

SECTION D7

SANITARY SEWAGE COLLECTION AND DISPOSAL

A PORTION OF

PART 2 - PUBLIC WORKS MANUAL

DIVISION I - DESIGN

SECTION D7 - SANITARY SEWAGE COLLECTION AND DISPOSAL

D7.01 - GENERAL

The purpose of this section is to set forth criteria, procedure, and minimum standards for the design of all sewage collection and disposal systems to be constructed in Dade County. Every such system shall be designed by an engineer registered by the State of Florida and shall be designed in accordance with the requirements of the Florida State Board of Health, the construction requirements and standard specification of this Manual and, where applicable, the requirements of the Florida State Road Department, the Central and Southern Florida Flood Control District, the Metropolitan Dade County Building and Zoning Department, and other public agencies. The term "system" used herein shall include extensions and modifications thereof.

The requirements of this section are minimum and nothing herein shall be construed to eliminate consideration of a design based on a rational procedure not covered by such requirements, provided in such case that the design engineer shall furnish satisfactory evidence of the adequacy of his design.

Sewage collection and/or disposal facilities shall be interpreted to include local branch sewers, sub-collectors, collectors, trunk mains, outfalls, sewage pumping stations, sewage lift stations, sewage force mains, sewage treatment plants and plant effluent lines. This section shall not be applicable to septic tanks, tile fields or other domestic sewage treatment and disposal systems, except the connection of building lateral sewers to street sewers or manholes.

In addition to the requirements set forth herein, it is emphasized that all sewage collection and disposal systems are subject to the requirements and approval of the Florida State Board of Health. Such approval does not grant or imply approval by Dade County, nor does approval by Dade County imply or grant approval by the Florida State Board of Health. In this regard, interested parties are advised to examine the "Sewerage Guide" prepared by the Florida State Board of Health. This document may be examined at the office of the Water and Sewer Branch, Public Works Department, Metropolitan Dade County, or at the local office of the Florida State Health Department. Copies may be made available by the Florida State Board of Health to interested parties.

Construction of pumping stations, lift stations, and structures for disposal facilities require review and approval of the Building and Zoning Department. Any construction in a public right of way requires a permit from the Permit Section, Public Works Department of Dade County. Special situations may require the approval of other agencies. Construction falling within the boundaries of a municipality will also require approval of the proper agencies of that municipality.

D7.02 - LIMITATIONS

The term "sewage" as used herein means the water-carried human or animal wastes from residences, buildings, industrial establishments, or other places, together with the minimum of such ground water infiltration and surface water as may be present, and also includes industrial wastes. Industrial wastes are defined as any liquid, gaseous, solid or other waste substance or a combination thereof resulting from any process of industry, manufacturing, trade or business or from the development or recovery of any natural resources. Certain industrial wastes may be eliminated from the sewage or pretreated before being discharged to the sewer. This requirement will be at the discretion of the utility involved and the State

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Health Department. No storm, cellar, surface or roof water or other drainage water shall be discharged to a sanitary sewage collection system.

No curved alignment will be allowed for any gravity flow sewers.

Sewer lines will not be installed in the same trench with water mains. Sewer lines will not be located closer horizontally than 10 feet from a water pipe except where the bottom of the water pipe will be at least 12 inches above the top of the sewer pipe, in which case 6 feet minimum horizontal spacing will be permitted. The horizontal measurement is to be considered as between center-lines of pipes. Where water lines cross over gravity sewers the sewer pipe for a distance of 10 feet each side of the crossing will be made of pressure pipe with no joint located within 5 feet, horizontally, of the crossing. Water lines will cross above sewage force mains and depressed sewers, and the sewer lines will be at least 2 feet below the water mains.

Where a sewer line or sewage force main passes under a railroad, pipe will be encased in rigid conduit in accordance with the standard practice of the servicing railroad company and/or in accordance with the criteria contained in the Manual of Recommended Practices of the American Railway Engineering Association.

