

SECTION 01000

TECHNICAL SPECIFICATIONS

CONSTRUCTION DETAILS

**DIVISION 2 OF THE FLORIDA DEPARTMENT OF TRANSPORTATION
STANDARD SPECIFICATIONS FOR ROAD AND BRIDGE CONSTRUCTION
2000 EDITION ARE ADOPTED BY REFERENCE AND MODIFIED AS
FOLLOWS.**

**THROUGHOUT THE STANDARD SPECIFICATIONS FOR ROAD AND
BRIDGE CONSTRUCTION, SUBSTITUTE THE WORD “CONSULTANT” FOR
THE WORD “ENGINEER” AND THE WORD “CITY” FOR THE WORD
“DEPARTMENT” WHENEVER THEY APPEAR.**

**Division 2-FDOT
SECTION 102**

Article 102-3 Traffic Control is expanded by the following subarticles:

102-3.4 Special Use Permits: The Contractor shall be required to apply for and obtain a Special Use Permit from the Miami Police Department. Contractor will be required to provide a schedule of activities which affect the flow of traffic on the right-of-way such as overall project scope, lane closures, Traffic Control Plan, construction schedule/time frame, etc. The Contractor will be required to renew the Special Use Permit each month for construction projects and pay the permit fee monthly. Cost shall be included under Pay Item 102-1.

102-3.5 No Parking Signs: The contractor shall install "NO PARKING" signs within each block of the proposed Work Zone. Signs shall be in place no more than 48 hours per installation and shall be installed only during milling and repaving operations. Signs shall be installed separately for each operation unless both operations are to occur within a 48 hour period. Sufficient signs shall be posted to clearly indicate where parking is prohibited. In addition, the Contractor will furnish and install door hangers and vehicle parking notices for all residents living on the street that will have "No Parking" signs installed, at least 24 hours but not more than 48 hours prior to posting "No Parking" signs. Cost shall be included under Pay Item 102-1.

**SECTION 104
PREVENTING, CONTROL, AND ABATEMENT OF EROSION AND WATER
POLLUTION**

104-1 Description:

Subarticle 104-1 is modified as follows:

The Bidder is alerted that strict compliance with Department of Capital Improvements Bulletin No. 25 is required for this project. This bulletin establishes rules, regulations and requirements for discharges originated from construction sites or resulting from construction activities. A copy of Bulletin No. 25 and corresponding Engineering Standards is included in the City of Miami Engineering Standards.

SECTION 327

MILLING OF EXISTING ASPHALT PAVEMENT

Article 327-3 Construction is modified and expanded by the following:

The maximum time allowed between milling and resurfacing operations shall be 72 hours unless written permission is received from the Consultant to delay resurfacing due to rain or other events not under control of the Contractor.

When the asphalt pavement, remaining after milling, is one inch or less in thickness, the first layer of asphalt shall be placed before the lane is reopened to traffic.

SECTION 330

**HOT BITUMINOUS MIXTURES – QUALITY ASSURANCE, GENERAL
CONSTRUCTION REQUIREMENTS AND ACCEPTANCE PROCEDURES**

The following new subarticle is added:

330-13.3.5 Acceptance Criteria for Layer Thickness: The Contractor shall obtain four three-inch diameter core borings of the asphalt per lot (500 tons) within 24 hours of placement to be used in determining layer thickness. Locations shall be randomly selected by the Consultant with no sample taken within 12" of any unsupported edge of pavement. Payment to the Contractor for each lot shall be based on the average of the four cores taken per the following table.

Layer Thickness	AVE. Core Thickness	Deviation	Bid Price Increase
1.00*	1.00	0.00	0.00
	1.05	5.00%	5.00%
	1.10	10.00%	10.00%
	1.15	15.00%	14.00%
	1.20	20.00%	17.00%
	1.25	25.00%	19.00%
	1.30	30.00%	20.00%
			Max.

*Other layer thicknesses shall be proportional to the increases shown therein. As an example, if the layer thickness is shown as 1.5", a 20% increase would be 1.8" in thickness and the Contractor would receive a 17% increase in the bid price for a 1 ½" layer thickness. However, the lift thicknesses must conform to 330-15 to be eligible for extra payment.

The Contractor shall accurately measure each core taken and calculate the average for each lot. Contractor will prepare and provide the Consultant with certified documentation indicating the precise core locations and core measurements of each lot as well as a payment calculation for each lot based on the above chart. The asphalt cores as well as the certified documentation shall be provided to the consultant within 24

hours after construction of each lot. No payment for any lot will be made without the actual asphalt cores and certified documentation.

Section 331, Type S Asphalt Concrete, is modified and expanded as follows;

SECTION 331

TYPE S ASPHALT CONCRETE, QUALITY ASSURANCE AND ACCEPTANCE PROCEDURES

331-1 Description.

331-1.1 General: Construct a Type S Asphalt Concrete course using the type of mixture specified in the Contract, or when offered as alternates, as selected. If offered as alternates, meet the layer thickness criteria specified in 331-1.2. Type S mixes are identified as Type S-I, Type S-II, or Type S-III. The composition and physical test properties for all mixes including Type S Asphalt Concrete are shown in Tables 331-1 and 331-2. This Section establishes Acceptance Procedures for materials and work performed under Sections 280, 331, and 337.

Meet the requirements for plant and equipment specified in Section 320. Meet the general construction requirements specified in Section 330.

Table 331-1 Bituminous Concrete Mixtures (Gradation Design Range)								
Type	Total Aggregate Passing Sieves ¹							
	3/4 inch [19.0 mm]	1/2 inch [12.5 mm]	3/8 inch [9.5 mm]	No. 4 [4.75 mm]	No. 10 [2.0 mm]	No. 40 [425 µm]	No. 80 [180 µm]	No. 200 [75 µm]
S-I ⁵	100	88-98	75-93	47-75	31-53	19-35	7-21	2-6
S-II ²	83-98	71-87	62-78	47-63	33-49	19-35	9-18	2-6
S-III ⁵		100	88-98	60-90	40-70	20-45	10-30	2-6
Type II		100	90-100	80-100	55-90			2-12
Type III		100	80-100	65-100	40-75	20-45	10-30	2-10
SAHM		100						0-12
ABC-1		100						0-12
ABC-2		100			55-90			0-12
ABC-3 ³	70-100			30-70	20-60	10-40		2-10
FC-2 ⁴		100	85-100	10-40	4-12			2-5
FC-3 ⁵		100	88-98	60-90	40-70	20-45	10-30	2-6

¹ In inches [mm] or sieves [µm].
² 100% passing 1 1/4 inch [31.5 mm] sieve and 94 to 100% passing 1 inch [25.0 mm] sieve.
³ 100% passing 1 1/2 inch [37.5 mm] sieve.
⁴ The Consultant may increase the design range for the No. 10 [2.00 mm] sieve for lightweight aggregates.
⁵ The Consultant may retain up to 1% on the maximum sieve size.

**Table 331-2 Non SI Units
Marshall Design Properties For Bituminous Concrete Mixes**

Mix Type	Minimum Marshall Stability (lbs.)	Flow** (0.01 in.)	Minimum VMA (%)	Air Voids (%)	Minimum Effective Asphalt Content (%)	VFA Voids Filled with Asphalt (%)
S-I	1,500*	8-13	14.5	4-5	***	65-75
S-II	1,500*	8-13	13.5	4-5	***	65-75
S-III	1,500*	8-13	15.5	4-6	***	65-75
Type II	500-750	7-15	18	5-16	6.0	-
Type III	750-1,000	7-15	15	5-12	5.5	-
SAHM	300-500	7-15	15	5-16	6.0	-
ABC-1	500	7-15	15	5-16	6.0	-
ABC-2	750	7-15	15	5-14	5.5	-
ABC-3	1,000	8-13	14	4-7	***	65-78
FC-2	-	-	-	-	-	-
FC-3	1,500	8-13	15.5	4-6	***	65-75

*The minimum Marshall Stability for Type S mixes used on limited access facilities (Interstate, Turnpike, and Expressways) shall be 1,800 lbs.

**The maximum Flow value during production shall not exceed one point more than shown in the Table.

***The ratio of the percentage by weight of total aggregate passing the No. 200 sieve to the effective asphalt content expressed as a percentage by weight of total mix shall be in the range of 0.6 to 1.2.

Table 331-2 SI Units Marshall Design Properties For Bituminous Concrete Mixes						
Mix Type	Minimum Marshall Stability (kN)	Flow** (mm)	Minimum VMA (%)	Air Voids (%)	Minimum Effective Asphalt Content (%)	VFA Voids Filled with Asphalt (%)
S-I	6.7*	2.0-3.3	14.5	4-5	***	65-75
S-II	6.7*	2.0-3.3	13.5	4-5	***	65-75
S-III	6.7*	2.0-3.3	15.5	4-6	***	65-75
Type II	2.2-3.3	1.8-3.8	18	5-16	6.0	-
Type III	3.3-4.4	1.8-3.8	15	5-12	5.5	-
SAHM	1.3-2.2	1.8-3.8	15	5-16	6.0	-
ABC-1	2.2	1.8-3.8	15	5-16	6.0	-
ABC-2	3.3	1.8-3.8	15	5-14	5.5	-
ABC-3	4.4	2.0-3.3	14	4-7	***	65-78
FC-2	-	-	-	-	-	-
FC-3	6.7	2.0-3.3	15.5	4-6	***	65-75

*The minimum Marshall Stability for Type S mixes used on limited access facilities (Interstate, Turnpike, and Expressways) shall be 8.0 kN.
**The maximum Flow value during production shall not exceed 0.25 mm more than shown in the Table.
***The ratio of the percentage by weight of total aggregate passing the 75µm sieve to the effective asphalt content expressed as a percentage by weight of total mix shall be in the range of 0.6 to 1.2.

The Consultant will accept the work in accordance with the applicable requirements of Sections 6, and 9.

331-1.2 Layer Thicknesses:

331-1.2.1 Structural Layers: the allowable layer thickness for Type S Asphalt Concrete mixtures used in structural and overbuild applications is as follows:

- Type S-I 1 1/4 – 2 1/2 inches [30 – 60 mm]
- Type S-II 2 – 2 3/4 inches [50 – 70 mm]
- Type S-III 3/4 – 1 1/4 inches [20 – 30 mm]

In addition to the minimum and maximum thickness requirements, the following restrictions are placed on Type S mixtures when used as a structural course:

Type S-I: May not be used in the first layer of courses over 3 1/2 inches [90 mm] thick but shall be used for all lesser thicknesses.

Type S-I and Type S-II: May not be used in the final (top) structural layer.

Type S-III: Limited to the final (top) structural layer, one layer only.

331-1.2.2 Additional Requirements: The following requirements also apply to Type S Asphalt Concrete mixtures:

1. A minimum 1 1/2 inch [40 mm] initial lift is required over an Asphalt Rubber Membrane Interlayer (ARMI) or crack relief membrane.

2. When construction includes the paving of adjacent shoulders (<5 feet [<1.5 m] wide), the layer thickness for the upper pavement layer and shoulder shall be the same and paved in a single pass, unless shown differently in the plans.

3. All overbuild layers shall be Type S asphalt concrete. Use the minimum and maximum layer thicknesses as specified in 331-1.2.1 unless shown differently in the plans. On variable thickness overbuild layers, the minimum allowable thickness may be reduced by 1/2 inch [13 mm], and the maximum allowable thickness may be increased 1/2 inch [13 mm], unless shown differently in the plans. Other variations from these thicknesses must be approved by the Consultant.

331-2 Materials.

331-2.1 General Requirements: Meet the material requirements specified in Division III of the Specifications. Specific references are as follows:

Superpave PG Asphalt Binder or Recycling Agent 916-1, 916-2

Mineral Filler 917-1, 917-2

Coarse Aggregate, Stone, Slag or Crushed Gravel Section 901

Fine Aggregate Section 902

Asphalt concrete mixes containing crushed gravel as coarse aggregate component must show no potential for stripping during laboratory testing for mix design verification.

Crushed Reclaimed Portland Cement Concrete Pavement may be used as a coarse aggregate or screenings component subject to meeting all applicable specifications.

331-2.2 Specific Requirements:

331-2.2.1 Condition of Aggregate: Use clean aggregate containing no deleterious substances. Do not use coarse or fine aggregate which contains more than 0.5% of phosphate.

331-2.2.2 Fine Aggregate and Mineral Filler: In laboratory tests, and for the purpose of proportioning the paving mixture, consider all material passing the No. 10 [2.00 mm] sieve and retained on the No. 200 [75 µm] sieve as fine aggregate, and the material passing the No. 200 [75 µm] sieve as mineral filler.

331-2.2.3 Screenings: Do not use any screenings in the combination of aggregates containing more than 15% of material passing the No. 200 [75 µm] sieve. When two screenings are blended to produce the screening component of the aggregate, one of such screenings may contain up to 18% of material passing the No. 200 [75 µm] sieve, as long as the combination of the two does not contain over 15% material passing the No. 200 [75 µm] sieve. Screenings may be washed to meet these requirements.

331-2.2.4 Use of Reclaimed Asphalt Pavement (RAP): Subject to certain requirements, Reclaimed Asphalt Pavement (RAP) may be used as a component material of the asphalt mixture. Where the material is recovered from a project, the Composition of Existing pavement may be available

RAP may be used as a component material of the bituminous mixture subject to the following:

1. Assume responsibility for the design of asphalt mixes which incorporate RAP as a component part.

2. Do not allow RAP to exceed 60% by weight of total aggregates for Asphalt Base Courses nor more than 50% by weight of total aggregates for Structural and Leveling Courses. Do not use RAP in Friction Courses.

