhole located and adjusted. The excavation and the amount of asphalt, concrete or reinforced concrete as necessary to fill the area excavated will not be measured for payment.

851.a. 4. PAYMENT: The work performed as prescribed by this item will be paid for at the contract unit price bid per manhole for "Locating and Adjusting Existing Manholes" which price shall be full compensation for all excavation, including saw cutting or surfaces as required, reinforced concrete and disposal of material excavated; for furnishing and placing all materials and for all labor, tools, equipment and incidentals necessary to complete the work.

ITEM NO. SP 100
Special Specification

DOOR HANGERS

DESCRIPTION: Contractor shall place Hangers with every business and resident within each segment of a project limit and at Inspector specified locations. The City of San Antonio is to provide template/verbage for the Door Hangers.

BID ITEM:
Item SP 100 – Door Hangers – lump sum

SPECIAL SPECIFICATION
Item SP500 Police Officer

Article SP500.1. Description. Provide uniformed off-duty police officers as directed where two-way traffic is to be maintained at major intersections.

Article SP500.2. Materials. N/A.

Article SP500.3. Construction. Coordinate with the inspector to determine the duration and locations where off-duty police officers will be deployed.

Article SP500.4. Measurement. Police officer services will be measured by the hour per officer.

Article SP500.5. Payment. The accepted quantity of man-hours shall be paid at the contract unit price for each hour.

Bid Item SP500 – Police Officer – Hour

SPECIAL SPECIFICATION
Item SP800 Project Signs

Article SP800.1. Description. Furnish, install, maintain, move and remove project information signs on each street whenever workmen, materials or equipment is present, or as directed. The project information signs will identify the construction as being a part of the 2014 SMP program of the City of San Antonio Public Works Street Department.

Article SP800.2. Materials. Furnish signs meeting the materials specifications of Item 531, the Barricade and Construction Standard details in the plans, and following the template of the layout, size, and legend to be provided by the City of San Antonio.

Article SP800.3. Construction. Erect all signs in conformance with the requirements of the TMUTCD and the Barricade and Construction Standard Details. It is the contractor's responsibility to see that all signs are properly installed and maintained at the job site. Erect project information signs at the locations directed by the Inspector, generally one sign facing each direction entering the project work area. Maintain the project sign so that no visual defect or graffiti is visible.

Article SP800.4. Measurement. Project signs will be measured by the number of project information signs that are deployed simultaneously on the various project sites.

Article SP800.5. Payment. The accepted quantity of signs shall be paid at the contract unit price for each sign, which shall be full compensation for furnishing all materials, labor, tools, equipment and supplies to construct the signs, mountings, installation at the various street sites, maintaining the signs, moving the signs from street to street, and removal of signs.

Bid Item SP800 – Project Signs – Each

ITEM NO. SP 2000
Special Specification

RAILROAD INSURANCE AND PERMIT

DESCRIPTION: Each Contractor is to include a $5,000 allowance for the SP RAILROAD INSURANCE AND PERMIT bid item. Contractor to secure all required railroad permits. All fees associated with such permits shall be included in this item.

BID ITEM:
Item SP 2000 – Railroad Insurance and Permit - lump sum

ITEM 315
Special Provision

FOG SEAL

For this project, Item 315 "Fog Seal", of the TxDOT Standard Specifications, is hereby amended as follows:

1) Delete in its entirety Article 315.5, Measurement.

2) Add Article 315.5 Measurement:

   This Item will be measured by the square yard (SY) of accepted emulsified asphalt used in the emulsified asphalt and water mixture.

3) When referenced in the Item 315, "Fog Seal" specification, Item 300, "Asphalts, Oils and Emulsions," of the TxDOT Standard Specifications is hereby amended with respect to the clauses cited below.

Article 300.2. Materials D. Emulsified Asphalt., is supplemented by the following:

D. Emulsified Asphalt. Emulsified asphalt must be homogeneous, not separate after thorough mixing, and meet the requirements for the specified type and grade in the Table 11A for TRMSS.

