

PART II

SECTION 9 ROADWAYS

1. **Materials:**

All roadways are to be demucked or stabilized with geotextile material in accordance with the geotechnical report and City requirements.

Laboratory analysis shall be complete, and the material approved by the Engineer prior to placement.

- A. Geotextile material: Woven fabric to be structurally prepared and placed as per manufactures written specification.
- B. Sub-grade: limited to maximum six (6") diameter clean non deleterious material Sub grade to be proof-rolled. Subgrade material supporting the roadway and shoulders shall have a minimum limerock bearing (LBR) of 40. The stabilized subgrade shall be twelve (12) inches compacted to 98% of maximum dry density as per AASHTO-T-180.
- C. Limerock: The material used in limerock base courses shall be material classified as either Miami Oolite Formation or Ocala Formation at the Contractor's option having a minimum percentage of calcium or magnesium of 60; however, only one formation may be used on any contract. Limerock base course shall have a minimum bearing ratio (LBR) of 100 and shall be minimum of eight (8) inches thick. Base material shall be compacted to a density of not less than 98% of maximum dry density as determined by AASHTO-T180 under all paved areas.

1. Composition:

- a. The limerock material shall contain not more that 0.5 percent of organic material or objectionable matter and shall show no significant tendency to air slake or undergo any chemical under exposure to weather.
- b. Limerock material shall contain not less than 70 percent of carbonates of calcium and magnesium. The maximum percentage of water sensitive clay material shall be three (3).

- 2. Gradation: At least 97 percent (by weight) of the material shall pass a 3 1/2-inch sieve and the material shall be graded uniformly down to dust. The fine material shall consist entirely of dust of fracture. All crushing or breaking up which might be necessary in order to meet such size requirements shall be done before the material is placed on the road.

3. Quality:

- a. The limerock material shall be uniform in quality and shall not contain cherty or other extremely hard pieces or lumps, balls or pockets of sand or clay size material in sufficient as to be detrimental to prevent proper bonding, finishing or strength of the limerock base. Limerock material shall be nonplastic, and the liquid limit shall not exceed 35.
- b. Limerock material shall have an average LBR value of not less than 100.

D. Asphaltic Concrete:

- 1. Bituminous Material: Asphalt cement, Viscosity Grade AC-20 or AC-30, shall conform with the requirements of FDOT Specifications, Section 916-1.
- 2. Coarse Aggregate: Coarse aggregate, stone or slag shall conform to the requirements of the FDOT Specifications, Section 901.

3. Fine aggregate: Fine aggregate shall conform to the requirements of FDOT Specifications, Section 902.3.
4. Mineral Filler: Mineral filler shall conform to the requirements of FDOT Specifications, Section 917-1 and 917-2.
5. Prime Coat: Unless otherwise indicated, the material used for the prime coat shall be cutback asphalt, Grade RC-70 or RC-250 and shall conform with the requirements specified in AASHTO Designation M 81-75(1983). Unless otherwise indicated, the use of either RC-70 or RC-250 shall be at the Contractor's option.
6. Tack Coat: The material used for the tack coat shall be emulsified asphalt, Grade RS-2 and shall conform with the requirements specified in AASHTO Designation M 140-82
7. Asphalt Pavement: Use type S-III for roadway leveling course, Type S-III for driveways

E. Concrete:

Concrete shall be composed of cement, fine aggregate, coarse aggregate, and water, so proportioned and mixed as to produce a plastic workable mixture in accordance with all requirements under this section suitable to the specific conditions of placement.

1. Cement:
 - a. Cement for all concrete shall be domestic Portland cement that conforms to the requirements of ASTM Designation C 150, 2500 psi compressive strength. Type III cement for high early strength concrete shall be used only for special locations and only with the approval of Engineer. 4000 psi cement shall be used in the construction of sanitary sewer manholes, wet wells and pump stations.
 - b. Only one brand of cement shall be used in any individual structure unless approved by the Engineer. Cement which has become damaged, partially set, and lumpy or caked shall not be used the entire contents of the sack or container which contains such cement will be rejected. No salvage or reclaimed cement shall be used.
 - c. Slump shall not exceed six inches (6")
 - d. Concrete for underground work shall be acid resistant cement and shall maintain a minimum compressive strength of 4000 psi in 28 days.
2. Fine Aggregate: Fine Aggregate shall conform to the requirements of Section 902, Article 902-1 of the Florida Department of Transportation "Standard Specifications for Road and Bridge Construction" dated 1982.
3. Coarse Aggregate: Coarse aggregate shall conform to the requirements of Section 901 of the Florida Department of Transportation "Standard Specifications for Road and Bridge Construction", dated 2003.
4. Water: Water shall be taken from a potable water supply and shall be fresh, clean and free from injurious amounts of oil, acid, alkali or organic matter.
5. Admixtures: No admixtures shall be used except by specific approval of the Engineer. When approved, admixtures shall meet the following minimum standards.
 - a. Air entraining agent: ASTM C 260.