3. Mount a grizzly or grid with openings of a sufficient size to prevent clogging of the cold feed over the RAP cold bin.

Use a grizzly or grid over the RAP cold bin, in-line roller crusher, screen, or other suitable means to prevent oversized RAP material from showing up in the completed recycled mixture.

If oversized RAP material appears in the completed recycled mix, cease plant operations and take appropriate corrective action.

4. Ensure that the RAP material as stockpiled is reasonably uniform in characteristics and contains no aggregate particles which are soft or conglomerates of fines.

5. Ensure that the RAP has a minimum average asphalt content of 4% by weight of total mix. The Consultant reserves the right to sample the stockpile in order that this requirement is met.

When material milled from the project is used as a component of the asphalt mixture and a Composition of Existing Pavement is known, use the following procedures for obtaining representative samples for the mix design:

1. Cut ten 6-inch [150 mm] cores in area(s) approved by the Consultant. Fill the core holes immediately prior to opening to traffic.

2. Representative samples may also be obtained by milling the existing pavement to the full depth shown on the plans for pavement removal for a length of approximately 200 feet [60 m]. Immediately replace the pavement removed with the specified mix in the Contract.

3. Submit a request in writing to the Consultant for any variance from the above outlined methods of obtaining samples for mix designs.

When the composition of stockpiled RAP to be used as a component in a mix design is not known, design the mix as follows:

1. Submit a bag of RAP, composed of samples from several locations in the stockpile(s), to the Consultant at least four weeks prior to the planned start of mix design. The Consultant will run viscosities on the reclaimed asphalt pavement and furnish the information to the Contractor.

2. Run a minimum of six extraction gradation analyses of the RAP. Take the samples at random locations around the stockpile(s).

3. Request the Consultant to make a visual inspection of the stockpile(s) of RAP. Based on visual inspection, the Consultant will determine the suitability of the stockpiled materials.

4. When the proposed mix design is submitted to the Consultant for verification, submit the data from the extraction gradation analyses required above.

331-2.2.5 Binder for Mixes with RAP: Use a PG 67-22 where RAP is less than 20% by weight of total aggregate; use a PG 64-22 where RAP is 20% or greater but less than 30% by weight of total aggregate; use appropriate recycle agent where RAP is 30% or greater.

The Consultant reserves the right to change binder type and grade at design based on the characteristics of the RAP binder, and reserves the right to request reasonable changes during the production based on the requirements of 331-4.4.4.

331-2.2.6 Use of Recycled Crushed Glass: Recycled crushed glass may be used as a component of the bituminous mixture subject to the following:

1. Consider the recycled crushed glass a local material and meet all requirements specified in 902-6.
2. The percentage of recycled crushed glass in any bituminous mixture does not exceed 15% of the total aggregate weight.
3. The asphalt binder used with mixtures containing recycled crushed glass contains 0.5% anti-stripping agent from an approved source. The addition of the specified amount of anti-stripping agent must be certified by the supplier.
4. Test bituminous mixtures containing recycled crushed glass in accordance with AASHTO T 283 as part of the mix design approval. The minimum tensile strength ratio must not be less than 80%. An increase in the amount of anti-stripping agent may be necessary in order to meet this requirement.
5. Recycled crushed glass must not be used in friction course mixtures nor in structural course mixtures which are to be used as the final wearing course.

331-3 Permissible Variation for the Coarse Aggregate.

Size and uniformly grade or combine the aggregate or aggregates shipped to the job in such proportions that the resulting mixture meets the grading requirements of the mix design.

331-4 General Composition of Mixture.

331-4.1 General: Use a bituminous mixture composed of a combination of aggregate (coarse, fine or mixtures thereof), mineral filler, if required, and bituminous material. Ensure that not more than 20% by weight of the total aggregate used is silica sand or local materials as defined in Section 902. Consider the silica sand and local materials contained in any RAP material, if used in the mix, in this limitation. Size, grade and combine the several aggregate fractions in such proportions that the resulting mixture meets the grading and physical properties of the verified mix design.

RAP meeting the requirements of 331-2.2.4 may be approved as a substitution for a portion of the combination of aggregates, subject to all applicable specification requirements being met.

331-4.2 Grading Requirements: In all cases, use a mix design within the design ranges specified in Table 331-1.

331-4.3 Mix Design:

331-4.3.1 General: Prior to the production of any asphalt paving mixture, submit a mix design, with certification that the mix design was approved by the Florida Department of Transportation or similar local agency for use on previous project(s) and certification that materials properties remain the same as when mix design was approved, or provide evidence that the mix design was made or certified by an independent testing laboratory and is in compliance with the requirements of these Specifications. Submit representative samples of all component materials to the Consultant at least two weeks before the scheduled start of production. The Consultant will verify the mix design before use. Furnish the following information:

1. The specific project on which the mixture will be used.
2. The source and description of the materials to be used.

3. The gradation and approximate proportions of the raw materials as intended to be combined in the paving mixture. The gradation of the component materials shall be representative of the material at the time of use.

4. A single percentage of the combined mineral aggregate passing each specified sieve. Degradation of the aggregate due to processing (particularly No. 200 [75 µm]) should be accounted for and identified for the applicable sieves.

5. A single percentage of asphalt by weight of total mix intended to be incorporated in the completed mixture, shown to the nearest 0.1%. For structural mixes (S-I, S-II and S-III) establish the optimum asphalt content at a level corresponding to a minimum of 4.5% air voids. For FC-9.5 and FC-12.5 mixes, establish optimum asphalt content at a level corresponding to a minimum of 5.0% air voids.

6. A single temperature at which the mixture is intended to be discharged from the plant.

7. The laboratory density of the asphalt mixture for all mixes except Open-Graded Friction Courses.

8. Evidence that the completed mixture will meet all specified physical requirements.

9. The name of the individual responsible for the control of the mixture during production.

If a design mix has been previously approved by the State of Florida Department of Transportation or by the City of Miami or Miami-Dade County and the Contractor certifies that previously approved materials sources used in the design mix are still the same, that mix design may be used on City of Miami CIP and Public Works paving contracts. The Contractor must certify that material sources and/or material properties have not changed.

Where the properties have changed, and the Contractor does not have an approved mix design, the Contractor shall have an independent materials laboratory certify the proposed mix design meets the requirements for Type S Asphalt Pavement as included in these Specifications.

The City of Miami Director of Public Works or Director of Transportation for CIP projects will oversee the approval and certification process, and in the event of a dispute, become the final authority on approval of these design mix alternatives.

331-4.3.2 Revision of Mix Design: Submit all requests for revisions to approved mix designs, along with supporting documentation, in writing to the Consultant. In order to expedite the revision process, a verbal revision request or discussion of the possibility of a revision request may be made, but must be followed up with a written request. The verified mix design will remain in effect until a change is authorized by the Consultant. In no case will the effective date of the revision be established earlier than the date of the first communication with the Consultant regarding the revision.

Provide a new mix design for any change in source of aggregate.

331-4.3.3 Resistance to Plastic Flow: Include with the submitted mix design test data showing that the material as produced will meet the requirements specified in Table 331-2 when tested in accordance with ASSHTO T 245. Further, determine the bulk specific gravity of the laboratory compacted bituminous mixture in accordance with AASHTO T 166.

Determine the percent of unfilled voids and the percent of aggregate voids filled with asphalt using the maximum specific gravity of the bituminous mixture and on the asphalt content of each group of specimens prepared from the same

sample. Determine maximum specific gravity of the bituminous mixture by AASHTO T 209.

331-4.3.4 Revocation of Mix Design: The Consultant will consider any marked variations from original test data for a mix design or any evidence of inadequate field performance of a mix design as sufficient evidence that the properties of the mix design have changed, and the Consultant will no longer allow the use of the mix design.

331-4.4 Contractor's Quality Control:

331-4.4.1 Personnel: In accordance with the requirements of 331-5.2 provide the necessary qualified personnel. Ensure that the Technician responsible for quality is certified and possesses a valid certificate of qualification. When it becomes evident to the Consultant that the Technician cannot perform as required by the position, the Consultant will require replacement with a certified Technician.

331-4.4.2 Extraction Gradation Analysis: Sample the bituminous mixture at the plant in accordance with AASHTO T 168. Determine the percent bitumen content of the mixture in accordance with FM 5-563, and determine the percent passing the standard sieves in accordance with AASHTO T 030. In the event the calibration factor for the mix exceeds 0.50%, conduct the extraction and gradation analysis in accordance with FM 5-544 and FM 5-545, respectively. Show all test results to the nearest 0.01. Carry all calculations to the nearest 0.001 and rounded to the nearest 0.01..

Run a minimum of one extraction gradation analysis of the mixture for each day's or part of a day's production and immediately following any change in the production process. Take the quality control sample of mixture for the extraction gradation analysis each day as soon as the plant operations have stabilized. Obtain the results in a timely manner (no later than the end of the day) so that adjustments can be made if necessary.

On initial use of a Type S mix design at a particular plant, as a minimum, run an additional extraction gradation analysis if more than 500 tons [450 metric tons] of mixture are produced on the first day of production.

Extraction gradation analysis will not be required on the days when mix production is less than 100 tons [90 metric tons]. However, when mix production is less than 100 tons [90 metric tons] per day on successive days, run the test when the accumulative tonnage on such days exceeds 100 tons [90 metric tons].

Use the target gradation and asphalt content as shown on the mix design. Any changes in target will require a change in the mix design in accordance with 331-4.3.2.

If the percentage of bitumen deviates from the optimum asphalt content by more than 0.55% or the percentage passing any sieve falls outside the limits shown in Table 331-3, make the necessary correction. If the results for two consecutive tests deviate from the optimum asphalt content by more than 0.55% or exceeds the limits as shown in Table 331-3 for any sieve, stop the plant operations until the problem has been corrected. In addition, if the results of two consecutive tests show an amount greater than 99.0% passing the 1/2 inch [12.5 mm] sieve for Type S-I, an amount greater than 99.0% passing the 3/4 inch [19.0 mm] sieve for Type S-II, or an amount greater than 99.0% passing the 3/8 inch [9.5 mm] sieve for Types S-III or FC-3, stop the plant operation until the problem has been corrected.

Maintain control charts showing the results of the extraction gradation analysis (bitumen content and sieve analysis).

Sieve Size	Percent Passing
1 inch [25.0 mm]	7
3/4 inch [19.0 mm]	7
1/2 inch [12.5 mm]	7
3/8 inch [9.5 mm]	7
No. 4 [4.75 mm]	7
No. 10 [2.00 mm]	5.5
No. 40* [*425 µm]	4.5
No. 80* [*180 µm]	3
No. 200 [75 µm]	2

*Does not apply to SAHM, ABC-1 or Type II.

331-4.4.3 Plant Calibration: At or before the start of mix production, perform a wash gradation on a set of hot bin samples for batch or continuous mix plants or belt cut for drum mix plants to verify calibration of the plant. When approved by the Consultant, extraction gradation analysis of the mix may be used to verify calibration of the plant. This extraction gradation analysis may also be used to fulfill the quality control requirements for the first day's production.

331-4.4.4 Viscosity of Asphalt in Mixes Containing RAP: When RAP is a component material, the viscosity of the asphalt material in the bituminous mixture, determined by the Consultant in accordance with ASTM D 2171, shall be 6,000 ± 2,000 poises [600 ± 200 Pa·s]. This determination will be made on samples obtained by the Consultant on a random basis at a frequency of approximately one per 1,000 tons [900 metric tons] of mix.

If the viscosity determined by the Consultant is out of the specified range, adjust the binder formulation or blend of RAP in the mix to bring the viscosity within tolerance.

331-5 Acceptance Procedures.

331-5.1 General: The Contractor is responsible for the quality of construction and materials incorporated therein. Perform all sampling and testing of materials in strict conformance with AASHTO and ASTM requirements. The Consultant will monitor and observe the Contractor's test procedures and results. Maintain effective quality control until final values on the remaining subplot(s) test data as defined in 331-6 have been achieved.

331-5.2 Control by the Contractor: Provide and maintain a quality control system that provides reasonable assurance that all materials, products and completed construction meet Contract requirements. Develop and maintain a quality control system in conformance with the following requirements:

CONTRACTOR QUALITY CONTROL SYSTEM

I. SCOPE:

These Specifications establish minimum requirements and activities for the Contractor. These requirements pertain to the inspections and tests necessary to substantiate material and product conformance to Contract requirements and to all inspections and tests required by the Contract.

II. FUNCTIONS AND RESPONSIBILITIES:

1. The Consultant will verify the Contractor's design mixes, inspect plants and monitor control of the operations to ensure conformance with these Specifications.

At no time will the Consultant issue instructions to the Contractor or Producer as to the setting of dials, gauges, scales and meters. However, the Consultant's representatives may question and warn the Contractor against the continuance of any operations or sequence of operations that obviously do not result in satisfactory compliance with the requirements of these Specifications.

2. The Contractor shall submit in writing the proposed Quality Control Plan for each asphalt plant for the Consultant's approval. Maintain the approved Quality Control Plan in effect for the plant to which it is assigned until the Consultant rejects it in writing. Include in the plan the sampling, testing, inspection and the anticipated frequencies of each to maintain process control. A recommended series of sampling, testing and inspecting activities are shown in Table 331-4.

Table 331-4

RECOMMENDATIONS FOR A CONTRACTOR
QUALITY CONTROL PLAN

A. All Types of Plants

1. Stockpiles

- a. Place materials in the correct stockpile.
- b. Use good stockpiling techniques.
- c. Inspect stockpiles for separation, contamination, segregation, etc.