Table 11A

Hazardous Materials Identification System (HMIS) ratings:

HMIS	Rating
Health	1
Flammability	0
Reactivity	0
Protective Equipment	E

American Society for Testing and Materials (ASTM):

TEST METHOD	PROPERTY	REQUIREMENT
ASTM D 562	Viscosity, Kreb Unit (KU)	35 to 65
ASTM D 2939.07	Weight/Gallon	8.3 – 8.6
ASTM D 2939.08	Residue by Evaporation %	>33.0
ASTM244 (sec. 44-47)	Sieve Analysis	0.1 max
ASTM D 93	Flash Point (of residue)	>500
ASTM D 2939.05	Emulsion Uniformity	Pass
ASTM D 2939.14	Resistance to Heat	Pass
ASTM D 2939.15	Resistance to Water	Pass
ASTM D 2939.19	Wet Flow	Pass
Performance Criteria Testing*		
ASTM G 154	Accelerated Weathering Test **	Pass

Asphalt Cement Certificate of Compliance ***		
Certificate of compliance	Ground Whole Tire Rubber %	10 min
ASTM D 5	Penetration 77˚F, 100g, 5sec, dmm	15-55
ASTM D 36	Softening Point, ˚F	> 140
ASTM D 2042	Solubility % (3 set average)	>98.0

* TRMSS, ready to use.
** 1,000 hours. UVA-340 lamp, 0.77 W/m^2(V1.0 calibration), 8 hours UV light @ 50˚C, 5min. Spray, 3.55 hours condensation @ 50˚C.
*** Ground whole tire rubber modified asphalt cement.

International Slurry Surfacing Association (ISSA):

TEST METHOD	PROPERTY	REQUIREMENT
Performance Criteria Testing*		
ISSA TB-100	Wet track Abrasion, %****	<5.0%

* TRMSS, ready to use.
**** Calculated weight loss, percentage of original Volume, 1 hour soak.

SPECIAL PROVISION
Item 502 Concrete Sidewalks

For this project, Item 502 "Concrete Sidewalks" of the Standard Specifications is hereby amended with respect to the clauses cited below, and no other clauses or requirements on the Item are waived or changed hereby.

Article 502.4. Construction. G. Curb Ramps. This paragraph is void and replaced with the following:

Curb ramps must include a detectable warning surface and conform to the details shown on the plans. Confirm that abrupt changes in sidewalk elevation do not exceed ¼ inch, sidewalk cross slope does not exceed 2%, curb ramp grade does not exceed 8.3%, and flares adjacent to the ramp do not exceed 10% slope.

Construct curb ramps to include the following provisions (no separate pay):

- Construct detectable warning surface with truncated domes conforming to the City of San Antonio Wheelchair Ramp Standards sheet.
- Remove existing flatwork in accordance with the specification for Item 103, except measurement and payment.
- Construct new curb in accordance with the specification for Item 500, except measurement and payment.
- Construct concrete retaining wall (combination type), up to a maximum height of 6 inches, in accordance with the specification for Item 506, except measurement and payment.
- Adjust or relocate existing signs as directed.
- Contractor shall not leave the ramp unattended more than 1 day.
- Concrete work shall be maintained free from graffiti of any kind.
- Relocate irrigation systems in accordance with the specification for Item 552, except measurement and payment.
- Contractor shall deliver flyers at least 2 days in advance.
- Relocate landscape as directed.
- Avoid damage to the property of others. Contractor will be held liable for damage.

Article 502.5. Measurement. This article is void and replaced with the following:

Sidewalks will be measured by the square yard of surface area at the depth specified.

Curb ramps will be measured by each unit. "Each unit" will consist of one curb ramp of the type specified in the plans, removal of existing curb and flatwork, one landing and up to two wings, one detectable warning surface, new curb up to 24 feet in length, concrete retaining wall (combination type up to 6" in height), concrete surfaces up to a maximum of 13 square yards, sign adjustment or relocation, irrigation relocation, landscape relocation, and graffiti removal. Type I and Type III as per City of San Antonio Wheelchair Ramp Standards shall be measured as 2 EA of this item.