- b. Water Reducing and Retarding Admixture: ASTM C 494, Type D and free of chlorides.
- 6. Membrane Curing Compound: Membrane curing compound shall conform to the requirements of AASHTO Designation M 148, Type 1-clear, or type 2-white pigmented.
- 7. Expansion Joint Filler:
 - a. Preformed expansion joint filler shall be of the nonextruding and resilient bituminous type and conform to the requirements of AASHTO Designation M 213.
 - b. Expansion joint filler shall be gray neoprene sponge rubber that conforms to AASHTO Designation M 153, Type I.
- 8. Reinforcing and Welded Wire Fabric: Reinforcing and welded wire fabric shall be 6"X6" – 10/10 steel bars to be used in curb & gutter and wire mesh in sidewalk.

F. Concrete Pavers

Product name(s)/shape(s), color(s), overall dimension, thickness and pattern as shown on the drawing: Color and Textures: Miami Beach red approved equal. Designer can recommend for Public Works approval other colors to complement project design theme and/or match existing pavers' configuration. All concrete pavers shall have a skid resistant finish.

- 1. Provide products supplied by a member of the Interlocking Concrete Pavement Institute (ICPI) as called for in the Drawings and/or as specified herein:
 - a) Meet the following requirements set forth in ASTM C936, Standard Specification for Interlocking Concrete Paving Units:
 - 1. Average compressive strength of 8000 psi (55 Mpa) with no individual unit under 7, 200 psi (50MPa).
 - 2. Average absorption of 5% with no unit greater than 7% when tested in accordance with ASTM C140.

G. Textured Pavement:

- 1. "StreetBond SP150E Coating Material" refers to a high performance premium coating material consisting of epoxy modified acrylic polymers blended with sand and aggregate, and specially formulated by Intergrated Paving Concept, Inc. (Tel. 800-688-5652), for application on asphalt surfaces to provide a durable, long lasting color and texture to the asphalt surface.
- 2. "StreetBond Colorant" is a highly concentrated, high quality, UV stable pigment blend designated to be added to StreetBond SP150E coating system to provide color to the coating. The colors to be used shall be shown on the drawings. The same StreetBond Colorant shall be used in each SP150E coating layer to the asphalt surface. One pint of colorant shall be used with one pail of StreetBond coating material.
- 3. Use only patterned/textures pavement products listed on the Qualified Products List. Meet manufacturer's specifications for all pattern/texture templates, coating and coloring material. Use only material that is delivered to the job site in sealed containers bearing the manufacture's original labels. Material coating used to achieve the pattern/texture and/or color shall produce an adherent, weather resistant, skid resistant surface capable of resisting deformation to traffic. Paint and thermoplastic material must meet the requirements of this Specification and Section 971, except that the requirements for Color and Retroreflectivity do not apply.

Manufacturers seeking approval for inclusion on the QPL must submit application and certifications in accordance with Section 6 along with the following documentation:

1.) Manufacturer's specifications and procedures for materials and installation. 2.) Manufacturer's certification with supporting test data and results that the patterned/textured pavement installed in accordance with the manufacturer's specifications and procedures has been tested in accordance with the ASTM E-274, Skid Resistance of Paved Surfaces using a standard ribbed full scale tire at a speed of 40 mph (FN40R), and has a minimum FN40R value of 35.

2. Installation of Roadways Material:

A. Subgrade: The work shall consist of bringing the bottom of the excavations and the top of the embankments of the roadways between the outer limits of the roadway to a surface conforming to the lines, grades, and cross sections shown on the plans, of uniform required density, ready to receive the base or paving course. The final elevation of the subgrade shall be within 0.1 foot of the required elevation.