2. Incoming Aggregate

- a. Obtain gradations and bulk specific gravity (BSG) values from the aggregate supplier.
- b. Determine gradation of all component materials.
- c. Compare gradations and BSG to mix design.

3. Cold Bins

- a. Calibrate the cold gate/feeder belt settings.
- b. Observe operation of cold feed for uniformity.

4. Dryer

- a. Observe pyrometer for aggregate temperature control.
- b. Observe efficiency of the burner.

5. Hot Bins

- a. Determine gradation of aggregates in each bin.
- b. Determine theoretical combined grading.

6. Bituminous Mixture

- a. Determine asphalt content.
- b. Determine mix gradation.
- c. Check mix temperature.
- d. Verify modifier addition.

B. Batch Plants

1. For batch weights, determine percent used and weight to be pulled from each bin to ensure compliance with the mix design.
2. Check mixing time.
3. Check operations of weigh bucket and scales.

C. Continuous Mix Plant

1. Determine gate calibration chart for each bin.
2. Determine gate settings for each bin to ensure compliance with the mix design.
3. Determine gallons [cubic meters] per revolution or gallons [cubic meters] per minute to ensure compliance with the mix design.

D. Drum Mixer Plant

1. Calibrate the cold feed and prepare a calibration chart for each cold gate.
2. Develop information for the synchronization of the aggregate feed, reclaimed asphalt pavement (RAP) feed and the bituminous material feed.
3. Calibrate the weigh bridge on the changing conveyor.

The activities shown in Table 331-4 are the normal activities necessary to control the production of bituminous concrete at an acceptable quality level. The Consultant recognizes, however, that depending on the type of process or materials, some of the activities listed may not be necessary and, in other cases, additional activities may be required. The frequency of these activities will also vary with the process and the materials. When the process varies from the defined process average and variability targets, increase the frequency of these activities until the proper conditions are restored. Take one sample and test for every 500 tons [450 metric tons] of incoming aggregate (including RAP) as it is stockpiled. Test RAP material for extracted gradation and asphalt content.

Plot and keep up-to-date control charts for all quality control sampling and testing. Provide control charts for the following:

- a. gradation of incoming aggregates
- b. gradation and asphalt content of RAP
- c. combined gradations of hot bins
- d. extracted asphalt content
- e. mix gradation
- f. gradation of cold feed (drum mixers)

Post all current control charts in the asphalt lab where they can be seen.

Formulate all design mixes. Submit design mixes to the Consultant for verification prior to their use. Provide process control of all materials during handling, blending, mixing and placing operations.

III. QUALITY CONTROL SYSTEM:

1. General Requirements. Furnish and maintain a quality control system that provides reasonable assurance that all materials and products submitted to the Consultant for acceptance meet the Contract requirements. Perform, or have performed, the inspection and tests required to substantiate product conformance to Contract requirements, and also perform, or have performed, all inspections and tests otherwise required by the Contract. Keep a qualified quality control technician available at the asphalt plant at all times when producing asphalt mix for the City. Place a qualified person in responsible charge of the paving operations. Document the quality control procedures, inspection and tests, and make that information available for review by the Consultant throughout the life of the Contract.

2. Documentation. Maintain adequate records of all inspections and tests. Record the nature and number of tests made, the number and type of deficiencies found, the quantities approved and rejected, and the nature of corrective action taken, as appropriate. The Consultant may review and approve all documentation procedures prior to the start of the work. The Consultant will take ownership of all charts and records documenting the Contractor's quality control tests and inspections upon completion of the work.

3. Charts and Forms. Record all conforming and nonconforming inspections and test results on approved forms and charts, and keep them up to date and complete and make them available at all times to the Consultant during the performance of the work. Prepare charts of test properties for the various materials and mixtures on charts and forms approved by the Consultant. The Consultant will furnish a copy of each applicable chart and form. Provide a supply of the charts and forms from the copy furnished. Obtain the Consultant's approval of non-standard forms and charts prior to using them.

4. Corrective Actions. Take prompt action to correct any errors, equipment malfunctions, process changes or other problems that result or could result in the submission of materials, products or completed construction that do not meet the requirements of these Specifications. When it becomes evident to the Consultant that the Contractor is not controlling his process and is making no effort to take corrective actions, the Consultant will require the Contractor to cease plant operations until such time as the Contractor can demonstrate that he can and is willing to control the process.

5. Laboratories with Measuring and Testing Equipment. Furnish a fully equipped asphalt laboratory (permanent or portable) at the production site, and meeting the following requirements:

a. Area - Provide an effective working area for the laboratory that is a minimum of 180 ft² [17 m²]. This area does not include the space for desks, chairs and file cabinets.

b. Lighting - Provide lighting in the lab adequate to illuminate all areas of work.

c. Temperature Control - Equip the lab with heating and air conditioning units that provide a satisfactory working environment.

d. Ventilation - Equip the lab with fume hoods and exhaust fans that will remove all hazardous fumes from within the laboratory in accordance with OSHA requirements.

e. Equipment and Supplies - Furnish the lab with the necessary sampling and testing equipment, and supplies, for performing Contractor quality control and Consultant's sampling and testing. A detailed list of equipment and supplies required for each test is included in the ASTM requirements for each test.

When running plants at a high production rate, furnish additional testing equipment as necessary to allow the completion of the Contractor's quality control tests and the Department's Consultant's tests within the specified time frame.

6. Sampling and Testing. Use the sampling and testing methods and procedures that the Consultant provides to determine quality conformance of the materials and products. The Consultant will use these same methods and procedures for its tests. Include the sampling for other material characteristics on a random basis and the plotting of the test results on control charts in the Quality Control Plan.

7. Alternative Procedures. The Contractor may use alternative sampling methods, procedures and inspection equipment when such procedures and equipment provide, as a minimum, the quality assurance required by the Contract Documents. Prior to applying such alternative procedures, describe them in a written proposal and demonstrate for the Consultant's approval that their effectiveness is equal to or better than the Contract requirements. In case of dispute as to whether certain proposed procedures provide equal assurance, use the procedures stipulated by the Contract Documents.

8. Nonconforming Materials. Establish and maintain an effective and positive system for controlling nonconforming materials, including procedures for identification, isolation and disposition. Reclaim or rework nonconforming materials in accordance with procedures acceptable to the Consultant. Discuss the details of this system at the preconstruction conference, and make these details a part of the record of the conference.

9. Inspection at Subcontractor or Supplier Facilities. The Consultant reserves the right to inspect materials not manufactured within the Contractor's facility. The Consultant's inspection does not constitute acceptance and does not, in any way, replace the Contractor's inspection or otherwise relieve the Contractor of his responsibility to furnish an acceptable material or product. When the Consultant inspects

the subcontractor's or supplier's product, such inspection does not replace the Contractor's responsibility to inspect such subcontractor's or supplier's product.

Inspect subcontracted or purchased materials when received, as necessary, to ensure conformance to Contract requirements. Report to the Consultant any nonconformance found on Consultant source-inspected material, and require the supplier to take necessary corrective action.

331-5.3 Defective Materials:

331-5.3.1 Acceptance or Rejection: Following the application of the appropriate acceptance plan, the Consultant will make the final decision as to the acceptance, rejection or acceptance at an adjusted payment.

331-5.3.2 Disposition: For nonconforming materials, products, items of construction or complete construction that are not adaptable to correction by reworking, either remove and replace the nonconforming work, or accept no payment or an adjusted payment as stated in these Specifications, or, if not stated, as directed by the Consultant.

331-5.4 General Basis of Adjusted Payment For Deficiencies: When the Consultant determines that a deficiency exists, the Consultant will apply the applicable payment factor as shown in these Specifications. When the Consultant determines that multiple deficiencies exist, the Consultant will apply an adjustment to the material that is identified by each deficiency. The Consultant will apply the adjustment for each deficiency separately as it occurs. The Consultant will not allow an adjustment to be affected by any other adjustment. As an exception to the foregoing requirements, when there are two or more deficiencies in the gradation acceptance tests (% pass No. 4 [4.75 mm] sieve, % pass No. 10 [2.0 mm] sieve, % pass No. 40 [425 µm sieve], % pass No. 200 [75 µm] sieve) the Consultant will only apply the greater adjustment. The Consultant will express all reductions in payment in terms of equivalent pay items at no pay. When the item is measured by the ton [metric ton], the Consultant will convert the area in the field, which is measured in feet [meters], to equivalent tons [metric tons] and by using the average calculated spread. When the pay item is measured by the square yard [square meter], the Consultant will convert the quantity at the production point, which is measured in tons [metric tons], to equivalent square yards [square meters] at the design thickness and by using the laboratory density as a conversion factor.

331-6 Acceptance of the Mixture at the Plant.

331-6.1 General: The Consultant will accept the bituminous mixture at the plant, with respect to gradation and asphalt content. The material will be tested for acceptance in accordance with the provisions of 331-5 and the following requirements. However, the Consultant will reject any load or loads of mixture which are unacceptable for reason of being excessively segregated, aggregates improperly coated, or of excessively high or low temperature for use in the work.

For initial use of a Type S or FC-3 mix design with a Florida limestone source north of the 28th parallel at a particular plant, limit the first day's production to a maximum of 100 tons [92 metric tons]. Resume production upon notification of acceptable Marshall properties as determined in accordance with 331-6.4.

331-6.2 Acceptance Procedures: Control all operations in the handling, preparation, and mixing of the asphalt mix so that the percent bitumen and the percents passing the No. 4, No. 10, No. 40 and No. 200 [4.75 mm, 2.00 mm, 425 µm and 75 µm] sieves will meet the approved job mix formula within the tolerance shown in Table 331-6.

Table 331-6 Tolerances for Tests	
Characteristic	Tolerance*
Asphalt Content (Extraction)	±0.55%
Asphalt Content (Printout)	±0.15%
Passing No. 4 [4.75 mm] sieve	±7.00%
Passing No. 10 [2.00 mm] sieve	±5.50%
Passing No. 40 [425 µm] sieve**	±4.50%
Passing No. 200 [75 µm] sieve	±2.00%

*Tolerances for sample size of n=1. See Table 331-7 for other sample sizes n=2 through n=6.
**Applies only to Types S-I, S-II, S-III, and FC-3.

Acceptance of the mixture will be on the basis of test results on consecutive random samples. The bituminous mixture will be sampled and tested at the plant as specified in 331-4.4.2.

Calculations for the test results for bitumen content and gradation (percentages passing No. 4, No. 10, No. 40 and No. 200 [4.75 mm, 2.00 mm, 425 µm and 75 µm] sieves) will be shown to the nearest 0.01. Calculations for arithmetic averages will be carried to the nearest 0.001 and rounded to the nearest 0.01. Payment will be made on the basis of Table 331-7, "Schedule of Payment". The process will be considered out of control when the deviation of any individual test result from the mix design falls in the 80% pay factor for the "one test" column of Table 331-7. When this happens, the mix will be automatically terminated and production stopped. The approval of the Consultant will be required prior to resuming production of the mix. Acceptance will then be determined in accordance with Table 331-7.

All tests will be completed on the same day the sample was taken, when possible, and on no occasion will they be completed later than the following work day.

Table 331-7 Schedule of Payment (Asphalt Plant Mix Characteristics)						
Average of Accumulated Deviations of the Acceptance Tests from the Mix Design.						
Pay Factor	1-Test	2-Tests	3-Tests	4-Tests	5-Tests	6-Tests
Asphalt Cement Content (Extraction - FM 5-544 or 5-563)						
1.00	0.00-0.55	0.00-0.43	0.00-0.38	0.00-0.35	0.00-0.33	0.00-0.31
0.95	0.56-0.65	0.44-0.50	0.39-0.44	0.36-0.40	0.34-0.37	0.32-0.36
0.90	0.66-0.75	0.51-0.57	0.45-0.50	0.41-0.45	0.38-0.42	0.36-0.39
0.80*	over 0.75	over 0.57	over 0.50	over 0.45	over 0.42	over 0.39
Asphalt Cement Content (Printout)						
1.00	0.00-0.15	0.00-0.15	0.00-0.15	0.00-0.15	0.00-0.15	0.00-0.15
0.95	0.16-0.25	0.16-0.25	0.16-0.25	0.16-0.25	0.16-0.25	0.16-0.25
0.90	0.26-0.35	0.26-0.35	0.26-0.35	0.26-0.35	0.26-0.35	0.26-0.35
0.80*	over 0.35	over 0.35	over 0.35	over 0.35	over 0.35	over 0.35
No. 4 [4.75 mm] sieve**						
1.00	0.00-7.00	0.00-5.24	0.00-4.46	0.00-4.00	0.00-3.68	0.00-3.45
0.98	7.01-8.00	5.25-5.95	4.47-5.04	4.01-4.50	3.69-4.13	3.46-3.86
0.95	8.01-9.00	5.96-6.66	5.05-5.62	4.51-5.00	4.14-4.58	3.87-4.27
0.90	9.01-10.00	6.67-7.36	5.63-6.20	5.01-5.50	4.59-5.02	4.28-4.67
0.80*	over 10.00	over 7.36	over 6.20	over 5.50	over 5.02	over 4.67
No. 10 [2.00 mm] sieve**						
1.00	0.00-5.50	0.00-4.33	0.00-3.81	0.00-3.50	0.00-3.29	0.00-3.13
0.98	5.51-6.50	4.34-5.04	3.82-4.39	3.51-4.00	3.30-3.74	3.14-3.54
0.95	6.51-7.50	5.05-5.74	4.40-4.96	4.01-4.50	3.75-4.18	3.55-3.95
0.90	7.51-8.50	5.75-6.45	4.97-5.54	4.51-5.00	4.19-4.63	3.96-4.36
0.80*	over 8.50	over 6.45	over 5.54	over 5.00	over 4.63	over 4.36
No. 40 [425 µm] sieve**						
1.00	0.00-4.50	0.00-3.91	0.00-3.65	0.00-3.50	0.00-3.39	0.00-3.32
0.98	4.51-5.50	3.92-4.62	3.66-4.23	3.51-4.00	3.40-3.84	3.33-3.72
0.95	5.51-6.50	4.63-5.33	4.24-4.81	4.01-4.50	3.85-4.29	3.73-4.13
0.90	6.51-7.50	5.34-6.04	4.82-5.39	4.51-5.00	4.30-4.74	4.14-4.54
0.80*	over 7.50	over 6.04	over 5.39	over 5.00	over 4.74	over 4.54
No. 200 [75µm] sieve**						
1.00	0.00-2.00	0.00-1.71	0.00-1.58	0.00-1.50	0.00-1.45	0.00-1.41
0.95	2.01-2.40	1.72-1.99	1.59-1.81	1.51-1.70	1.46-1.63	1.42-1.57
0.90	2.41-2.80	2.00-2.27	1.82-2.04	1.71-1.90	1.64-1.80	1.58-1.73
0.80*	over 2.80	over 2.27	over 2.04	over 1.90	over 1.80	over 1.73
*If approved by the Consultant based on an engineering determination that the material is acceptable to remain in place, the Contractor may accept the indicated partial pay. Otherwise, remove and replace the material at no cost to the City at any item.						
**When there are two or more reduced payments for these items, only the greatest reduction in payment will be applied. CAUTION: This rule applies only to these four gradation test results.						
NOTES:						
(1) The No. 40 [425 µm] sieve applies to Type S-I, S-II, S-III and FC-3.						
(2) Deviations are absolute values with no plus or minus signs.						