Canal, stream, and river crossings shall be made in accordance with the regulations of the agencies having jurisdiction over these waters. A sewer may not be suspended from, placed on, or otherwise attached to any bridge or culvert. No interference with present or proposed future flow of the waterways will be allowed.

D7.03 - BASIS OF DESIGN

1. Design Period

Sewer systems shall be designed for the estimated future tributary population of fifty (50) years hence, or the ultimate estimated population of the area. Pump stations and lift stations shall be sized for ultimate planned capacity except for pumps and/or other equipment that can be readily increased in capacity at a later date. Treatment plants shall be sized for the estimated future tributary population twenty five (25) years hence except that land use and plant design for future expansion shall be planned for fifty (50) years hence. Flows shall be computed on the basis of 100 gallons per capita per day for residential areas. Special consideration of flows shall be given to industries, commercial establishments, institutions and other non-residential areas.

2. Sewer Capacity

Branch and submain sewers shall be designed to carry 4.0 times the average ultimate design flow when flowing full, and main trunk and outfall sewers shall be designed to carry 2.5 times the average ultimate design flow when flowing full.

3. Infiltration

Pipe and joints, including manholes, shall have a maximum infiltration allowance of 500 gallons per inch of pipe diameter per mile per 24 hours. If pipe is laid above ground water level, an exfiltration test with a 2 foot static head above the crown of the pipe shall meet the same allowance. The County may require infiltration or exfiltration tests to be performed, and such tests shall be witnessed and attested to by a professional engineer registered by the State of Florida.

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D7.04 - HYDRAULIC DESIGN

1. Size

The minimum allowable size for any public sewer shall be 8 inches in diameter. This requirements shall not apply to house sewer connections.

Sewers shall be sized for the ultimate future design as required in Section D7.03, including future extensions.

Gravity sewers shall be designed in accordance with the requirements of Section G.3 of the Florida State Board of Health "Sewerage Guide."

2. Master Plan

Where applicable, sewer design shall be in conformity with and shall be designed to take account of the planning of the "Metropolitan Dade County Master Plan for Sanitary Sewerage."

D7.05 - MANHOLES AND APPURTENANCES

1. Location

Manhole locations shall be as recommended in Section G.51 of the Florida State Board of Health "Sewerage Guide." Terminal cleanouts at the upstream ends of sewers will not be allowed; manholes will be required at these locations.

2. Manhole Barrel Diameter

The minimum inside barrel diameter for manholes shall be 48 inches.

3. Eccentric Cones

Manholes over 4 feet in depth shall have eccentric cone sections to reduce from the full diameter manhole barrel to the frame and cover. See Standard Sanitary Sewerage Detail SS 1.1, Standard Manhole Details.

4. Flow Channel

The manhole floor shall have a flow channel made to conform in shape and carrying capacity to that of the sewers. The shelf or shelves so created shall be sloped to the channel with a 1/4 inch minimum and a 1 inch maximum drop from the manhole wall to the channel. See Standard Sanitary Sewerage Detail SS 1.2, Standard Manhole Details.

5. Drop Manholes

The suggestions of Section G.52 of the Florida State Board of Health "Sewerage Guide" shall be followed. See Standard Sanitary Sewerage Detail SS 2.1, Standard Manhole Details.

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6. Manhole Steps

Manhole steps shall be especially designed and manufactured for the purpose. They shall be evenly spaced 14 to 18 inches on center vertically and staggered.

7. Manhole Frame and Cover

The manhole frame and cover shall be of suitable design for the surface loads to be carried and the use for which it is intended. The minimum opening dimension will be 24 inches. The cover, together with whatever other wording is desired, will also be marked in raised letters with the words "Sanitary Sewer." Manholes in easements shall be provided with an approved lock type or traffic weight cover.

8. Depressed Sewers

The suggestions of Section G.6 of the Florida State Board of Health "Sewerage Guide" shall be followed.