1. All submerged stumps, roots, and other unsuitable matter encountered in the preparation of the subgrade shall be removed and replaced with a suitable material.
2. The material in the top 12" of subgrade shall have a minimum CBR of 25 when compacted to 95% of maximum density as determined by AASHTO Specification T 180-74. In areas such a condition does not exist, the top 12" of subgrade shall be stabilized as described below:
3. Stabilizing Material: Where stabilized subgrade and shoulders are required, the subgrade and shoulder material shall have a minimum California Bearing Ratio Material Value not less than 25. If the in place subgrade or shoulder material has a CBR value less than 25, a suitable stabilizing material shall be added. Such stabilizing material shall be crushed limerock, coarse limerock screenings, or any other stabilizing material approved by the engineer.
4. Suitable stabilizing materials obtained from an existing base or pavement which is to be replaced or abandoned may be used providing that such material contain no fragments larger than 3 ½ inches in diameter.
5. The entire subgrade, including 2 feet beyond the edge of the proposed pavement, shall be thoroughly plowed, scarified, and mixed to a depth of not less than 6 inches below grade. All pot holes and other irregularities shall be filled with suitable material or trimmed down as the case may be, prior to compacting. If the area is cut to grade in natural limerock, the top 6 inches shall be thoroughly plowed, scarified, and mixed. This plowed, scarified, and mixed layer shall be compacted to not less than 95 percent of the maximum density as determined by AASHTO Specifications T 180-74 prior to the placement of the base course.
6. After the subgrade has been prepared as specified above, the Contractor shall maintain it free from ruts, depressions, and damage resulting from the hauling and handling of any material, equipment, tools, etc. Ditches or drains shall be constructed and maintained along the completed subgrade section. Just before the base course is laid, the subgrade shall be tested as to, elevation and density.

B. Transporting Limerock: The limerock shall be transported to the point where it is to be used, over rock previously placed if practicable, and dumped on the end of the preceding spread. No hauling over the subgrade or dumping on the subgrade shall be done

C. Spreading Limerock:

1. When using new material, the limerock shall be spread uniformly, and all segregated areas of fine or coarse rock shall be removed and replaced with well-grade rock.
2. When the specified compacted thickness of the base is greater than 6-inches, the base shall be constructed in two courses. The thickness of the first course shall be approximately one-half the total thickness of the finished base, or enough additional to bear the weight of the construction equipment without disturbing the subgrade.
3. When using the existing base material, the Contractor shall expose the existing base material to the final base grade shown on the drawings. He shall then proceed with scarifying the top 6 inches of the base and reworking and compacting the material to achieve the required cross-section.
4. Minimum longitudinal slope shall be 0.3% for all roadways. For roadways with gutters, the longitudinal slope may be reduced upon approval by the Public Works Department.

D. Compacting and Finishing Base:

1. General:
 - a. For single course base, after spreading is completed, the entire surface shall be scarified and then shaped so as to produce the required grade and cross section after compacting.
 - b. For multi lift base course, the first course shall be four (4) inches thick compacted cleaned of foreign material, bladed and brought to a surface cross section approximately parallel to that of the finished base. Prior to the spreading of any material for the upper course, the density test for the lower course shall be made and the Engineer shall have determined that the required compacting has been obtained. After the spreading of material for the second course is completed, its surface shall be finished and shaped so as to produce the required grade and cross section after compacting and free of scab and laminations.
2. Moisture Content: When the material does not have the proper moisture content to insure the required density, wetting or drying will be required. If the material is deficient in moisture, water shall be added and uniformly mixed in by discing the base course to its full depth. If the material contains an excess of moisture, such excess shall be reduced or removed until the required moisture content is attained before being compacted. Wetting or drying operations shall involved manipulation of the entire width and depth of the base as a unit.
3. Density Requirements: As soon as proper conditions of moisture are attained, the material shall be compacted to a density of not less than 98 percent of the maximum density as determined by AASHTO Designation T-180 as described below:
 - a. During final compacting operations, if blading of any areas is necessary to obtain the true grade and cross section, the compacting operations for such areas shall be completed prior to making the density determinations on the finished base.
 - b. At least three density determinations shall be made at the completion of each course, also the density determinations shall be made at new/replaced every utility crossings and also at every 7,000 square feet of roadways or at more frequent intervals if deemed necessary by the Engineer.
4. Correction of Defects:
 - a. If at any time the subgrade material should become mixed with the base course material, the Contractor shall dig out and remove the mixture, reshape and compact

the subgrade and replace the materials removed with clean base material, which shall be shaped and compacted as specified above.

b. If cracks or checks appear in the base, either before or after priming, which in the opinion of the Engineer would impair the structural efficiency of the base course, the Contractor shall remove such cracks or check by rescarifying, reshaping, adding base material where necessary and recompacting.

E. Testing Surface: The finished surface of the base course shall be checked with a templet cut to required crown and cross section and with a 10-foot straightedge laid parallel to the centerline of the road. All irregularities greater than 1/4-inch shall be corrected by scarifying and removing or adding limerock as may be required, after which the entire area shall be recompacted as specified herein before.

F. Thickness Determinations:

1. The thickness of the compacted limerock base shall be measured at intervals of not more than 200-feet. Measurements shall be taken at various points on the cross sections prior to the application of the prime coat.
2. The measurements shall be taken in holes through the base of not less than 3-inches in diameter. Where the compacted base is deficient by more than 1/2-inch from the thickness called for on the drawings, the Contractor shall correct such areas by scarifying and adding limerock. The base shall be scarified and rock added for a distance of 100-feet in each direction from the edge of the deficient area. The affected areas shall then be brought to the required state of compaction and to the required thickness and cross section.