331-6.3 Automatic Batch Plant With Printout: Acceptance determinations for asphalt content for mixtures produced by automatic batch plants with printout will be based on the calculated bitumen content using the printout of the weights of asphalt actually used. Acceptance determinations for gradations (No. 4, No. 10, No. 40 and No. 200 [4.75 mm, 2.00 mm, 425 µm and 75 µm] sieves) will be based on the actual test results from extraction gradation analyses. Payment will be made based on the provisions of Table 331-7.

331-6.4 Additional Tests: The Consultant reserves the right to run any test at any time for informational purposes and for determining the effectiveness of the Contractor's quality control.

331-6.4.1 Determination of Marshall and Volumetric Properties: The Consultant will determine the Marshall and Volumetric Properties of the mix at a minimum frequency of 50 tons, to determine whether or not the produced mix is meeting the specification requirements. The Consultant will sample and prepare test specimens and test them in accordance with FM 5-511 for Marshall stability and flow, T 209 for maximum specific gravity, and T 166 for density. Volumetric properties will be determined for Type S and FC-3 mixes only.

331-6.4.2 Failing Marshall Properties: When the average value of the specimens fails to meet specification requirements for stability or flow, the Consultant may stop the plant operations until all specification requirements can be met or until another verified mix design has been approved. Make revisions to a mix design in accordance with 331-4.3.2. If the Lab Density of the mix during production differs from the value shown on the verified mix design by more than 2 lbs/ft³ [32 kg/m³] for two consecutive tests, the Consultant will revise the target value.

331-6.4.3 Failing Volumetric Properties (Type S and FC-3 mixes only): When the Consultant determines the air void content to be less than 3.0%, or greater than 6.5%, make appropriate adjustments to the mix. When the air void content is determined to be less than 2.5% or greater than 7.0% on any one test, or less than 3.0% on two consecutive tests, cease operations until the problem has been resolved.

331-6.4.4 Resuming Production: In the event that plant operations are stopped due to a failure to meet specification requirements, obtain the Consultant's approval before resuming production of the mix. Limit production to a maximum of 50 tons [45 metric tons]. At this time, the Marshall and volumetric properties of the mix will be verified. After the Marshall and volumetric properties are verified, full scale production of the mix may be resumed.

331-6.5.5 Disposition of In-Place Material: Any material in-place that is represented by the failing test results (low stability, high flow, or less than 2.5% air voids) will be evaluated by the Consultant to determine if removal and replacement is necessary. Remove and replace any in-place material, if required, at no cost to the City.

331-7 Acceptance of the Mixture at the Roadway

331-7.1 Density Control Nuclear Method: The Contractor shall test and determine the in-place density of each course of asphalt mix construction using the Nuclear Density Backscatter Method as specified by T 238 (Method B). For a completed course, obtain an average in-place density of at least 98% of the valid control strip density. The Contractor shall certify compliance of each lot or pass of the paving train (refer to 331-7.3 and 331-7.4) with the density requirements contained in this section of the specifications. No payment shall be made for any lot without certified compliance to the satisfaction of the Consultant.

Do not perform density testing on patching courses, leveling and intermediate courses less than 1 inch [25 mm] thick (or a specified spread rate less than 100 lb/yd² [55kg/m²]), overbuild courses where the minimum thickness is less than 1 inch [25 mm], projects less than 1,000 feet [300 m], sections with variable width, or open-graded friction courses. Compact these courses, with the exception of open-graded friction courses in accordance with 330-10.1.2.

331-7.2 Control Strips: In order to determine the density of compacted asphalt mixtures for the purpose of acceptance, first establish a control strip. Construct one or more control strips for the purpose of determining the control strip density. Construct a control strip at the beginning of asphalt construction and one thereafter for each successive course. Construct a new control strip for any change in the composition of the mix design, underlying pavement structure, compaction equipment, or procedures. The Consultant may require an additional control strip when the Consultant deems it necessary to establish a new control strip density or confirm the validity of the control strip density being used at that time. The Contractor may also request a confirmation of the control strip density. Construct the control strip as a part of a normal day's run.

Construct a control strip 300 feet [100 m] in length and of an adequately uniform width to maintain a consistent compaction effort throughout the section. When constructing the control strip, start it between 300 and 1,000 feet [100 and 300 m] from the beginning of the paving operation. Construct a control strip of a thickness that is the same as that specified for the course of which it is a part. Construct the control strip using the same mix, the same paving and rolling equipment, and the same procedures as those used in laying the asphalt course of which the control strip is to become a part. Leave every control strip in place to become a portion of the completed roadway.

In order to determine the acceptability of the control strip, make ten nuclear density determinations at random locations within the control strip after completing the compaction of the control strip. Do not make any determinations within 12 inches [300 mm] of any unsupported edge. Use the average of these ten determinations for the Control Strip Density. For purposes of determining the percent of laboratory density, as required in Table 331-8, the Consultant will develop a correction factor at four nuclear density locations from 6 inch [150 mm] diameter cores or by direct transmission nuclear determination where applicable. Cut the cores prior to opening the roadway to traffic. The Consultant will calculate the percent of lab density to the nearest 0.01% and round it to the nearest 0.1%. Should the percent of lab density in a control strip exceed 99.0%, notify the Consultant immediately. In the event that a control strip does not meet the minimum density requirements specified in Table 331-8, take appropriate corrective actions and construct a new control strip. If three consecutive control strips fail to meet specification requirements, the Consultant will limit production and placement of the mix to 400 to 500 feet [215 to 150 m], regardless of the thickness and width the Contractor is placing, until the Contractor obtains a passing control strip.

Once the Contractor has obtained a passing control strip after a failing control strip (for the same mix, layer, and project), the Consultant will use the passing control strip to accept all previously laid mix. In the event the Contractor does not obtain a passing control strip, and this particular mix, layer, etc., is completed on the project, the Consultant will evaluate density in accordance with FM 5-543.

Table 331-8			
Roadway Requirements for Bituminous Concrete Mixes			
Mix Type	Density	Minimum Control Strip Density* (% of Lab Density)	Surface Tolerance
S-I, S-II, S-III, Type II, Type III, SAHM	per 331-7	96	per 330-12
ABC-1, ABC-2, ABC-3	per 280-8.6	96	per 200-7
FC-2	No density required	N/A	per 330-12
FC-3	per 331-7	96	per 330-12

* The minimum control strip density requirement for shoulders is 95% of lab density.

331-7.3 Standards: For the purpose of acceptance and partial payment, the Consultant will divide each day's production. The standard is 1,000 feet [300 m] of any pass made by the paving train regardless of the width of the pass or the thickness of the course. A test area will be 250 feet [75 m] or less. The Consultant will consider pavers traveling in echelon as two separate passes. When at the end of a production day, the completion of a given course, layer, or mix, or at the completion of the project, and the size is determined to be less than 1,000 feet [300 m], it will be considered a partial. Handle partials as follows:

If the length is 500 feet [150 m] or less, and a standard length 1,000 feet from the same day, mix, layer, and project is available, then the standard will be redefined to include this and the number of tests required for the combined area will be as shown in Table 331-9.

If the partial is 500 feet [150 m] or less, and a standards length of 1,000 feet from the same day, mix, layer, and project is not available, the Consultant will evaluate the partial separately and perform the number of tests required for the partial as shown in Table 331-9.

If the partial is greater than 500 feet [150 m] long, the Consultant will evaluate the partial separately and perform the number of tests required for the partial as shown in Table 331-9.

Table 331-9	
Testing Requirements for Partial	
Partial Size	Number of Tests
Less than 500 feet [150 m]	3
501 to 650 feet [151 to 195 m]	4
651 to 800 feet [196 to 240 m]	5
801 to 1,000 feet [241 to 300 m]	6
1,001 to 2,000 feet [301 to 600 m]	7
Greater than 2,000 feet [600 m]	2 Standards

For each standard length and partial, the Consultant will make density determinations at a frequency shown in Table 331-9 at random locations, but will not take them within 12 inches [300 mm] of any unsupported edge. The Consultant will determine the random locations by the use of statistically derived stratified random

number tables. For the Contractor to receive full payment for density, the average density of a standard shall be a minimum of 98.0% of the control strip density. Once the Consultant determines the average density of a standard length, do not provide additional compaction to raise the average. Notify the Consultant should the average density for two consecutive standard lengths be greater than 102% of control strip density.

331-7.4 Acceptance: The Consultant will accept the completed pavement with respect to density on a LOT basis. The Department will make partial payment for those Standards that have an average density less than 98.0% of the Control Strip Density based on Table 331-10:

Table 331-10	
Payment Schedule For Density	
Percent of Control Strip Density*	Percent of Payment
98.0 and above	100
97.0 to less than 98.0	95
96.0 to less than 97.0	90
Less than 96.0**	75

* In calculating the percent of control strip density, do not round off the final percentage.

** If approved by the Consultant, based on an engineering determination that the material is acceptable to remain in place, the Contractor may accept the indicated partial pay; otherwise, remove and replace the material at no expense to the City. The Contractor may remove and replace the material at no expense to the City at any time.

331-7.5 Density Requirements for Small Projects and Other Non-mainline Roadway Areas: For projects less than 750 feet [225 m] in length and bridge projects with approaches less than 750 feet [225 m] each side, do not apply the requirements for control strips and nuclear density determination. Use the standard rolling procedures as specified in 330-11.1.2. Do not apply the provisions for partial payment to these small projects.

In other non-mainline roadway areas where it is not practical to establish a control strip, such as parking areas, toll plazas, turn lanes, and acceleration/deceleration lanes, the Contractor may use the standard rolling procedure to determine density requirements if so authorized in writing by the Consultant.

331-7.6 Surface Tolerance: The bituminous mixture will be accepted on the roadway with respect to surface tolerance in accordance with 330-13.

331-7.7 Warranty: The contractor shall warrant the Asphalt Pavement, placed under this specification, for a period of one year after final acceptance. If, during this one year period, the pavement distress exceeds threshold values determined in accordance with 331-7.8, the Contractor shall provide remedial work at no cost to the City of Miami.

331-7.8 Pavement Condition: Threshold values and associated remedial work are specified in Table 331-7.8.

TABLE 331-7.8		
Type of Distress	Threshold Values	Remedial Work
Rutting	Depth > 0.4"	Remove and replace 1.5" depth the full lane width for the area plus 50' either side
Cracking	Cumulative length of cracking > 300' for cracks	Remove and replace the distressed area to the full depth of all layers, and to the full lane width
Pot holes, Slippage	Observation by Engineer	Remove and replace distressed area(s) to full distressed depth and to a minimum surface area of 150% of each distressed area
Bleeding	Loss of surface texture due to excess asphalt	Remove and replace distressed area(s) to full distressed depth and to a minimum surface area of 150% of each distressed area

331-8 Method of Measurement.

The quantity to be paid for will be the weight of the mixture, in tons [metric tons], completed and accepted. The weight will be determined as provided in 320-2 (including the provisions for the automatic recordation system). The thickness of the asphalt shall be shown in inches (mm) on the plans but ALL payment will be made on the basis of weight.

The bid price for the asphalt mix will include the cost of the liquid asphalt or the asphalt recycling agent. There will be no separate payment for the bituminous material in the asphalt mix.

There will be no separate payment for Tack or Prime coat materials. These costs shall be included in the bid price for Type S Asphaltic Concrete.

331-9 Basis of Payment:

Price and payment will be full compensation for all the work specified under this Section, including the applicable requirements of Sections 320 and 330.

Payment will be made under:

Item No. 331- 2- Type S Asphaltic Concrete - per ton.

Item No. 2331- 2-Type S Asphaltic Concrete - per metric ton.

SECTION 337

ASPHALT CONCRETE FRICTION COURSES

Article 337 is deleted and then following substituted:

337-1 Description.