D7.06 - SEWAGE FORCE MAINS

1. Minimum Velocity

At design flow, a velocity in excess of 2.5 feet per second shall be maintained.

2. Air Relief Valves

Air relief valves shall be provided at all high points on force mains.

3. Outfall End Protection

The outfall end of all sewage force mains shall be trapped as shown in Standard Sanitary Sewerage Detail SS 4.1, Force Main Outfall Detail. As an alternate to this, the final 300 feet of the force main shall have its interior surface protected by a method approved by the Metropolitan Dade County Public Works Department.

4. Thrust Blocks

Concrete thrust blocks will be required at all bends and fittings as shown on Standard Detail No. WS 5.1, Thrust Blocks.

D7.07 - STRUCTURAL REQUIREMENTS

1. Minimum Cover

The minimum allowable cover for gravity and force main sewers shall be as shown on Sheets G2.1 and G2.2, Public Works Manual. Where it is not possible to meet this requirement, properly designed concrete encasement (steel reinforced or non-reinforced) may be used to protect pipe from excessive live loads. Each such case will be considered for approval individually.

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2. Trench Loads and Live Loads

Sewers shall be designed to withstand trench loads in accordance with Chapter IX of Manual of Practice No. 37, "Design and Construction of Sanitary and Storm Sewers", published by the American Society of Civil Engineers.

D7.08 - BUILDING SEWER

1. Code Compliance

Building sewer connections to branch sewers shall comply with Section 11, Chapter VIII, of the Sanitary Code of the State of Florida and with the requirements of the Building and Zoning Department and of municipal ordinances where applicable.

2. Lateral Connection

Building sewer connections to branch sewers shall be by a wye or tee branch connection to the branch for all new construction. Where an existing branch must be broken into for a new building sewer connection, the opening shall be made with a proper cutting tool and the piece, or pieces, of branch sewer so broken out shall be removed from the branch line. The invert of the house sewer shall not be below the centerline elevation of the branch at the point of entry unless this is absolute unavoidable. All such connections shall be sealed, and the lateral shall not protrude into the branch.

3. Connections to Manholes

Where a building sewer is connected to an existing manhole, the opening made in the manhole shall be as small as possible and shall be made by methods which shall not injure or impair the manhole. After the building sewer is placed, the opening shall be sealed and the building sewer cut off flush with the interior wall of the manhole. The invert of the building sewer shall be at the manhole shelf elevation, and if this is not feasible, the maximum allowable drop shall be 18 inches. House laterals shall not be installed in manholes which are over 5 feet deep.

4. Individual Laterals

Each residence or place of business shall have an individual house connection. No twin house connections will be allowed. On deep sewers with an upright wye or tee and vertical stack, it shall be permissible to place a double wye at the top of the stack and install house connections therefrom to both sides of the street.

5. Size

The minimum diameter of laterals shall be 4 inches.

6. Vertical Stack Encasement

All vertical house connection stacks shall be encased in concrete and such encasement shall continue to an elevation at least 4 inches below the bottom of the main line sewer. The minimum diameter for vertical stacks shall be 6 inches. See Standard Sanitary Sewerage Detail SS 3.2, Vertical House Connection Stack.

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D7.09 - LOCATION

Gravity sewers shall be installed in utility easements or, preferably, in public rights of way. When in public rights of way, unless changed by reason of interference with existing utilities, the platting of half streets or other valid cause, they shall be on the centerline of the street. Sewage force mains shall be located on the south and east sides of the rights of way. These requirements may be modified in special cases with specific approval. For required locations see General Detail G3.1, Utility Placement within a Right of Way. Gravity sewers installed in utility easements, where possible, shall be installed on the south and east sides of the easement with a 3 foot offset from the easement line.

D7.10 - LIFT STATIONS AND PUMP STATIONS

1. General

Sewage pump station design shall follow the recommendations of Section H, "Sewerage Guide", Florida State Board of Health.

2. Pump Suction Inlets

It is recommended that all pump suction inlets be bellmouth inlets.