Article 502.6. Payment. This article is void and replaced with the following:

For Sidewalks – the work performed and materials furnished in accordance with this Item and measured as provided under "Measurement" will be paid for at the unit price bid per square yard for "Concrete Sidewalks – Conventionally Formed". This price is full compensation for surface preparation of base; materials; excavation, hauling and disposal of excavated material; drilling and doweling into existing concrete curb, sidewalk and pavement; repair of adjacent street or pavement structure damaged by these operations; and equipment, labor, tools and incidentals.

For Curb Ramps – the work performed and materials furnished in accordance with this Item and measured as provided under "Measurement" will be paid for a the unit price bid for "Curb Ramps". This price is full compensation for removal and disposal of existing concrete; surface preparation of base; materials, excavation, hauling and disposal of excavated material; drilling and doweling into existing concrete curb, sidewalk and pavement; repair of adjacent street or pavement structure damaged by these operations; and equipment, labor, tools and incidentals. Concrete surface for a curb ramp exceeding 13 SY will be paid as Concrete Sidewalk per square yard. New concrete curb installation for a curb ramp exceeding 24 feet in length will be paid as Curb Item 500.

Article 502.7. Bid Item. This article is void and replaced with the following:

Item 502.1 – Concrete Sidewalks – Conventionally Formed – per SY
Item 502.1A – Curb Ramps – EA

SPECIAL PROVISION
Item 503 Asphaltic Concrete, Portland Cement Concrete, and Gravel Driveways

For this project, Item 503 of the Standard Specifications is hereby amended with respect to the clauses cited below, and no other clauses or requirements on the Item are waived or changed hereby.

Delete in its entirety:
Section 503.6 Payment

Add:

Section 503.6 Payment:
The work performed as prescribed by this item will be paid for at the contract unit price bid per square yard for "Portland Cement Concrete Driveway", Portland Cement Concrete Driveway – Commercial", "Asphaltic Concrete Driveway", or "Gravel Driveway", which price shall be full compensation for preparing the subgrade, for furnishing and placing all materials, manipulations, labor, tools, equipment and incidentals necessary to complete the work.

SPECIAL PROVISION
Item 533 Cleaning and Removal of Pavement Markings and Markers

For this project, Item 533 "Cleaning and Removal of Pavement Markings and Markers" of the Standard Specifications is hereby amended with respect to the clauses cited below, and no other clauses or requirements of the Item are waived or changed hereby.

Article 533.3. Equipment. This paragraph is void and replaced with the following:

All equipment shall be of sufficient capacity to clean the roadway surface to the specified cleanliness. Equipment shall be power driven and in good operating condition.

Article 533.4. Construction. The first paragraph is void and replaced with the following:

Unless otherwise shown on the plans, acceptable methods of removal for asphaltic pavements include heat scarification, blasting, and mechanical methods. Blasting and mechanical are the only acceptable methods for removal or cleaning of a Portland cement concrete surfaced pavement.

If truck mounted equipment is unable to achieve acceptable results in accordance to this specification, hand operated, power driven equipment, or equivalent, shall be used.

Article A. is void and replaced with the following:

A. Removal of Existing Pavement Markings/Markers.

1. Existing markings or markers to be removed shall be removed to the extent that the pavement marking or marker and its adhesive compound is/are either completely removed or obliterated.
2. Widths, lengths, and shapes of the cleaned surface shall be of sufficient size to include the full area of the specified pavement marking to be placed or removed.
3. Eliminate existing pavement markings and markers on both concrete and asphaltic surfaces in such a manner that color and texture contrast of the pavement surface will be held to a minimum. Repair damaged areas on asphaltic surfaces in excess of 1/8" inch in depth. Repair consists of milling and overlaying new asphaltic material in accordance to the appropriate San Antonio Standard Specifications. Width and length of the repair will be as directed by the Engineer.