Construct an asphalt concrete friction course using the Contractor's Quality Control System as defined in these Specifications. This Section specifies mixes designated as FC-2 and FC-3.

Meet the plant and equipment requirements of Section 320, as modified herein. Meet the general construction requirements of Section 330, as modified herein.

337-2 Materials.

337-2.1 General Requirements: Meet the requirements specified in Division III of these Specifications as modified herein. The Engineer will base continuing approval of material sources on field performance.

337-2.2 Asphalt Rubber Binder: Meet the requirements of Section 336, and any additional requirements or modifications specified herein for the various mixtures

337-2.3 Coarse Aggregate: Meet the requirements of Section 901, and any additional requirements or modifications specified herein for the various mixtures.

337-2.4 Fine Aggregate: Meet the requirements of Section 902, and any additional requirements or modifications specified herein for the various mixtures.

337-2.5 Hydrated Lime: Meet the requirements of AASHTO M303 Type 1.

Provide certified test results for each shipment of hydrated lime indicating compliance with the specifications.

337-3 General Composition of Mixes.

337-3.1 General: Use a bituminous mixture composed of aggregate (coarse, fine, or a mixture thereof), asphalt rubber binder, and in some cases, fibers and/or hydrated lime. Size, uniformly grade and combine the aggregate fractions in such proportions that the resulting mix meets the requirements of this Section. The use of RAP material will not be permitted.

337-3.2 Specific Component Requirements by Mix:

337-3.2.1 FC-2:

337-3.2.1.1 Aggregates: In addition to the requirements of Section 901, meet the following coarse aggregate requirements. Use crushed granite, crushed slag or lightweight aggregates approved by the Engineer. Crushed limestone from the Oolitic formation, may be used if it contains a minimum of 12% non-carbonate material (as determined by FM 5-510), and has been approved for this use. Aggregates other than those listed above may be used if approved by the Engineer.

In addition to the requirements of Section 902, meet the following fine aggregate requirements. Use either crushed granite screenings, or crushed Oolitic limestone screenings for the fine aggregate.

337-3.2.1.2 Asphalt Rubber: Use an ARB-12 asphalt rubber.

337-3.2.1.3 Hydrated Lime: Add the lime at a dosage rate of 1.0% by weight of the total dry aggregate to mixes containing granite.

337-3.2.2 FC-3:

337-3.2.2.1: Aggregates: In addition to the requirements of Sections 901 and 902, use coarse and fine aggregate components which also meet the aggregate requirements for an SP-9.5 or SP-12.5 Superpave mix, respectively, as specified in Section 334.

Use an aggregate blend that consists of crushed granite, crushed Oolitic limestone, or a combination of the two. (Aggregates other than those listed above may be used if approved by the Engineer for use in friction courses.) Crushed limestone from the Oolitic formation may be used if it contains a minimum of 12% non-carbonate material as determined by FM 5-510 and the Engineer grants approval of the source prior to its use. As an exception, mixes that contain a minimum of 60% crushed granite may contain up to 40% fine aggregate from other approved sources.

337-3.2.2.2: Asphalt Binder: Use an ARB-5 asphalt rubber. If called for in the Contract, use a PG 76-22 meeting the requirements of 916-1.

337-3.3 Grading Requirements:

337-3.3.1 FC-2: Use a mixture having a gradation at design within the ranges shown in Table 337-1.

Table 337-1 FC-2 Gradation Design Range									
3/4 inch [19.0 mm]	1/2 inch [12.50 mm]	3/8 inch [9.50 mm]	No. 4 [4.75 mm]	No. 8 [2.36 mm]	No. 16 [1.18 mm]	No. 30 [600 :m]	No. 50 [300 :m]	No. 100 [150 :m]	No. 200 [75 :m]
100	85-100	55-75	15-25	5-10	--	--	--	--	2-4

Note: The No. 10 [2.00 mm] sieve may be used in lieu of the No. 8 sieve, with the same design range.

337-3.3.2 FC-3 Meet the design gradation requirements for a SP-9.5 Superpave mix passing above the restricted zone, as specified in Section 334.

337-4 Mix Design.

337-4.1 FC-2: Provide a previously approved Florida Department of Transportation mix design for FC-2 mixtures. Furnish the materials and all appropriate information (source, gradation, etc.) as specified in 334-3.2.5. The City of Miami will have two weeks to review the proposed mix design to approve or reject the proposed mix. The City will approve the design binder content for FC-2 based on the following ranges based on aggregate type:

Aggregate Type	Binder Content
Crushed Granite	5.5 - 7.0
Crushed Limestone (Oolitic)	6.5 - 8.0

337-4.2 FC-3: Provide a mix design conforming to the requirements of 334-2. Develop the mix design using an ARB-5 meeting the requirements of Section 336.

337-4.3 Revision of Mix Design: For FC-3, meet the requirements of 334-2

337-5 Contractor's Quality Control.

Provide the necessary quality control of the friction course mix and construction in accordance with the applicable provisions of 330-2 and 334-5-2 for FC-2, and 330-2 and 334-5.2 for FC-3.

The Contractor will continually monitor the spread rate to ensure uniform thickness and the Consultant will periodically check for compliance. Provide quality control procedures for daily monitoring and control of spread rate variability. If the spread rate varies by more than 5% of the spread rate set by the Engineer in accordance with 337-9, immediately make all corrections necessary to bring the spread rate into the acceptable range.

337-6 Acceptance of the Mixture At the Plant.

337-6.1 FC-3: The FC-3 mix will be accepted at the plant in accordance with 334-2. In addition, the asphalt content of the mixture will be determined in accordance with FM 5-563 and the gradation will be determined in accordance with FM 1-T 030.

Characteristic	Tolerance (1)
Asphalt Binder Content (%)	Target ± 0.60
Passing 3/8 inch [9.50 mm] Sieve (%)	Target ± 7.50
Passing No. 4 [4.75 mm] Sieve (%)	Target ± 6.00
Passing No. 8 [2.36 mm] Sieve (%)	Target ± 3.50

(1) Tolerances for sample size of n = 1 from the verified mix design

337-6.2.1 Individual Test Tolerances for FC-3 Production: In the event that an individual Quality Control test result of a subplot for gradation ($P_{-3/8}$, P_{-4} , and P_{-8}), or asphalt binder content does not meet the requirements of Table 337-2, steps shall be taken to correct the situation and actions taken shall be reported to the Engineer.

In the event that two consecutive individual Quality Control test results for gradation ($P_{-3/8}$, P_{-4} , and P_{-8}) or asphalt binder content do not meet the requirements of Table 337-2, the LOT will be automatically terminated and production of the mixture stopped until the problem is adequately resolved (to the satisfaction of the Engineer), unless it can be demonstrated to the satisfaction of the Engineer that the problem can immediately be (or already has been) resolved. Evaluate any material represented by the failing test result in accordance with the following:

Assume responsibility for evaluating all low pay factor material or other material represented by failing test results, placed on the project. Complete the evaluation in accordance with the following:

1. Remove and replace the material at no cost to the City.
2. Obtain an engineering analysis, as directed by the Consultant, by an independent laboratory (as approved by the Consultant) to determine if the material can (a) remain in place, for this case the appropriate composite pay factor will be applied, or (b) be removed and replaced at no cost to the City. The analysis will be a signed and sealed report by a Professional Engineer licensed in the State of Florida. The Consultant may, at his sole option, perform an engineering evaluation to determine if the material is suitable to (a) remain in place or (b) be removed and replaced at no cost to the City.

337-7 Acceptance of the Mixture at the Roadway.

337-7.1 FC-3: The FC-3 mixtures will be accepted on the roadway with respect to surface tolerance in accordance with the applicable requirements of 330-13. No density testing will be required for these mixtures.

337-7.2 Additional Tests: The provisions of 334-5 will apply to FC-2 and FC-3.

337-8 Special Construction Requirements.

337-8.1 Hot Storage of FC-2 Mixtures: When using surge or storage bins in the normal production of FC-5, do not leave the mixture in the surge or storage bin for more than one hour.

337-8.2 Longitudinal Grade Controls for Open-Graded Friction Courses: On FC-2, do not use a longitudinal grade control (skid, ski or traveling stringline). Use a joint matcher.

Non SI Units

$$PLI = \frac{\text{Total Weight of Roller (pounds)}}{\text{Total Width of Drums (inches)}}$$

SI Units

$$\frac{\text{kg}}{\text{mm}} = \frac{\text{Total Weight of Roller (kilograms)}}{\text{Total Width of Drums (millimeters)}}$$

337-8.3 Temperature Requirements for FC-2:

337-8.3.1 Air Temperature at Laydown: Spread the mixture only when the air temperature (the temperature in the shade away from artificial heat) is at or above 60°F [15°C]. In no case shall the mixture be placed at temperatures lower than 60°F [16°C].

337-8.3.2 Temperature of the Mix: Heat and combine the asphalt rubber binder and aggregate in a manner to produce a mix having a temperature, when discharged from the plant, meeting the requirements of 290°F [145°C] or as directed by the Engineer. Meet all requirements of 330-9.1.2 at the roadway. The target mixing temperature shall be established at 320°F [160°C].

337-8.4 Compaction of FC-2: Perform only seal roller, with a tandem steel wheeled roller. Do not allow the weight of the steel wheeled roller to exceed 135 PLI [2.4 6 kg/mm], determined as follows:

Non SI Units

$$PLI = \frac{\text{Total Weight of Roller (pounds)}}{\text{Total Width of Drums (inches)}}$$

SI Units

$$\frac{\text{kg}}{\text{mm}} = \frac{\text{Total Weight of Roller (kilograms)}}{\text{Total Width of Drums (millimeters)}}$$

Perform seal rolling with a single coverage and with a nominal amount of overlap. Where the lane being placed is adjacent to a previously laid mat, do not pinch the longitudinal joint with the roller on the cold mat. Pinch the longitudinal joint with the roller on the mat being rolled, overlapping onto the cold mat by no more than three inches [75 mm]. Never allow a roller on the mat after completing the seal rolling.

(Any variation of this equipment requirement must be approved by the Engineer.) Establish an appropriate rolling pattern for the pavement in order to effectively seat the mixture without crushing the aggregate. In the event that the roller begins to crush the aggregate, reduce the number of coverages or the PLI of the rollers. If the rollers continue to crush the aggregate, use a tandem steel-wheel roller weighing not more than 135 lb/in (PLI) [2.4 kg/mm] of drum width.

337-8.5. Temperature Requirements for FC-3:

337-8.5.1 Air Temperature at Laydown: Spread the mixture only when the air temperature (the temperature in the shade away from artificial heat) is at or above 45°F [7°C].

337-8.5.2 Temperature of the mix: Heat and combine the asphalt rubber binder and aggregate in a manner to produce a mix having a temperature, when discharged from the plant, at 310°F [155°C] or as directed by the Engineer. Meet all requirements of 330-10.1.2 at the roadway.

337-8.6 Prevention of Adhesion: To minimize adhesion to the drum during the rolling operations, the Contractor may add a small amount of liquid detergent to the water in the roller.

At intersections and in other areas where the pavement may be subjected to cross-traffic before it has cooled, spray the approaches with water to wet the tires of the approaching vehicles before they cross the pavement.

337-8.7 Transportation Requirements of Friction Course Mixtures: Cover all loads of friction course mixtures with a tarpaulin.

337-9 Thickness of Friction Courses.

The thickness of the friction courses will be based on the spread rate set by the Engineer. Plan quantities are based on the maximum spread rate within the ranges shown below. Pay quantities may be less, based on the spread rate set by the Engineer.

337-9.1 Spread Rate of FC-2: For FC-2 with granite, oolitic limestone, or other conventional aggregate, the Engineer will set the spread rate within the range of 50 - 60 lb/yd² [27 -34 kg/m²]. For lightweight aggregate, the Engineer will set the spread rate within the range of 28 - 35 lb/yd² [15-19 kg/m²].

337-9.2 Spread Rate of FC- 3: The Engineer will set the spread rate within the range of 100 - 110 lb/yd² [54 - 60 kg/m²].

337-10 Method of Measurement.

The quantity to be paid for will be the weight of the mixture, in tons [metric tons]. The pay quantity will be based on the average spread rate for the project, limited to a maximum of 105% of the spread rate set by the Engineer in accordance with 337-9.

The bid price for the asphalt mix will include the cost of the asphalt binder (asphalt rubber (or polymer), asphalt cement, ground tire rubber, anti-stripping agent, blending and handling) and the tack coat application as directed in 300-7, as well as fiber stabilizing additive and hydrated lime (if required). There will be no separate payment for the asphalt binder material in the asphalt mix. The weight will be determined as provided in 320-2 (including the provisions for the automatic recordation system).

Prepare a Certification of Quantities, using the Department's current approved form, for the certified asphalt concrete friction course pay item. Submit this certification to the Engineer no later than Twelve O'clock noon Monday after the estimate cut-off or as directed by the Engineer, based on the quantity of asphalt produced and accepted on the Contract. The certification must include the Contract Number, FPID Number, Certification Number, Certification Date, period represented by Certification and the tons [metric tons] produced for each asphalt pay item.

337-11 Basis of Payment.

Price and payment will be full compensation for all the work specified under this Section (including the applicable requirements of Sections 320 and 330).

Payment will be made under:

- Item No. 337- 7- Asphaltic Concrete Friction Course -per ton.
- Item No. 2337- 7- Asphaltic Concrete Friction Course -per metric ton.