G. Priming and Maintaining:

1. The prime coat shall be applied only when the base meets the specified density requirements and the moisture content in the top half of the base does not exceed 90 percent of the optimum moisture content of the base material. At the time of priming, the base shall be firm and unyielding.
2. The contractor will be responsible for assuring that the true crown and grade are maintained with no rutting or other distortion and that the base meets all the requirements at the time the surface course is applied.

3. Installation of Concrete:

1. The concrete shall be placed on stabilizing or compacted subgrade to such depth that, when it is consolidated and finished, the slab thickness required by the Drawings will be obtained at all points and surface will at no point be below the grade specified for the finished surface, after application of the allowable tolerance. The concrete shall be deposited on the stabilized subgrade in a manner which will require as little rehandling as possible. Placing of the concrete shall be continuous between transverse joints, without the use of intermediate bulkheads.
2. Steel reinforcement is called for on the drawings shall be placed at mid slab depth and the fabric shall be maintained at this location during the placing and finishing operations.
3. Concrete shall be thoroughly consolidated against and along the faces of all forms, and along the full length and on both sides of all joint assemblies, by means of hand-operated, vibrators. Vibrators shall not be permitted to come in contact with joint assembly, the subgrade or a side form. Vibration at any one location shall not continue so long as to produce puddling or the accumulation of excessive grout on the surface. In no case shall the vibrator be operated longer than 15 seconds in any one location.

4. Coloring of concrete shall be done by dry-mixing the compound and broadcasting over the fresh-poured concrete after it has been struck off.
- A. Striking off, Consolidating and Finishing Concrete:
1. Immediately after the placing, the concrete shall be struck off, consolidated and finished, to produce a finished pavement conforming to the cross section, width and surface finish required by the Drawings and Specifications. The sequence of operations shall be as follows: strike-off; vibratory consolidation; screeding; floating; removal of laitance; straightedging; and final surface finish. Strike-off, consolidation and finishing shall be accomplished in a manner such as to avoid damage to, or misalignment of, joint assemblies, dowels and other embedded items.
- B. Straightedging and Surface Correction:
1. After floating has been completed and the excess water removed, but while the concrete is still in a plastic state, the surface of the concrete shall be tested for trueness with an accurate 10-foot straightedge. The straightedge shall be furnished by the Contractor. The straightedge shall be held in successive positions parallel to the road center line, in contact with the surface, and the whole area tested from one side of the slab to the other as necessary. The advance along the road shall be in successive stages of not more than one-half the length of the straightedge. Any depressions shall be immediately filled with freshly mixed concrete and struck-off, consolidated and refinished. High areas shall be cut down and refinished. Straightedge testing and surface correction shall continue until the entire surface appears to conform to the required grade and cross section.
 2. As soon as the concrete has hardened sufficiently to be walked on, straightedging shall again be done. All surface irregularities exceeding $\frac{1}{4}$ -inch in a 10-foot shall be corrected by grinding as directed by the Engineer.
- C. Final Finish: As soon as the water sheen has disappeared from the surface of the pavement and just before the concrete becomes nonplastic, a light broom finish shall be given to the surface.
- D. Edging:
1. After the final finish has been applied, but before the concrete has become nonplastic, the edge of the pavement along each side of the strip being placed, on each side of transverse and longitudinal contraction joints and construction joints and along structure extending into the pavement, shall be carefully rounded to a $\frac{1}{4}$ -inch radius except as otherwise indicated. A well-defined and continuous radius shall be produced and a smooth, dense mortar finish obtained. All concrete shall be completely removed from the top of the joint filler.
 2. All joints shall be checked with a straightedge before the concrete has become nonplastic and, if one side of the joint is higher than the other or the entire joint is higher or lower than the adjacent slabs, corrections shall be made as necessary.
- E. Joints:
1. Transverse Construction Joints: Transverse construction joints shall be constructed at the end of all pours and at other locations where the paving operations are stopped for as long as 30 minutes. Construction joints, however, shall not be placed within ten feet of any other transverse joint or of either end of a section of pavement. If sufficient concrete has not been placed to form a slab at least ten feet long, the excess concrete, back to the last preceding joint, shall be removed. The joints shall be formed by placing a wood or metal bulkhead accurately and securely in place, in a plane perpendicular to the profile and center line of the pavement.