4. Blasting or mechanical method on Portland cement concrete surfaces shall be sufficient to remove old pavement markings and all other contaminants. Damage to the roadway surface shall be avoided.
5. Very small particles of tightly adhering existing markings may remain in place if complete removal of the small particles will result in pavement damage.

Article 533.5. Measurement and Payment. This paragraph is void and replaced with the following:

Removal of existing pavement markings shall be measured by the length of satisfactorily removed line, in feet, or as appropriate, the number of symbols or words which are satisfactorily removed. The accepted quantities shall be paid at the contract unit price, which shall be full compensation for furnishing all materials, labor, tools, equipment and supplies to remove the marking and any raised markers. Removal of raised pavement markers shall not be measured or paid for directly but shall be considered subsidiary to the various items. Cleaning of new or existing pavements prior to installing new pavement markings or markers, and removal of incorrectly installed pavement markings and/or markers, shall not be paid for directly, but shall be considered subsidiary to the new pavement marking or marker.

Article 533.6. Bid Item. This paragraph is void and replaced with the following:

Bid Items:
533-A – Eliminate Existing Pavement Markings and Raised Markers (4”) – LF
533-B – Eliminate Existing Pavement Markings and Raised Markers (8”) – LF
533-C – Eliminate Existing Pavement Markings and Raised Markers (12”) – LF
533-E – Eliminate Existing Pavement Markings and Raised Markers (24”) – LF
533-F – Eliminate Existing Pavement Markings and Raised Markers (SYMBOL) – EA
533-G – Eliminate Existing Pavement Markings and Raised Markers (WORD) – EA
533-H – Eliminate Existing Pavement Markings and Raised Markers (RR-Xing) – EA

SPECIAL PROVISION
Item 535 Hot Applied Thermoplastic Pavement Markings

For this project, Item 535 "Hot Applied Thermoplastic Pavement Markings" of the Standard Specifications is hereby amended with respect to the clauses cited below, and no other clauses or requirements on the Item are waived or changed hereby.

Article 535.7. Bid Item.

The following items are added:

Item 535.22 – White Sharrow (Bike Shared Lane) – Each, includes one bicycle symbol and two chevrons

Item 535.23 – White Arrow (Right, Left, or Straight) – Each

SPECIAL PROVISION
Item 712 Cleaning and Sealing Joints and Cracks (Asphalt Concrete)

For this project, Item 712 "Cleaning and Sealing Joints and Cracks (Asphalt Concrete)" of the TxDOT Standard Specifications is hereby amended with respect to the clauses cited below, and no other clauses or requirements of the Item are waived or changed hereby.

Article 712.2. Materials. This paragraph is void and replaced with the following:

Furnish a hot-applied, single component polymer/rubber modified asphalt material meeting the specifications of Crafco Asphalt Rubber 541 or approved equivalent.

CRAFCO INC
AN ERGON COMPANY
420 N. Roosevelt Ave. • Chandler AZ 85226
1-800-528-8242 • (602) 276-0406 • FAX (480) 961-0513
www.crafco.com