**SECTION 425
INLETS, MANHOLES AND JUNCTION BOXES**

The following new Subarticle 425-6.9 is added:

425-6.9 Reworking Existing Drainage Structures:

All existing catch basins that are to remain and/or that will be disconnected from existing sanitary sewers or connected to the proposed storm sewer shall be reworked, if necessary, by re-plastering interior walls, all to the satisfaction of the Consultant. The cost for all reworking of catch basins shall be included in the unit price bid items in the Proposal and no additional compensation will be allowed.

The following Section is added:

**Section 523
PATTERNED/TEXTURED PAVEMENT**

523-1 Description.

Apply a patterned and/or textured treatment to asphalt or concrete, in accordance with manufacturer's recommendations. Treatments include both imprinted and surface applications.

Meet the requirements of Section 350 for Cement Concrete Pavement; meet the requirements of Section 331 for Type S asphalt or Section 337 Revised for FC-3. Meet manufacturer's recommendations for all other surface treatments.

For the purpose of this Specification, patterns are defined as visible surface markings; imprinted textures are defined as palpable surface markings.

Use the location, pattern/texture type (brick, stone, etc), and coating color as specified in plans.

523-2 Materials Certification.

Meet manufacturer's specifications for all pattern/texture templates, coating and coloring materials. Coefficient of friction (skid resistance) of imprinted and coated/colored textures must meet the value of adjacent pavement on which the textured pattern is placed. Use only material that is delivered to the job site in sealed containers bearing the manufacturer's original labels. Provide certification from the manufacturer that the imprinted texture, coating and coloring materials have a minimum three year performance measure as described below and that the coefficient of friction meets the value defined herein.

Performance measure for the imprinted textures is that imprint must maintain a depth of 50% of the original installed depth at the end of three years after Final Acceptance of the project. Surface coatings must maintain 80% of their original color at the end of three years after Final Acceptance of the project. Original color values will be measured at the time of Final Acceptance

523-3 Construction.

523-3.1 Surface Protection: Protect treated surfaces from traffic and environmental effects until the area is completely coated/imprinted, and any coatings have dried or cured according to the manufacturer's instructions.

523-3.2 Pavement Cuts: Complete all utility, traffic loop detector and other items requiring a cut and installation under the finished surface, prior to pattern installation

523-3.3 Installation Acceptance: Upon completion of the installation, the Consultant will check the area at random locations for geometric accuracy, as specified in the plans. If any of the chosen areas have an imprint depth of less than the manufacturer's specifications, correct the entire textured area, at no additional cost to the City.

Supply the specified color chips for the Consultant's use to visually determine that the material matches the color specified in the plans. For any continuous or touching area of an intersection, color materials must be from the same lot/batch.

523-4 Method of Measurement.

The quantity to be paid will be the area in square yards of patterned/textured pavement, measured in place, completed and accepted. No deduction will be made for the area(s) occupied by ornamental trees within the asphalt area, or other areas occupied by manholes, inlets, drainage structures, or by any public utility appurtenances within the area. Asphalt or concrete materials placed prior to treatment will be paid separately under the appropriate pay items.

523-5 Basis of Payment.

Price and payment shall be full compensation for all work specified in this Section. Surface materials, including colors, sealers, and/or resins, shall be included for payment under this Section.

Payment will be made under:

523-1 Pattered/Textured Pavement - Per square yard.

Section 580 is modified and expanded as follows:

**SECTION 580
LANDSCAPE INSTALLATION**

580-1 Description.

Plant trees and shrubs of the species, size, and quality indicated in the plans.

The City reserves the right to adjust the number and location of any of the designated types and species to be used at any of the locations shown, in order to provide for any unanticipated effects which might become apparent after the substantial completion of other phases of the project, or for other causes.

580-2 Materials.

580-2.1 Plants:

580-2.1.1 Authority for Nomenclature; Species, etc.: For the designated authority in the identification of all plant material, refer to two publications of L.H. Bailey: "Hortus III" and "Manual of Cultivated Plants," and ensure that all specimens are true to type, name, etc., as described therein. For the standard nomenclature, refer to the publication of the American Joint Committee on Horticultural Nomenclature, "Standardized Plant Names."

580-2.1.2 Grade Standards and Conformity with Type and Species: Only use nursery grown plant material except where specified as Collected Material. Use nursery grown plant material that complies with all required inspection, grading standards, and plant regulations in accordance with the latest edition of the Florida Department of Agriculture's "Grades and Standards for Nursery Plants".

Except where a lesser grade might be specifically specified in the plans, ensure that the minimum grade for all trees and shrubs is Florida No. 1. Ensure that all plants are the proper size and grade at the time of delivery to the site, throughout the project construction period and during the plant establishment period.

Ensure that plant materials are true to type and species and that any plant materials not specifically covered in Florida Department of Agriculture's "Grades and Standards for Nursery Plants" conform in type and species with the standards and designations in general acceptance by Florida nurseries.

Ensure that plant materials are shipped with tags stating the botanical and common name of the plant.

580-2.1.3 Inspection and Transporting: Move nursery stock in accordance with all Federal and State regulations therefore, and accompany each shipment with the required inspection certificates for filing with the Consultant..

580-2.2 Water: Meet the requirements of Section 983.

580-3 Specific Requirements for the Various Plant Designations.

580-3.1 Balled-and-Burlapped Plants (B&B), and Wired Balled-and-Burlapped (WB & B):

580-3.1.1 General: Properly protect the root ball of these plants until planting them. The Consultant may reject any plant which shows evidence of having been mishandled.

Set the B&B and WB&B plants then remove the top □ of all wire, rope, and binding surrounding the plant. Remove the burlap from the top 4 inches [100 mm] of the root ball. Do not disturb the root ball in any way. Bare root material is not allowed for substitution.

At least 90 days before digging out B & B and WB & B plants, root-prune those 1□ inches [38 mm] or greater in diameter and certify such fact on accompanying invoices.

580-3.1.2 Provisions for Wiring: For plants grown in soil of a loose texture, which does not readily adhere to the root system (and especially in the case of large plants or trees), the Engineer may require WB & B plants. For WB

& B plants, before removing the plant from the excavated hole, place sound hog wire around the burlapped ball, and loop and tension it until the tightened wire netting substantially packages the burlapped ball such as to prevent disturbing of the loose soil around the roots during handling.

580-3.2 Container-Grown Plants (CG): The Consultant will not accept any CG plants with roots which have become pot-bound or for which the top system is too large for the size of the container. Fully cut and open all containers in a manner that will not damage the root system. Do not remove CG plants from the container until immediately before planting to prevent damage to the root system.

580-3.3 Collected Plants (Trees and Shrubs) (C): Use C plants which have a root ball according to □Florida Grades and Standards for Nursery Plants□. Do not plant any C plant before the Engineer's inspection and acceptance at the planting site.

580-3.4 Collected Plants (Herbaceous) (HC): The root mass and vegetative portions of collected herbaceous plants shall be as large as the specified container-grown equivalent. Do not plant any collected plant before inspection and acceptance by the Consultant.

580-3.5 Specimen Plants (Special Grade): When Specimen (or Special Grade) plants are required, label them as such on the plant list, and tag the plant to be furnished.

580-3.6 Palms: Wrap the roots of all plants of the palm species before transporting, except if they are CG plants and ensure that they have an adequate root ball structure and mass for healthy transplantation as defined in □Florida Grades and Standards for Nursery Plants□.

The Engineer will not require burlapping if the palm is carefully dug from marl or heavy soil that adheres to the roots and retains its shape without crumbling. During transporting and after arrival, carefully protect root balls of palms from wind and exposure to the sun. Muck grown palms are not allowed. After delivery to the job site, if not planting the palm within 24 hours, cover the root ball with a moist material. Plant all palms within 48 hours of delivery to the site.

Move sabal and coconut palms in accordance with the "Florida Grades and Standards for Nursery Plants."

580-3.7 Substitution of Container-Grown (CG) Plants: With the Consultant's approval, the Contractor may substitute CG plants for any other root classification types, if he has met all other requirements of the Contract Documents.

580-4 Planting Requirements.

580-4.1 Layout: Prior to any excavation or planting, mark all planting beds and individual locations of palms, trees, large shrubs and proposed art and architectural structures, as shown in the plans, on the ground with a common bright orange colored spray paint, or with other approved methods, within the project limits. Obtain the Consultant's approval and make necessary utility clearance requests.

580-4.2 Excavation of Plant Holes: Excavate plant holes after an area around the plant three times the size of the root ball has been tilled to a depth of the root ball. Ensure that the plant hole is made in the center of the tilled area only to the depth of the plant root ball.

Where excess material has been excavated from the plant hole, use the excavated material to backfill to proper level.

580-4.3 Setting of Plants: Center plants in the hole. Lower the plant into the hole so that it rests on a prepared hole bottom such that the roots are level with, or slightly above, the level of their previous growth and so oriented such as to present the best appearance.

Backfill with native soil, unless otherwise specified on the plans. Firmly rod and water-in the backfill so that no air pockets remain. Apply a sufficient quantity of water immediately upon planting to thoroughly moisten all of the backfilled earth. Keep plants in a moistened condition for the duration of the planting period.

When so directed, form a water ring 6 inches [150 mm] in width to make a water collecting basin with an inside diameter equal to the diameter of the excavated hole. Maintain the water ring in an acceptable condition.

580-4.4 Special Bed Preparation: Where multiple or mass plantings are to be made in extended bedding areas, and the plans specify Special Bed Preparation, prepare the planting beds as follows:

Remove all vegetation from within the area of the planting bed and excavate the surface soil to a depth of 6 inches [150 mm]. Backfill the excavated area with peat, sand, finish soil layer material or other material to the elevation of the original surface. Till the entire area to provide a loose, friable mixture to a depth of at least 8 inches [200 mm]. Level the bed only slightly above the adjacent ground level. Then mulch the entire bedding area, in accordance with 580-8.

580-5 Staking and Guying.

580-5.1 General: When specified in the plans, or as directed by the Consultant, stake plants in accordance with the following.

Use wide plastic, rubber or other flexible strapping materials to support the tree to stakes or ground anchors that will give as the tree moves in any direction up to 30 degrees. Do not use rope or wire through a hose. Use guy chords, hose or any other thin bracing or anchorage material which has a minimum 12 inches [300 mm] length of high visibility flagging tape secured to guys, midway between the tree and stakes for safety.

Stake trees larger than 1 inch [25 mm] diameter and smaller than 2 inches [50 mm] diameter with a 2 by 2 inch [50 by 50 mm] stake, set at least 2 feet [0.6 m] in the ground and extending to the crown of the plant. Firmly fasten the plant to the stake with flexible strapping materials as noted above.

580-5.2 Trees of 2 to 3-1/2 inches [50 to 90 mm] Caliper: Stake all trees, other than palm trees, larger than 2 inches [50 mm] caliper and smaller than 3-1/2 inches [90 mm] caliper with two 2 by 4 inch [50 by 100 mm] stakes, 8 feet [2.4 m] long, set 2 feet [0.6 m] in the ground. Place the tree midway between

the stakes and hold it firmly in place by flexible strapping materials as noted above.

580-5.3 Large Trees: Guy all trees, other than palm trees, larger than 3-1/2 inches [90 mm] caliper, from at least three points, with flexible strapping materials as noted above.

Anchor flexible strapping to 2 by 4 by 24 inch [50 by 100 by 600 mm] stakes, driven into the ground such that the top of the stake is at least 3 inches [75 mm] below the finished ground.

580-5.4 Special Requirements for Palm Trees: Brace palms which are to be staked with three 2 by 4 inch [50 by 100 mm] wood braces, toe-nailed to cleats which are securely banded at two points to the palm, at a point one third the height of the trunk. Pad the trunk with five layers of burlap under the cleats. Place braces approximately 120 degrees apart and secure them underground by 2 by 4 by 12 inch [50 by 100 by 300 mm] stake pads.

580-6 Tree Protection and Root Barriers.

Install tree barricades when called for in the Contract Documents or by the Consultant to protect existing trees from damage during project construction. Place barricades at the drip line of the tree foliage or as far from the base of the tree trunk as possible. Barricades shall be able to withstand bumps by heavy equipment and trucks. Maintain barricades in good condition.

When called for in the Contract Documents, install root barriers or fabrics in accordance with the details shown.

580-7 Pruning.

Prune all broken or damaged roots and limbs in accordance with established arboriculture practices. When pruning is completed ensure that all remaining wood is alive. Do not reduce the size or quality of the plant below the minimum specified.

580-8 Mulching.

Uniformly apply mulch material, consisting of wood chips (no Cypress Mulch is allowed), pine straw, compost, or other suitable material approved by the Engineer, to a minimum loose thickness of 3 inches [75 mm] over the entire area of the backfilled hole or bed within two days after the planting. Compost used for mulch shall meet the requirements of Section 987. Maintain the mulch continuously in place until the time of final inspection.

580-9 Disposal of Surplus Materials and Debris.

Dispose of surplus excavated material from plant holes by scattering or otherwise as might be directed so that it is not readily visible or conspicuous to the passing motorist or pedestrian. Remove all debris and other objectionable material from the site and clean up the entire area and leave it in neat condition.

580-10 Contractor's Responsibility for Condition of the Plantings.

Ensure that the plants are kept watered, that the staking and guying is kept

adjusted as necessary, that all planting areas and beds are kept free of weeds and undesirable plant growth and that the plants are maintained so that they are healthy, vigorous, and undamaged at the time of acceptance.

580-11 Plant Establishment Period and Contractor's Warranty.