2. Transverse & Longitudinal Contraction Joints: Construction joints shall be constructed at the interval indicated in the plans and shall consist of planes of weakness created by an edging tool. The cut in the fresh concrete shall be perpendicular to the surface of the pavement, shall extend to a depth of 1/3 of its thickness (1 1/2" for 4" pavement) and shall have tooled edges as described above.
3. Expansion Joints: 1/2" Expansion Joints shall be formed by placing performed joint filler around all structures and foundations where pavement abuts curbs and gutters and at intervals not to exceed 100'.
4. Cleaning and Sealing Joints: Joints which are to be sealed, shall be filled with joint sealing material before the pavement is opened to traffic and as soon after completion of the curing period as is feasible. Just prior to sealing, each joint shall be thoroughly cleaned of all foreign material (including any membrane curing compound) and the joint faces shall be clean and surface-dry when the sealer is applied.
 - a) The sealing material shall be applied to each joint to conform to the details shown on the Drawings and in accordance with the manufacturer's recommendation. The pouring shall be done in such manner that the material will not be spilled on the exposed surfaces of the concrete. Any excess material on the surface of the concrete pavement shall be removed immediately and the pavement surface cleaned.
 - b) All cracks occurring in the pavement prior to its acceptance shall be cleaned out and sealed as specified above, except that the cracks and fractures shall be completely filled with joints sealer and any excess filler material cut down level with the pavement surface.

4. Installation of Asphalt:

- A. The pressure distributor used for placing the tack or prime coat shall be equipped with pneumatic tires having sufficient width of rubber in contact with the road surface to avoid breaking the bond of or forming a rut in the surface. The distance between the centers of openings of the outside nozzles of the spray bar shall be equal to the width of the application required, within an allowable variation of 2-inches. The outside nozzle at each end of the spray bar shall have an area of opening of not less than 25 percent, nor more than 75 percent in excess of the other nozzles which shall have uniform openings. When the application covers less than the full width, the normal opening of the end nozzle at the junction line may remain the same as those of the interior nozzles.
- B. 310-9.2 Application Temperatures: For asphalt cement Viscosity Grade AC-5, the application temperature shall be between 300 degree and 350 degree F; for emulsified asphalt, between 100 degrees and 170 degrees F; and for cut-back asphalt, between 175 degree and 275 degree F. 310-9.3 Uniformity of Distribution: Special precautions shall be observed to assure that an even and uniform distribution of bituminous material will be obtained, and the distributor shall be so adjusted and operated as to maintain uniform, even distribution of the type of material being applied. Excessive deposits of bituminous material upon the road surface caused by stopping or starting the distributor, by leakage or otherwise, shall be immediately removed.
- C. When the prime or tack coat is applied adjacent to curb and gutter, or any other concrete or special pavement surface (except where they are to be covered with a bituminous wearing course) such concrete surfaces shall be protected by heavy paper or other protective material while the prime or tack coat is being applied. Any bituminous material deposited on such concrete surfaces shall be removed immediately.

- D. Prime coat shall be applied at a rate of 0.25 gallons per square yard. Prime and tack coat for base shall conform to the requirements and specifications of Sections 300-1 through 300-7 of FDOT standards specifications.
- E. No bituminous material shall be applied when the air temperature is less than 50 degree in the shade, or when the weather conditions or the condition of the existing surface is unsuitable. In no case shall bituminous material be applied while rain is falling or when there is water on the surface to be covered.
- F. After the base has been finished, the full width of surface shall be swept with a power broom supplemented with hand brooms and mechanical blowers prior to the application of the prime coat. Care shall be taken to remove all loose dust, dirt and objectionable matter. If deemed necessary, the base shall be lightly sprinkled with water immediately in advance of the prime coat. The prim coat shall be applied to the full width of the base.
- G. The temperature of the prime material shall be such as to insure uniform distribution. The material shall be applied with a pressure distributor as specified above. The amount to be applied shall be sufficient to coat the surface thoroughly and uniformly without any excess to form pools or to flow off the base. For limerock base, the rate of application shall not be less than 0.10 gallons per square yard:
- H. The roadway may be opened for use following the application of the prime material, and a light uniform application of clean sand shall be applied and rolled. The sand shall be nonplastic, shall be free from silt rock particles and shall not contain any sticks, vegetation, grass, roots or organic matter. After the sand covering has been applied, the surface will be opened to traffic.
- I. Asphalt Densities: The inplace density of each course of asphalt mix construction, with the exceptions of patching courses, leveling and intermediate course less than one-inch thick or a specified spread rate less than 100 pounds per square yard, overbuild courses where the minimum thickness is less than one-inch, and open-graded friction course, shall be determined by the use of the Nuclear Density Backscatter Methods as specified by FM 1-T238 (method B). The required density of a completed course shall be at least 98 percent of the average density of the control strip.