PRODUCT DATA SHEET

ASPHALT RUBBER 541

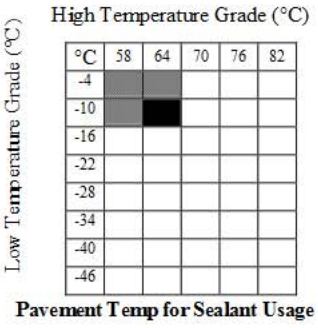
PART NO. 34541

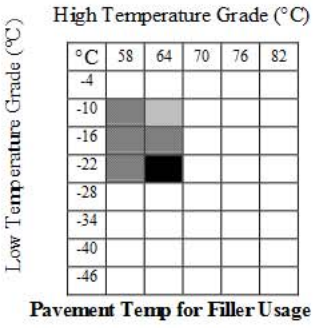
JANUARY 2008

READ BEFORE USING THIS PRODUCT

GENERAL Crafco Asphalt Rubber 541 is a hot-applied asphalt based product used to seal and fill cracks and joints in asphalt or portland cement concrete pavements in moderate to warm climates. Asphalt Rubber 541 is supplied in solid form which when melted and properly applied forms an adhesive and flexible compound that resists cracking in the winter and resists flow at summer temperatures. Asphalt Rubber 541 is used in highway, street, airfield and parking lot pavements and is applied to pavement cracks and joints using pressure feed melter applicators. At application temperature, Asphalt Rubber 541 is a higher viscosity, non self-leveling product. Asphalt Rubber 541 contains virgin rubber, vulcanized granulated crumb rubber, and selected paving asphalt. Asphalt rubber 541 is produced to meet requirements of the Texas Highway Department for Rubber Asphalt Crack Sealer. VOC = 0 g/l.

USAGE GUIDELINES Asphalt Rubber 541 pavement temperature performance limits are 64-10 for crack sealing and 64-22 for crack filling. Usage recommendations are shown in Crafco pavement temperature grade charts shown at the right. Refer to Crafco Product Selection Procedures to determine sealant or filler use and pavement temperature grades.





SPECIFICATION CONFORMANCE Crafco Asphalt Rubber 541 meets all requirements of State of Texas Department of Highways for Rubber Asphalt Crack Sealer (Texas SDHPT Item 300.2 Class B) and exceeds requirements of ASTM D5078.

Test	Texas SDHPT 300.2 Class B Limits
Minimum Application Temperature	380°F (193°C)
Maximum Heating Temperature	400°F (204°C)
Cone Penetration, 77°F (25°C)	30-50
Cone Penetration, 32°F (0°C), 200 g 60 sec.	12 min.
Softening Point (ASTM D36)	170°F (77°C) min.
Flash Point, modified C.O.C.	400°F (204°C) min.
Virgin Rubber Polymer, % by wt.	2% min.
Granulated vulcanized rubber, % by wt.	13-17%
Bond@20°F (-7°C), 50% ext	Pass 3 cycles.

INSTALLATION Prior to use, the user must read and follow Installation Instructions for Hot-Applied RoadSaver, PolyFlex, Parking Lot and Asphalt Rubber Products to verify proper product selection, heating methods, pavement preparation procedures, application geometry, usage precautions and safety procedures. These instructions are provided with each pallet of product.

PACKAGING Packaging consists of individual boxes of product which are palletized into shipping units. Boxes contain a non-adherent film which permits easy removal of the product. Each pallet contains 72 boxes which are stacked in six layers of 12 boxes per layer. The weight of product in each box does not exceed 40 lbs. (18kg) and pallet weights do not exceed 2,880 lbs. (1310kg). Pallets of product are weighed and product is sold by the net weight of product. Product boxes are manufactured from double wall kraft board producing a minimum bursting test certification of 350 psi (241 N/cm^2) and using water resistant adhesives. Boxes use tape closure and do not contain any staples. Boxes are labeled with the product name, part number, lot number, specification conformance, application temperatures and safety instructions. Palletized units are protected from the weather using a three mil thick plastic bag, a weather and moisture resistant cap sheet and a minimum of two layers of six month u.v. protected stretch wrap. Pallets are labeled with the product part number, lot number and net weight. Installation Instructions are provided with each pallet in a weather resistant enclosure.

WARRANTY CRAFCO, Inc. warrants that CRAFCO products meet applicable ASTM, AASHTO, Federal or State specifications at time of shipment. Techniques used for the preparation of the cracks and joints prior to sealing or filling are beyond our control as are the use and application of the products; therefore, Crafco shall not be responsible for improperly applied or misused products. Remedies against Crafco, Inc., as agreed to by Crafco, are limited to replacing nonconforming product or refund (full or partial) of purchase price from Crafco, Inc. All claims for breach of this warranty must be made within three (3) months of the date of use or twelve (12) months from the date of delivery by Crafco, Inc. whichever is earlier. There shall be no other warranties expressed or implied. **For optimum performance, follow Crafco recommendations for product installation.**

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420 N. Roosevelt Ave. • Chandler AZ 85226
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INSTALLATION INSTRUCTIONS
HOT-APPLIED ROADSAVER, POLYFLEX , PARKING LOT AND ASPHALT RUBBER PRODUCTS

JANUARY 2008

READ BEFORE USING THIS PRODUCT

GENERAL: These products are hot-applied, single component polymer/rubber modified asphalts supplied in solid form used to seal or fill cracks or joints in asphalt concrete or Portland cement concrete pavements. These products are not fuel resistant, and should not be used in fuel or oil spill prone areas. To use, product is removed from the package, heated in a melter and applied to the pavement. Details on product specifications, climate and usage suitability, and product selection are contained in Product Data Sheets.