Assume responsibility for the proper maintenance, survival and condition of all landscape items for a period of one year after the final acceptance of all work under the Contract in accordance with 5-11. Provide a Warranty/Maintenance Bond to the Department in the amount of the total sums bid for all landscape items as evidence of warranty during this plant establishment period. The costs of the bond will not be paid separately, but will be included in the costs of other bid items.

In addition to satisfying the provisions of Section 287.0935, Florida Statutes, the bonding company is required to have an A.M. Best rating of A or better. If the bonding company drops below the A rating during the one year Warranty/Maintenance Bond period, provide a new Warranty/Maintenance Bond for the balance of the one year period from a bonding company with an A or better rating. In such event, all costs of the premium for the new Warranty/Maintenance Bond shall be at the Contractor's expense.

Take responsibility to apply water as necessary during this period and include the cost in the various landscape items. No separate measurement or payment will be made for water during the plant establishment period.

The Consultant will conduct interim inspections of all landscape items 90 days, 180 days and 270 days into the plant establishment period, as well as at the end of the plant establishment period. As part of the warranty to the City, and at no cost to the City, immediately replace all landscape items found not to meet minimum specifications as shown in 580-2.1.2 after each inspection.

At the end of the one year warranty period, the City will release the Contractor from further warranty work and responsibility, provided all landscape items are established and all previous warranty and remedial work, if any, has been completed.

580-12 Method of Measurement.

The quantities to be paid for will be the items shown in the plans, completed and accepted.

580-13 Basis of Payment.

Prices and payments will be full compensation for all work specified in this Section, including furnishing and planting the designated plant types, the furnishing and placing of the plant backfill, fertilizer and mulch, (except where such are shown to be paid for under a separate item), the application of water, the maintenance, care, etc., and all costs of any required replacing of plantings or restoring of damaged areas.

583-1	Tree	(seedlings)	PL
583-2	Tree	(10" to 18" Height)	PL

583-3	Tree	(19" to 7' Height)	PL
583-4	Tree	(8' to 20' Height)	PL
583-5	Tree	(21' or more Height)	PL
584-3	Palms Single Trunk	(19" to 7' Height)	PL
584-4	Palms Single Trunk	(8' to 20' Height)	PL
584-5	Palms Single Trunk	(21' or more in Height)	PL
585-2	Palms Clump Type	(10" to 18" Height)	PL
585-3	Palms Clump Type	(19" to 7' Height)	PL
585-4	Palms Clump Type	(8' to 20' Height)	PL

**SECTION 711
THERMOPLASTIC TRAFFIC STRIPES AND MARKINGS**

Subarticle 711-4.1 is expanded by the following:

Thermoplastic Pavement Markings shall be placed no sooner than 30 days after the placement of the upper or top layer of Asphaltic Concrete pavement including Friction Course, if specified. Painted Pavement Markings and/or Temporary Marking Tape shall be used for the period between final placement of the Asphaltic Concrete Pavement and the placement of the Thermoplastic Pavement Markings.

Subarticle 711-8 is expanded as follows:

Prices and Payments for Thermoplastic Pavement Markings shall include all costs of Paint/Temporary Tape and the cost for installation of same for the period between final installation of Asphaltic Concrete Pavement and the installation of the Thermoplastic Pavement Markings.

**Division 2-FDOT
SECTION 102
MAINTENANCE OF TRAFFIC**

4102-1 General Provisions:

The following new Subarticle 102-1.6 is added:

102-1.6 Routine Clean-Up:

The Contractor shall be responsible for landscape maintenance and mowing during the life of the contract. This responsibility begins on the first day of construction and will continue until final acceptance. This activity shall include roadside litter removal, small machine mowing and edging around all appurtenances within the project limits. Mowing cycles shall be a maximum of 14 calendar days or as otherwise approved by the Consultant.

The Contractor shall be responsible for mechanized sweeping to maintain the roadway surfaces, including all side streets, clear of sand, soil, paper, glass, cans and other debris. Sweeping cycles shall be a maximum of 7 calendar days or as otherwise approved by the Consultant, and shall occur during the hours of 9:00 p.m. and 6:00 a.m.

The Contractor shall be responsible to perform routine daily clean up of any litter, debris, and dirt that may have migrated by wind or rain unto the local county or city street system and/or private properties in areas adjacent to the Right of Way.

All costs associated with this article to be included in the Maintenance of Traffic pay item, except as may be specifically covered for payment under other items. In case of failure on the part of the Contractor to perform routine daily clean-ups, the Consultant may, upon 12 hours notice, proceed to clean up such local County or City streets and /or private properties, as may be deemed necessary by the Consultant, and the City of Miami will deduct the cost thereof from monies due to the Contractor under this contract.

4102-2.2 Number of Traffic Lanes:

The following is added to Subarticle 102-2.2:

In the event that any street must be closed to traffic or detoured, it shall be closed or detoured only after approval of the Department of Police and the Department of Public Works of the City of Miami, and after notifying the City of Miami Fire Department and Department of Solid Waste.

The following additional requirements will also be enforced:

- a) *A written request to alter existing traffic patterns as described above shall be submitted to the Consultant for review and approval a minimum of 14 days prior to commencement of the work. Such request must contain at a minimum the type of change requested and the duration of the detour and/or closure. Damage Recovery per 8-10.8 will apply.*
- b) All traffic control devices used on local street construction shall conform to the standards and specifications of Metro Traffic Division, *the FDOT Design Standards (Index 600 Series) and the Manual on Uniform Traffic Control Devices (MUTCD).*
- c) On all streets, at least one lane shall be available for vehicular traffic at all times. Steel plates or bridging capable of supporting H-20 loading and temporary asphalt pavement shall be used where necessary to comply with these requirements.
- d) All cost for traffic control, except for Law Enforcement Services, shall be included in the lump sum item for Maintenance of Traffic and no additional compensation shall be allowed to comply with these requirements.

4102-2.4 Access for Residences and Businesses:

The following is added to Subarticle 102-2.4:

During construction of the project, safe access shall be provided by the Contractor to the entrance of all residences and business establishments. Methods to be used shall be determined by the Contractor with the approval of the Consultant. All costs for providing this access shall be included in other parts of the work and no additional compensation will be allowed. The use of private property is prohibited unless the Contractor obtains written authorization from the property owner(s), and may have special conditions or requirements. It is the responsibility of the Contractor to provide the Consultant, prior to the use of private property with a signed release before entering the property. The Contractor must document existing conditions of the private property with video or digital photographs prior to and after use.

4102-7.2 Law Enforcement Services:

The following is added to Subarticle 102-7.2:

An allowance has been set forth in the Provisions for Special Items for the use of City of Miami Uniformed Police as required and when approved by the Consultant during the progress of the work. The Contractor will be reimbursed by the City of Miami for the actual amount spent for these services upon presentation of detailed bills covering these services, but shall be limited to actual contract time *and approved time extensions* only. Should there be an overrun on contract time; the Contractor will be

required to pay for all police protection required over the contract time. The traffic section, Department of Police, shall retain control over the use of police.

**SECTION 104
PREVENTING, CONTROL, AND ABATEMENT OF EROSION AND WATER
POLLUTION**

4104-1 Description:

Subarticle 104-1 is modified as follows:

The Bidder is alerted that strict compliance with Department of Capital Improvements Bulletin No. 25 is required for this project. This bulletin establishes rules, regulations and requirements for discharges originated from construction sites or resulting from construction activities. *A copy of Bulletin No. 25 and corresponding Engineering Standards is included in the City of Miami Engineering Standards.*

**SECTION 425
INLETS, MANHOLES AND JUNCTION BOXES**

The following new Subarticle 425-6.9 is added:

4425-6.9 Reworking Existing Drainage Structures:

All existing catch basins that are to remain and/or that will be disconnected from existing sanitary sewers or connected to the proposed storm sewer shall be reworked, if necessary, by re-plastering interior walls, all to the satisfaction of the Consultant. The cost for all reworking of catch basins shall be included in the unit price bid items in the Proposal and no additional compensation will be allowed.

01000 TECHNICAL SPECIFICATIONS

MATERIALS

DIVISION 3 OF THE FLORIDA DEPARTMENT OF TRANSPORTATION STANDARD SPECIFICATIONS FOR ROAD AND BRIDGE CONSTRUCTION 2000 EDITION ARE ADOPTED BY REFERENCE AND MODIFIED AS FOLLOWS.

THROUGHOUT THE STANDARD SPECIFICATIONS FOR ROAD AND BRIDGE CONSTRUCTION, SUBSTITUTE THE WORD "CONSULTANT" FOR THE WORD "ENGINEER" AND THE WORD "CITY" FOR THE WORD "DEPARTMENT" WHENEVER THEY APPEAR.

02000

SPECIAL TECHNICAL PROVISIONS

1. Geotechnical Testing

The CITY has included as an attachment the geotechnical test report from HR Engineering Services, Inc., dated April 19, 2006.

The Contractor is responsible for any conclusions to be drawn from the boring(s) including the character of the materials to be encountered. The Contractor shall not assume that materials other than those disclosed by the borings will not be encountered or that the proportions and character of the various materials will not vary from those indicated in the boring logs.

2. Technical Specifications

2.1 Division 2, Construction Details and Division 3, Materials, Florida Department of Transportation (FDOT) Standard Specifications for Road and Bridge Construction 2010 Edition are hereby incorporated by reference except as modified below.

2.1.1 Bidders shall replace the word "Department" with "CITY" in said FDOT Divisions whenever they appear.

2.1.2 Bidders shall replace the word "Engineer" with "CONSULTANT" in said FDOT Divisions whenever they appear.

2.1.3 As revised on the following sheets:

SECTION 102

Article 102-3 Traffic Control is expanded by the following subarticles:

102-3.4 Special Use Permits: The Contractor shall be required to apply for and obtain a Special Use Permit from the Miami Police Department. Contractor will be required to provide a schedule of activities which affect the flow of traffic on the right-of-way such as overall project scope, lane closures, Traffic Control Plan, construction schedule/time frame, etc. The Contractor will be required to renew the Special Use Permit each month for construction projects and pay the permit fee monthly. Cost shall be included under Pay Item 102-1.

102-3.5 No Parking Signs: The contractor shall install 'NO PARKING' signs within each block of the proposed Work Zone. Signs shall be in place no more than 48 hours per installation and shall be installed only during milling and repaving operations. Signs shall be installed separately for each

operation unless both operations are to occur within a 48 hour period. Sufficient signs shall be posted to clearly indicate where parking is prohibited. In addition, the Contractor will furnish and install door hangers and vehicle parking notices for all residents living on the street that will have "No Parking" signs installed, at least 24 hours but not more than 48 hours prior to posting "No Parking" signs. Cost shall be included under Pay Item 102-1.

SECTION 104

PREVENTING, CONTROL, AND ABATEMENT OF EROSION AND WATER POLLUTION

Subarticle 104-1 Description is modified as follows:

The Bidder is alerted that strict compliance with Department of Capital Improvements Bulletin No. 25 is required for this project. This bulletin establishes rules, regulations and requirements for discharges originated from construction sites or resulting from construction activities. A copy of Bulletin No. 25 and corresponding Engineering Standards is included in the City of Miami Engineering Standards.

SECTION 125

EXCAVATION FOR STRUCTURES

Subarticle 125-8 Backfilling is expanded as follows:

During backfilling the Contractor shall install a neoprene mat over the top of existing conduits in those areas as indicated on the Drawings and in accordance with the Drawing Details. The neoprene mat shall be installed 3-inches above the top crown of the existing pipe and after careful compaction of the soil envelope over the top of the pipe. Commence and end the length of the neoprene mat at not less than 18-inches from the edge of the outer diameter of pipe and width of the neoprene mat across the full exposed trench width of pipe to be protected.

Material: Neoprene Elastomer
Thickness: ¼" minimum

SECTION 327

MILLING OF EXISTING ASPHALT PAVEMENT

Article 327-3 Construction is modified and expanded by the following:

The maximum time allowed between milling and resurfacing operations shall be 72 hours unless written permission is received from the Consultant to delay resurfacing due to rain or other events not under control of the Contractor.

When the asphalt pavement, remaining after milling, is one inch or less in thickness, the first layer of asphalt shall be placed before the lane is reopened to traffic.

SECTION 580

LANDSCAPE INSTALLATION

580-1 Description:

Plant trees and shrubs of the species, size, and quality indicated in the plans. The City reserves the right to adjust the number and location of any of the designated types and species to be used at any of the locations shown, in order to provide for any unanticipated effects which might become apparent after the substantial completion of other phases of the project, or for other causes.

580-2 Materials:

580-2.1 Plants:

580-2.1.1 Authority for Nomenclature; Species, etc.: For the designated authority in the identification of all plant material, refer to two publications of L.H. Bailey: "Hortus III" and "Manual of Cultivated Plants," and ensure that all specimens are true to type, name, etc., as described therein. For the standard nomenclature, refer to the publication of the

American Joint Committee on Horticultural Nomenclature, "Standardized Plant Names."

580-2.1.2 Grade Standards and Conformity with Type and Species: Only use nursery grown plant material except where specified as Collected Material. Use nursery grown plant material that complies with all required inspection, grading standards, and plant regulations in accordance with the latest edition of the Florida Department of Agriculture's "Grades and Standards for Nursery Plants".

Except where a lesser grade might be specifically specified in the plans, ensure that the minimum grade for all trees and shrubs is Florida No.1. Ensure that all plants are the proper size and grade at the time of delivery to the site, throughout the project construction period and during the plant establishment period.

Ensure that plant materials are true to type and species and that any plant materials not specifically covered in Florida Department of Agriculture's "Grades and Standards for Nursery Plants" conform in type and species with the standards and designations in general acceptance by Florida nurseries.