5. Installation of Concrete Pavers:

- A. Install paver blocks as manufactured by licensee of Paver Systems, Inc., as indicated on the drawings, per manufacture's recommendations. For paver block construction shall conform to the requirements of Interlocking Concrete Pavers Institute (ICPI).
- B. The finished sub-grade shall be approved before placement of limerock base.
- C. The limerock base shall be spread which when compacted will not exceed (4").
- D. The base course shall be composed with suitable compaction equipment that will ensure a minimum 95% of AASHTO Designation T180.
- E. The finished base course shall be approved by the Engineer prior to placement of the sand leveling course.
- F. For sidewalk areas, the uncompacted sand leveling base shall be screened over the compacted limerock base to an uncompacted thickness of 1 ½" inches.
- G. For crosswalk areas, the uncompacted sand leveling base shall be screened over the concrete base to an uncompacted thickness of 1 1/2" inches.
- H. The paver blocks shall be laid in the pattern approved by the City of Miami Beach Public Works as illustrated on the drawings.

- I. Where necessary to cut blocks, cutting shall be done so as leave tight joint along all adjacent edges and surfaces. Smoothly split or sawn blocks only will be accepted.
- J. After final vibrating/compaction there shall be no more than ¼ inch deviation from proposed grades.
- K. The installation of concrete pavers on roadways shall include the following:
 - 1. Replacement of all underground city utilities
 - 2. The concrete pavers on the roadway shall be installed on 6" concrete base reinforced with galvanized steel wire mesh 6"X6" #10 on one (1) inch bedding between the concrete base and the concrete pavers.
 - 3. Treat bedding course with soil sterilizers to prohibit growth of grass and weeds.
 - 4. Construct 12"X12" concrete band 9" thick with reinforcing, see DSM sketch _____

6. Installation of Textured Pavement:

Applying a patterned and/or textured treatment to asphalt or concrete, in accordance with manufacturer's recommendations. Applications include the following: 1.) Imprinting patterns into existing or new pavement and covering with a surface coating(s) of paint or thermoplastic. 2.) Imprinting patterns into existing or new pavement and inlaying the imprint with performed thermoplastic material. 3.) Colored, preprinted, preformed texturized thermoplastic material that is applied over existing pavement. 4.) Colored thermoplastic material that can be imprinted and texturized during or after application to existing pavement. For application requiring removal and replacement of existing pavement, meet the requirements of Section 350 for cement concrete pavement; the requirements of Section 334 for Superpave asphalt or Section 337 for FC 9.5 and FC 12.5 asphalt. 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 the plans. Joint openings shall not exceed ½ inch [13 mm] in width.

Protect treated surfaces from traffic and environmental effect until the area is completely coated / imprinted and any coating have dried or cured according to the manufacturer's instructions. Complete all utility, traffic loop detector, and other items requiring a cut and installation under the finished surface, prior to pattern installation. For asphalt roadways, apply patterned/textured pavement a minimum of 14 days after placement of the adjacent pavement. Upon completion of the installation, the Engineer will check the area at random location for geometric accuracy, as specified in the plans. If any of the chosen areas have an imprint width and depth that is less than the manufacturer's specifications, correct the entire textured area, at no additional cost to the Department. Supply the specified pattern and color sample for the Engineer's use to visually determine that the material matches the color specified in the plans. For any continuous or abutting areas, i.e. all treated areas of an intersection, color material must be from the same lot/batch. Provide certification that the textured pavement was installed in accordance with the manufacturer's requirements

7. Installation of Sidewalk:

Sidewalks at intersections shall be six (6) inches; others are to be four (4) inches except that the driveways flush with the new and old sidewalk with a maximum slope of 1:12. The concrete for sidewalk shall be 2500 psi, with Integral Miami Beach Red color and to be City of Miami Beach approved design mix.

8. Installation of Curb Ramps:

Policy: It is the policy of the City of Miami Beach Public Works Department to install truncated dome detectable warnings on the curb ramps, in compliance with Americans with Disabilities Act Accessibility Guidelines (ADAAG) requirements for detectable

warnings on walking surfaces and with Florida Department of Transportation (FDOT) standards.

Procedure: The following standards shall be followed when detectable warnings are being installed on curb ramps:

1). All curb ramps installed in the public right of way or on City of Miami Beach property shall have detectable warnings in the form of truncated domes.

2). The installation of truncated domes on curb ramp shall be in compliance with the FDOT ADA/Accessibility design standard for Curb Ramp/Detectable Warning, found at: <http://www.dot.state.fl.us/rddesign/DS/12/IDx/00304.pdf>

See also Specification 527 (Detectable Warning on Walking Surfaces) on FDOT's Qualified Products List Index:

<http://www2.dot.state.fl.us/SpecificationsEstimates/ProductEvaluation/QPL/QPLIndex.aspx>

This specification excludes stamped concrete detectable warnings due to poor performance.