MELTING AND APPLICATION: These products must be melted in jacketed double boiler melters with effective agitation that meet requirements of Appendix X1.1 of ASTM D6690. Crafco Supershot, EZ Series 2, and EZ Pour melters are recommended. Do not use direct fired or air heated machines. Heat transfer oil should not exceed 525°F (274°C). The melter must be capable of safely heating product to 400°F (204°C). **CAUTION:** Stop agitation when adding product to prevent splashing. Product is heated to between the minimum application temperature and the maximum heating temperature which are shown on product containers and Product Data Sheets. These products are most effectively applied with pressure feed wand systems. RoadSaver, PolyFlex and Parking Lot products can also be applied using gravity feed pour pots (Part No.40200 and 40201).

APPLICATION LIFE: Application life when heated to application temperature is approximately 12 to 15 hours and may be extended by adding fresh product as quantity in the melter decreases. Product shall be agitated during installation. Product may be reheated once to application temperature, after initial heat up. When application life has been exceeded, RoadSaver and Parking Lot products will thicken, become "stringy" and may then gel. If this occurs, product should immediately be removed from the melter and discarded. Asphalt Rubber and PolyFlex products will soften when overheated or heated for too long.

PAVEMENT TEMPERATURES: Apply product when pavement temperature exceeds 40°F (4°C). Lower temperatures may result in reduced adhesion due to presence of moisture or ice. If pavement temperature is lower than 40°F (4°C), it may be warmed using a heat lance (Part No. 45650) that puts no direct flame on the pavement. If installing at lower pavement temperature than 40°F (4°C), extreme care should be used to insure that cracks or joints are dry and free from ice and other contaminants. Product temperature should be maintained at the maximum heating temperature. If installing product at night, assure that dew is not forming on the pavement surface. Applied product should be checked by qualified personnel to assure that adhesion is adequate.

TRAFFIC CONTROLS: Place traffic controls in accordance with Part 6, Temporary Controls, of the FHWA Manual on Uniform Traffic Control devices (MUTCD) to protect the work site for the duration of the repairs.

CRACK / JOINT CLEANING: For appropriate adhesion, cracks or joints must be thoroughly clean and dry immediately prior to product installation. After widening or debris removal, and just prior to product installation, final cleaning shall use high pressure 90 psi (620kpa) minimum, dry, oil free compressed air to remove any remaining dust. Both sides of the crack or joint shall be cleaned. Surfaces should be inspected to assure adequate cleanliness and dryness.

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ASPHALT PAVEMENT CRACK SEALING: Crack sealing consists of installing extensible sealants into routed reservoirs in working cracks in pavements in good condition.

Reservoir Cutting: Based on the 98% LTPPBIND temperature range (difference from high to low), cracks are to be routed as follows:

Temperature Grade Range	Reservoir Width	Reservoir Depth
80°C or less	½" (12 mm)	¾" (19 mm)
86°C	¾" (19 mm)	¾" (19 mm)
92°C	1 1/8" (28 mm)	½" (12 mm)
98° or greater	1 ½" (38 mm)	½" (12 mm)

Reservoir width should not exceed 1 ½" (38 mm). Cutting should remove at least 1/8" (3 mm) from each side and produce vertical, intact surfaces with no loosely bonded aggregate. The pavement should be sound enough to resist significant spalling during cutting. Final reservoir width should not exceed twice the cutter width or 1 ½" (38 mm) maximum.