Ensure that plant materials are shipped with tags stating the botanical and common name of the plant.

580-2.1.3 Inspection and Transporting: Move nursery stock in accordance with all Federal and State regulations therefore, and accompany each shipment with the required inspection certificates for filing with the Consultant.

580-2.2 Water: Meet the requirements of Section 983.

580-3 Specific Requirements for the Various Plant Designations.

580-3.1 Balled-and-Burlapped Plants (B&B), and Wired Balled-and-Burlapped (WB&B):

580-3.1.1 General: Properly protect the root ball of these plants until planting them. The Consultant may reject any plant which shows evidence of having been mishandled.

Set the B&B and WB&B plants then remove the top of all wire, rope, and binding surrounding the plant. Remove the burlap from the top 4 inches [100 mm] of the root ball. Do not disturb the root ball in any way. Bare root material is not allowed for substitution.

At least 90 days before digging out B & B and WB & B plants, root-prune those 1 inches [38 mm] or greater in diameter and certify such fact on accompanying invoices.

580-3.1.2 Provisions for Wiring: For plants grown in soil of a loose texture, which does not readily adhere to the root system (and especially in the case of large plants or trees), the Engineer may require WB & B plants. For WB & B plants, before removing the plant from the excavated hole, place sound hog wire around the burlapped ball, and loop and tension it until the tightened wire netting substantially packages the burlapped ball such as to prevent disturbing of the loose soil around the roots during handling.

580-3.2 Container-Grown Plants (CG): The Consultant will not accept any CG plants with roots which have become pot-bound or for which the top system is too large for the size of the

container. Fully cut and open all containers in a manner that will not damage the root system. Do not remove CG plants from the container until immediately before planting to prevent damage to the root system.

580-3.3 Collected Plants (Trees and Shrubs) (C): Use C plants which have a root ball according to Florida Grades and Standards for Nursery Plants. Do not plant any C plant before the Engineer's inspection and acceptance at the planting site.

580-3.4 Collected Plants (Herbaceous) (HC): The root mass and vegetative portions of collected herbaceous plants shall be as large as the specified container-grown equivalent. Do not plant any collected plant before inspection and acceptance by the Consultant.

580-3.5 Specimen Plants (Special Grade): When Specimen (or Special Grade) plants are required, label them as such on the plant list, and tag the plant to be furnished.

580-3.6 Palms: Wrap the roots of all plants of the palm species before transporting, except if they are CG plants and ensure that they have an adequate root ball structure and mass for healthy transplantation as defined in Florida Grades and Standards for Nursery Plants. The Engineer will not require burlapping if the palm is carefully dug from marl or heavy soil that adheres to the roots and retains its shape without crumbling. During transporting and after arrival, carefully protect root balls of palms from wind and exposure to the sun. Muck grown palms are not allowed. After delivery to the job site, if not planting the palm within 24 hours, cover the root ball with a moist material. Plant all palms within 48 hours of delivery to the site.

Move sabal and coconut palms in accordance with the "Florida Grades and Standards for Nursery Plants."

580-3.7 Substitution of Container-Grown (CG) Plants: With the Consultant's approval, the Contractor may substitute CG plants for any other root classification types, if he has met all other requirements of the Contract Documents.

580-4 Planting Requirements.

580-4.1 Layout: Prior to any excavation or planting, mark all planting beds and individual locations of palms, trees, large shrubs and proposed art and architectural structures, as shown in the plans, on the ground with a common bright orange colored spray paint, or with other approved methods, within the project limits. Obtain the Consultant's approval and make necessary utility clearance requests.

580-4.2 Excavation of Plant Holes: Excavate plant holes after an area around the plant three times the size of the root ball has been tilled to a depth of the root ball. Ensure that the plant hole is made in the center of the tilled area only to the depth of the plant root ball.

Where excess material has been excavated from the plant hole, use the excavated material to backfill to proper level.

580-4.3 Setting of Plants: Center plants in the hole. Lower the plant into the hole so that it rests on a prepared hole bottom such that the roots are level with, or slightly above, the level of their previous growth and so oriented such as to present the best appearance.

Backfill with native soil, unless otherwise specified on the plans. Firmly rod and water-in the backfill so that no air pockets remain. Apply a sufficient quantity of water immediately upon planting to thoroughly moisten all of the backfilled earth. Keep plants in a moistened condition for the duration of the planting period.

When so directed, form a water ring 6 inches [150 mm] in width to make a water collecting basin with an inside diameter equal to the diameter of the excavated hole. Maintain the water ring in an acceptable condition.

580-4.4 Special Bed Preparation: Where multiple or mass plantings are to be made in extended bedding areas, and the plans specify Special Bed Preparation, prepare the planting beds as follows:

Remove all vegetation from within the area of the planting bed and excavate the surface soil to a depth of 6 inches [150 mm]. Backfill the excavated area with peat, sand, finish soil layer material or other material to the elevation of the original surface. Till the entire area to provide a loose, friable mixture to a depth of at least 8 inches [200 mm]. Level the bed only slightly above the adjacent ground level. Then mulch the entire bedding area, in accordance with 580-8.

580-5 Staking and Guying.

580-5.1 General: When specified in the plans, or as directed by the Consultant, stake plants in accordance with the following.

Use wide plastic, rubber or other flexible strapping materials to support the tree to stakes or ground anchors that will give as the tree moves in any direction up to 30 degrees. Do not use rope or wire through a hose. Use guy chords, hose or any other thin bracing or anchorage material which has a minimum 12 inches [300 mm] length of high visibility flagging tape secured to guys, midway between the tree and stakes for safety.

Stake trees larger than 1 inch [25 mm] diameter and smaller than 2 inches [50 mm] diameter with a 2 by 2 inch [50 by 50 mm] stake, set at least 2 feet [0.6 m] in the ground and extending to the crown of the plant. Firmly fasten the plant to the stake with flexible strapping materials as noted above.

580-5.2 Trees of 2 to 3-1/2 inches [50 to 90 mm] Caliper: Stake all trees, other than palm trees, larger than 2 inches [50 mm] caliper and smaller than 3-1/2 inches [90 mm] caliper with two 2 by 4 inch [50 by 100 mm] stakes, 8 feet [2.4 m] long, set 2 feet [0.6 m] in the ground. Place the tree midway between the stakes and hold it firmly in place by flexible strapping materials as noted above.

580-5.3 Large Trees: Guy all trees, other than palm trees, larger than 3-1/2 inches [90 mm] caliper, from at least three points, with flexible strapping materials as noted above.

Anchor flexible strapping to 2 by 4 by 24 inch [50 by 100 by 600 mm] stakes, driven into the ground such that the top of the stake is at least 3 inches [75 mm] below the finished ground.

580-5.4 Special Requirements for Palm Trees: Brace palms which are to be staked with

three 2 by 4 inch [50 by 100 mm] wood braces, toe-nailed to cleats which are securely banded at two points to the palm, at a point one third the height of the trunk. Pad the trunk with five layers of burlap under the cleats. Place braces approximately 120 degrees apart and secure them underground by 2 by 4 by 12 inch [50 by 100 by 300 mm] stake pads.

580-6 Tree Protection and Root Barriers.

Install tree barricades when called for in the Contract Documents or by the Consultant to protect existing trees from damage during project construction. Place barricades at the drip line of the tree foliage or as far from the base of the tree trunk as possible. Barricades shall be able to withstand bumps by heavy equipment and trucks. Maintain barricades in good condition.

When called for in the Contract Documents, install root barriers or fabrics in accordance with the details shown.

580-7 Pruning.

Prune all broken or damaged roots and limbs in accordance with established arboriculture practices. When pruning is completed ensure that all remaining wood is alive. Do not reduce the size or quality of the plant below the minimum specified.

580-8 Mulching.

Uniformly apply mulch material, consisting of wood chips (no Cypress Mulch is allowed), pine straw, compost, or other suitable material approved by the Engineer, to a minimum loose thickness of 3 inches [75 mm] over the entire area of the backfilled hole or bed within two days after the planting. Compost used for mulch shall meet the requirements of Section 987. Maintain the mulch continuously in place until the time of final inspection.

580-9 Disposal of Surplus Materials and Debris.

Dispose of surplus excavated material from plant holes by scattering or otherwise as might be directed so that it is not readily visible or conspicuous to the passing motorist or pedestrian. Remove all debris and other objectionable material from the site and clean up the entire area and leave it in neat condition.

580-10 Contractor's Responsibility for Condition of the Plantings.

Ensure that the plants are kept watered, that the staking and guying is kept adjusted as necessary, that all planting areas and beds are kept free of weeds and undesirable plant growth and that the plants are maintained so that they are healthy, Vigorous, and undamaged at the time of acceptance.

580-11 Plant Establishment Period and Contractor's Warranty.

Assume responsibility for the proper maintenance, survival and condition of all landscape items for a period of one year after the final acceptance of all work under the Contract in accordance with 5-11. Provide a Warranty/Maintenance Bond to the Department in the amount of the total sums bid for all landscape items as evidence of warranty during this plant establishment period. The costs of the bond will not be paid separately, but will be included in the costs of other bid items.

In addition to satisfying the provisions of Section 287.0935, Florida Statutes, the bonding company is required to have an A.M. Best rating of A or better. If the bonding company drops

583-1	Tree	(seedlings)	PL
583-2	Tree	(10" to 18" Height)	PL
583-3	Tree	(19" to 7' Height)	PL
583-4	Tree	(8' to 20' Height)	PL
583-5	Tree	(21' or more Height)	PL
584-3	Palms Single Trunk	(19" to 7' Height)	PL
584-4	Palms Single Trunk	(8' to 20' Height)	PL
584-5	Palms Single Trunk	(21' or more in Height)	PL
585-2	Palms Clump Type	(10" to 18" Height)	PL
585-3	Palms Clump Type	(19" to 7' Height)	PL
585-4	Palms Clump Type	(8' to 20' Height)	PL

below the A rating during the one year Warranty/Maintenance Bond period, provide a new Warranty/Maintenance Bond for the balance of the one year period from a bonding company with an A or better rating. In such event, all costs of the premium for the new Warranty/Maintenance Bond shall be at the Contractor's expense.

Take responsibility to apply water as necessary during this period and include the cost in the various landscape items. No separate measurement or payment will be made for water during the plant establishment period.

The Consultant will conduct interim inspections of all landscape items 90 days, 180 days and 270 days into the plant establishment period, as well as at the end of the plant establishment period. As part of the warranty to the City, and at no cost to the City, immediately replace all landscape items found not to meet minimum specifications as shown in 580-2.1.2 after each inspection.

At the end of the one year warranty period, the City will release the Contractor from further warranty work and responsibility, provided all landscape items are established and all previous warranty and remedial work, if any, has been completed.

580-12 Method of Measurement.

The quantities to be paid for will be the items shown in the plans, completed and accepted.

580-13 Basis of Payment.

Prices and payments will be full compensation for all work specified in this Section, including furnishing and planting the designated plant types, the furnishing and placing of the plant backfill, fertilizer and mulch, (except where such are shown to be paid for under a separate item), the application of water, the maintenance, care, etc., and all costs of any required replacing of plantings or restoring of damaged areas.

SECTION 711

THERMOPLASTIC TRAFFIC STRIPES AND MARKINGS

Subarticle 711-4.1 is expanded by the following:

Thermoplastic Pavement Markings shall be placed no sooner than 30 days after the placement of the upper or top layer of Asphaltic Concrete pavement including Friction Course, if specified. Painted Pavement Markings and/or Temporary Marking Tape shall be used for the period between final placement of the Asphaltic Concrete Pavement and the placement of the Thermoplastic Pavement Markings.

Subarticle 711-8 is expanded as follows:

Prices and Payments for Thermoplastic Pavement Markings shall include all costs of Paint/Temporary Tape and the cost for installation of same for the period between final installation of Asphaltic Concrete Pavement and the installation of the Thermoplastic Pavement Markings.

SECTION 01015

INDEX OF DRAWINGS

PART 1 – GENERAL

CONTRACT DRAWINGS

- A. Drawings dated June 2010, and any subsequent revision thereto introduced by Addenda prior to Bid, showing the work of the Contract are hereby made a part of the Contract Documents and are listed as follows:

SHEET NO.	DESCRIPTION	SHEET NO.	DESCRIPTION
1	COVER SHEET	34-59	ROADWAY CROSS SECTIONS
2	PROJECT NETWORK CONTROL	60	TRAFFIC CONTROL GENERAL NOTES
3	ROADWAY GENERAL NOTES	61	TRAFFIC CONTROL TYPICAL SECTIONS
4	SUMMARY OF QUANTITIES	62	SUMMARY OF VERIFIED UTILITIES
5-6	TYPICAL SECTIONS	63-69	UTILITY ADJUSTMENT PLAN
7	PROJECT LAYOUT	70-73	MISCELLANEOUS UTILITY DETAILS
8-14	ROADWAY PLAN AND PROFILE	74-80	ROADWAY SIGNING AND MARKING
15-16	FLARED TURNOUTS & SIDEWALK DETAILS	L-1-L-14	LIGHTING PLANS
17-18	OUTFALL & RESTORATION DETAILS	LS-1-LS-7	LANDSCAPE PLANS
19-31	DRAINAGE DETAILS	LD-1-LD-7	TREE DISPOSITION PLANS
32-33	SIDE STREET PROFILES		

- B. Due to the possibility of typing errors or omissions, the above list shall not be considered as necessarily complete. Perform all Work shown on all sheets of the Drawings, as specified herein or necessary for a complete functional installation and no extra compensation will be made due to the omission or incorrect listing of a Drawing in this Section.