3). The detectable warnings are required to have a dark-on-light or light-on-dark contrast with the surrounding concrete. Dark gray shall be the color used on the detectable warning portion of the curb ramp when applied to a curb ramp that is Miami Beach Red in color. The color of the detectable warnings shall be integral with the device material. On curb ramps constructed of material other than "standards" concrete or from colors other than Miami Beach Red, coordinate with the Public Works Department for appropriate color and contrast.

4). Provide certification from an independent testing laboratory that the applied detectable warning device meets the above minimum requirements. Submit this certification for review and approval by the Public Works Department at least 10 days before the planned installation of any Applied Detectable Warning Device.

5). At least 10 days before the first installation of any Applied Detectable Warning Device, submit manufacturer's installation recommendations and instructions for review and approval by the Public Works Department.

6). Special Considerations: Two curb ramps per corner should always be used unless technically infeasible. US Access Board Public Rights-of-Way Access Advisory Committee strongly discourages single installations where possible because single ramps can:

- A. Misdirect blind pedestrians who use the slope of curb ramps as a cue.
- B. Increase crossing times for persons who use wheeled mobility aids and can place users into oncoming traffic at small radius corners where it is difficult to provide landing space at the bottom that is wholly within marked crossings.
- C. Drivers may not be as alert to persons crossing at the apex of a corner.
- D. If a single diagonal curb ramp is installed because of technical infeasibility, a 48 inch clear space wholly contained within the crosswalk must be provided at the bottom of the curb ramp to allow wheelchair users enough room to maneuver off of the ramp and into the crosswalk.

9. **Bicycle Facilities:**

The work of this section consists of design standards for the development of bicycle facilities, including bike lanes, bike routes (shared use roadways), shared use paths, and bike racks. Standards will include minimum widths, roadway conditions, and traffic control signals such as pavement markings, signage, and signalizations.

1.0 General: Bicyclists shall be considered in all phases of transportation planning, design, construction and capacity improvement projects, and transit projects. All projects shall be designed to accommodate bicyclists. Florida Statutes require that all needs of

bicyclists and pedestrians be addressed in all local and state transportation plans and programs.

316.065(1)(a)- Bicycle and pedestrian ways shall be given full consideration in the planning and development of transportation facilities, including the incorporation of such ways into state and local transportation plans and programs. Bicycle and pedestrian ways shall be established in conjunction with the construction, reconstruction and other change of any state transportation facility.

1.01 Roadway Conditions:

A. Pavement Surface Quality: Pavement surfaces shall be smooth, and the pavement shall be uniform in width. Wide cracks, joints, holes, bumps or drop-offs at the edge of the traveled way shall be repaired. Other obstacles, barriers, and specific hazards to bicyclists shall be eliminated as well. Roadways shall be provided with adequate drainage to prevent ponding and washouts.

B. Drainage Inlet Grates: Bicycle-safe grates shall be used, and grates shall be located in a manner which will minimize severe and/or frequent maneuvering by the bicyclist. Drainage inlet grates shall be placed or adjusted to be flush with the adjacent pavement surface.

C. Utility Covers: Bicycle-safe utility covers shall be used, and utility covers shall be located in a manner which will minimize severe and/or frequent maneuvering by the bicyclist. Utility covers shall be placed or adjusted to be flush with the adjacent pavement surface.

D. Railroad Crossings: Railroad-highway grade crossings shall be at a right angle to the rails. If the crossing angle is less than approximately 45 degrees, an additional paved shoulder of sufficient width shall be provided to permit the bicyclist to cross the track at a safer angle, preferably perpendicularly. Where this is not possible, and where train speeds are low, commercially available compressible flangeway fillers may enhance bicyclist operation. Roadway approaches shall be at the same elevation as the rails. Rubber or concrete crossing materials are longer lasting than wood or asphalt and requires less maintenance. Warning signs and pavement markings shall be installed in accordance with the MUTCD.

2.0 Bike Lanes:

Bike lanes shall be one-way facilities and carry bike traffic in the same direction as the adjacent motor vehicle lane. In most cases, bike lanes shall be through lanes and shall be located to the right of the right most through lane.

A. Width: For roadways with no curb and gutter, the minimum width of a bike lane shall be four (4) feet. For roadways with curb and gutter, the minimum width of a bike lane shall be five (5) feet, including the gutter. If parking is permitted, the bike lane shall be placed between the parking area and the travel lane and have a minimum width of five (5) feet. Where parking is permitted but a parking stripe or stalls are not utilized, the shared area shall be a minimum of eleven (11) feet without a curb face and twelve (12) feet adjacent to a curb face. If the parking volume is substantial or turnover is high, an additional one to two (1-2) feet pf width is desirable. (See details RS5, RS6, & RS7 in Section 15).