Installation and Finishing: After cleaning, sealant at the required temperature is installed in the reservoir. Sealant can be installed with up to a 3/8" (10 mm) underfill, flush fill, or with an overband cap that does not exceed 1/16" (1.5mm) above the pavement surface, and not greater than a 2" (50 mm) width beyond crack edges, depending on project specifications. These configurations are achieved using appropriate wand tips, shoes or squeegees. To reduce surface tack, Crafco DeTack or other approved material may be applied.

ASPHALT PAVEMENT CRACK FILLING: Crack filling consists of installing flexible, traffic resistant product into prepared, cleaned, non-working pavement cracks. Filler can be installed in routed or unrouted cracks or in surface overbands.

Routed Reservoir – Routed reservoirs are recommended for longest life. Guidelines for determining reservoir use are:

1. Crack density should not exceed approximately 20% (linear feet of cracks per square feet of pavement area).
2. Pavement should be sound enough to resist significant spalling during cutting. (Final reservoir width should not exceed double the cutter width, or 1 ½"(38 mm) maximum

Reservoir Dimensions – Determined as follows:

1. The cut should remove at least 1/8" (3mm) from each side of the crack and cut back to sound pavement.
2. Minimum width is ½" (12 mm), maximum is 1 ½" (38 mm).
3. Recommended cut depth is ¾" (19 mm).
4. Reservoirs are then cleaned with compressed air.

Cleaned Unrouted Cracks – Cracks may be cleaned and filled without reservoirs, but longer life is achieved with reservoirs. Cleaning consists of using high-pressure dry, clean compressed air, brushing, or vacuum techniques to remove debris.

Surface Overbands – Product can be applied in overbands after crack cleaning with compressed air. Overbands should not exceed 1/16" (1.5 mm) high above the pavement surface and not extend greater than 2" (50 mm) beyond each crack edge.

Filler Installation and Finishing – Same as sealant installation and finishing.

PORTLAND CEMENT CONCRETE PAVEMENT JOINT SEALING AND RESEALING: Joint sealing and resealing consist of

installing extensible sealants into sawn and cleaned joint reservoirs in PCC pavements.

Reservoir Sawing – New concrete should be cured for at least 7 days prior to sawing the joint reservoir. Joint spacing should be at the design dimension, generally from approximately 12 to 20 ft. (3.7 to 6.2m). Joints shall be at least ¼" (6mm) wide, and should not exceed 1½" (38mm). For new pavements designed with narrow joints using the initial narrow saw cut as the reservoir, spaced at 15 ft (5m) maximum, and when using low modulus type sealants, joint width may be as narrow as 1/8 inch (3mm). Contact Crafco for more details. Reservoir depth should allow a sealant depth to width ratio of 1:1 to 2:1, sufficient depth for backer rod, and the specified surface recess. Reservoirs shall be cut no deeper than required. When resealing, old sealant can be removed by knives, plows or sawing. Sawing shall slightly widen the joint by 1/8 to ¼ inch (3-6mm) to remove all traces of old sealant and produce clean, intact vertical surfaces. Maximum joint width is 1 ½ inch (38mm).

Reservoir Cleaning – After sawing, joints shall be flushed with water to remove sawing slurry and allowed to dry. Just prior to installing sealant, both joint surfaces shall be cleaned using sandblasting, brushing or other means to remove any remaining of sawing residue. Final cleaning is then done with high-pressure (minimum 90 psi, 62N/cm2) clean, dry, oil free compressed air the same day that sealant is installed. Moisture and oil traps are required on the compressor. Joints must be inspected to assure cleanliness by rubbing a finger along each face to spot dust or other contaminants. If found, recleaning should occur until joints are completely clean and dry. The objective of sawing and cleaning is to provide vertical, intact, clean concrete bonding surfaces free from all contaminants and are dry.

Backer Rod – After cleaning, heat resistant backer rod (ASTM D5249, Type I) approx. 25% larger than the joint width shall be installed to the required depth without damage or punctures. Punctures or damage to backer rod may cause sealant bubbling.