B. Pavement Marking: Bike lane markings shall be installed in accordance to the MUTCD, Chapter 9C.

C. Signage: Bike lane signage shall be installed in accordance to the MUTCD, Chapter 9B.

D. Signalization: Bike lane signalization shall be installed in accordance to the MUTCD, Chapter 9D.

3.0 Bike Route: Bike routes are signed shared roadways and responsible agencies shall ensure these routes are suitable as shared routes and will also ensure that they be maintained. Bike routes shall meet the following conditions:

1. The route provides continuity to other bicycle facilities such as bike lanes or bike paths.
2. The road is a common route for bicyclists through a high demand corridor.
3. The route extends along local neighborhood streets and collectors that lead to an internal neighborhood destination such as a park, school, or commercial district.
4. An effort has been made to adjust traffic control devices to give greater priority to bicyclists on the route, as opposed to alternative streets.
5. Street parking has been removed or restricted in areas of critical width to provide improved safety.
6. Wider curb lanes are provided compared to parallel roads.

A. Bike Route Signage: Bike route signage shall be installed in accordance to the MUTCD, Chapter 9B.

B. Signalization: Bike route signalization shall be installed in accordance to the MUTCD, Chapter 9D.

4.0 Shared Use: Shared use paths are facilities that are usually on exclusive right of way, with minimal cross flow by motor vehicles. Users are non-motorized and may include, but are not limited to, bicyclists, in-line skaters, roller skaters, skateboarders, wheelchair users, and pedestrians. Shared use paths shall be separated from the roadway.

A. Width: The minimum recommended width for a paved two-way path is ten (10) feet.

B. Horizontal Clearance: A minimum two (2) feet wide graded area with a maximum 1:6 slope shall be maintained adjacent to both sides of the path; however three (3) feet or more is desirable to provide clearance from trees, poles, walls, fences, guardrails, or other lateral obstructions. Where the path is adjacent to canals, ditches, or slopes steeper than 1:3, a wider separation should be considered. A minimum five (5) feet separation from the edge of the path pavement to the top of the slope is desirable. Depending on the height of embankment and condition at the bottom, a physical barrier, such as dense shrubbery, railing or chain link fence, may need to be provided.

C. Vertical Clearance: Vertical clearance to obstructions shall be a minimum of eight (8) feet. However, vertical clearance may need to be greater to permit passage of maintenance and emergency vehicles. In under-crossings and tunnels, ten (10) feet is desirable.

D. Design Speed: A design speed of 20 mph shall be used for shared use paths.

E. Structures: The minimum clear width on structures should be the same as the approach shared use path, plus the minimum two (2) feet wide clear areas. Grades on structures to be used by pedestrians shall comply with the requirements of the ADA Accessibility Guidelines (as described in the Federal Register) and the Florida Accessibility Code For Building Construction as given in CHAPTER 3- GEOMETRIC DESIGN.

F. Ramp Widths: Ramps for curbs at intersections shall be at least the same width as the shared use path. Curb cuts and ramps should provide a smooth transition between the shared use path and the roadway. A five (5) feet radius or flare may be considered to facilitate right turns for bicyclists.

G. Pavement Marking: Bike path markings shall be installed in accordance to the MUTCD, Chapter 9C. (See Bicycle Details BK2 and BK5 in Part 3, Section 15D)

H. Bike Path Signage: Bike path signage shall be installed in accordance to the MUTCD, Chapter 9B. (See Bicycle Details BK1, BK4, BK6 and BK7 in Part 3, Section 15D)

I. Signalization: Bike path signalization shall be installed in accordance to the MUTCD, Chapter 9D.

5.0 Bike Racks:

A. Style: See standard detail BK3 in Part 3, Section 15D

B. Installation:

1. The bike rack should be a minimum of 24 inches from the curb when oriented in a parallel direction or a minimum of 54 inches to the centerline of the rack when oriented perpendicular to the curb.
2. The bike rack should be located to preserve at least 36 inches to 48 inches of pedestrian walkway clearance to meet ADA requirements.
3. At least (4) four feet clearance from any street utility vaults or utility poles.
4. At least 30 inches from any street encroachments, i.e.: ground level planters, garbage cans.
5. At least 8 feet from any fire hydrant.
6. At least 10 feet from the point of curvature of the curb adjacent to any intersection.
7. Do not block building entrances, driveways, handicap parking spaces, and stairs.
8. 2.2 feet width x 7 feet length required for a single rack.
9. Spacing between multiple bike racks mounted adjacent to each other should be a minimum of 30 inches on center.