Sealant Installation – Concrete should be cured at least 7 days prior to installing sealant. Sealant heated to required temperature is installed per project specifications. Typical installations include a recess up to ¼ inch (6mm), flush, or with a surface overband (maximum 1/16" (1.5mm) above the surface, and 2" (50 mm) maximum beyond each joint edge).

INSTALLATION PRECAUTIONS: In certain situations, additional consideration needs to be given to product selection and application geometries.

Parking lots and other areas subjected to slow moving traffic and pedestrians: Product used must be stiff enough at hot summer temperatures to resist pick up and should not be applied on top of the pavement surface. Product should have a high temperature grade at least one step above the LTPPBIND grade for the climate. For even better pick-up resistance, increase by two grades.

Pavement to receive an Overlay, Surface Treatment, or Seal Coat: Product will be subjected to overlay heat effects and carriers for surface treatments and seal coats. If product is applied on top of the pavement, and an overlay is then placed, bumps may occur during compaction. Refer to "Bump Formation & Prevention in Asphalt Concrete Overlays Which Have Been Crack Sealed" (www.crafco.com) for more information. Solvents or other carriers in surface treatments may soften product. Prior to placing a surface treatment or seal coat, a test strip should be placed to verify compatibility of the product and treatment.

High Severity Cracked Areas: Highly cracked areas (fatigue cracks in wheel paths) should not be treated by covering cracks because pavement friction may be affected. These cracks can be filled if followed by a surface treatment or overlay to restore friction.

Fuel or Oil Spill Areas: These products should not be used in fuel or oil spill areas due to softening of the sealant that may occur. Sealant will not adhere to asphalt or concrete pavements surfaces that are contaminated with oil spills.

Crack Sealing or Filling in Pavements with Surface Treatments: When crack sealing or filling pavements with chip seals, slurry seals, and open graded friction courses, routing should be deep enough to extend through the surface treatment layer into the underlying asphalt concrete. This anchors product into solid pavement for better bonding.

CLEAN OUT: If melters used require clean out, follow manufacturer's instructions. If solvent is used, insure it does not contaminate product because dilution and flash problems may occur.

STORAGE: Pallets of product are protected with a weather resistant covering. During storage, this covering must be intact to prevent boxes from getting wet. If wet, boxes may lose strength and crush. Rips in the pallet covering should be repaired to maintain packaging integrity. Pallets should be stored on a dry, level surface with good drainage. Pallets should not be stacked because crushing of bottom boxes may occur. Product properties are not affected by packaging deterioration.

SAFETY PRECAUTIONS: Since these products are heated to elevated temperatures, it is essential that operations be conducted safely. All personnel need to be aware of hazards of using hot applied materials and safety precautions. Before use, the crew should read and understand product use and safety information on the box and the product MSDS. User should check D.O.T. requirements for transportation of product at elevated temperatures above 212°F (100°C).

HAZARDS ASSOCIATED WITH HOT-APPLIED MATERIALS: Skin contact with hot materials causes burns. Over exposure to fumes may cause respiratory tract irritation, nausea, or headaches. Precautions are to be taken to prevent contact with hot material and to avoid inhalation of fumes for everyone in the vicinity. Safety precautions should include:

1. Protective clothing to prevent skin contact with hot material.
1. Care when adding product to melters to reduce splashing.
3. Careful operation of wands or pour pots that apply product.
4. Traffic and pedestrian control measures which meet or exceed MUTCD requirements to prevent access to work areas while product is in a molten state.
5. Avoidance of material fumes.
6. Proper application configurations with a minimum amount of material excess.
7. Appropriate clean up of excessive applications or product spills.

ADDITIONAL INFORMATION: Additional information regarding these products is available by contacting your distributor or Crafco, Inc. This information includes:

1. Product Data Sheets
2. Material Safety Data Sheet,
3. Safety Manual
4. Sealing Cracks and Joints in Parking and Pedestrian Areas
5. "Bump Formation & Prevention In Asphalt Concrete Overlays Which Have Been Crack Sealed"
6. Sealant Selection Guide

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