3. Bar Screens and Comminutors

Bar screens shall be required and comminutors may be required in order to protect the pumps. Such equipment shall be readily accessible for cleaning and maintenance.

4. Wet Wells

Wet wells shall be hopper bottom on all sides or on all sides except the suction side which shall then be vertical. Slope shall be a minimum of 1.75 vertical to 1 horizontal. The width of allowable flat bottom shall be twice the diameter of the suction.

5. Meter and Gages

It is recommended that all stations of 2 mgd capacity or greater be equipped with an indicator-totalizer-recorder type flow meter and with a pressure indicator recorder gage showing the station header pressure.

6. Wash Rooms

Wash room and toilet facilities should be provided at all stations which will require an operator or will require daily maintenance checks.

D7.11 - SEWAGE TREATMENT AND DISPOSAL WORKS

1. General

Sewage treatment works design shall follow the recommendations of Sections I, J, K, L, and M, "Sewerage Guide", Florida State Board of Health.

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2. Disposal by Ocean Outfall

In some areas of Dade County it is possible to dispose of raw sewage by pumping to sea through an ocean outfall. If such a disposal method is planned, it will be reviewed on its individual merits.

If disposal by ocean outfall is contemplated, ocean current studies, drift studies, and other related data will be required to demonstrate the adequate operation of the planned outfall.

Ocean outfalls less than one-half mile in length, measured from the shoreline, will not be considered for raw sewage disposal. Depth of water at the point of discharge shall be sufficient to provide initial mixing of sewage with sea water to avoid an objectionable surface slick. The point of discharge shall be far enough from the shoreline to permit the natural death of pathogenic organisms to occur before the sea water containing such organisms can be driven to shore by currents.

Screening and comminution of solids will be required before pumping to sea.

3. Non-Standard Treatment Methods

Non-standard methods of treatment or methods that do not have sufficient operating history to fully satisfy the State Board of Health and the Metropolitan Dade County Public Works Department may be considered or allowed conditionally if sufficient bond is posted with Dade County to allow revisions to the treatment works, as built, to change operation to a conventional method of treatment. This bond will be retained by the County for three years.

D7.12 - APPROVAL OF DESIGN

Application for approval of the design of a proposed installation, extension or alteration of a sewage collection and/or disposal system shall be signed by the owner, president of a corporation, or other responsible person such as the mayor or city manager of a municipality, with a statement that the plans for the project have been approved by the governing body of the applicant.

The application shall be accompanied by the following, in duplicate:

1. A comprehensive engineer's report which includes a description of the project, the basis of design, design data, and other pertinent data necessary to give an accurate understanding of the work to be done and the reasons for the same.
2. Blueline or blackline prints of drawings of the work to be done.
3. Complete specifications.
4. Additional pertinent data as may be required by the County.

If the County determines that the proposed system has been designed in accordance with this section, the Director of Public Works or his authorized representative will approve the application together with the plans and other data submitted therewith. A complete set of such approved plans and other data will be returned to the applicant.

Such approval does not constitute a permit for construction.

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D7.13 - CONSTRUCTION PERMIT

A permit for construction will be issued provided:

1. Five (5) sets of construction plans, identical to the approved plans, are presented.
2. Satisfactory evidence is presented that all other applicable approvals and permits have been obtained.
3. The required permit fee is paid as prescribed in Section 2-103.2, Metropolitan Dade County Code.
4. A performance bond has been provided, either under a subdivision agreement or a special agreement with Dade County in an amount not to exceed 110% of the estimated cost of the construction.
5. Certification by a registered engineer that he has been retained to provide engineering supervision throughout the construction period.

D7.14 - INFORMATION REQUIRED BEFORE FINAL ACCEPTANCE BY DADE COUNTY

The design engineer shall furnish the Public Works Department the following minimum information when the work is complete and prior to final acceptance by Dade County.

1. A certification by the design engineer that the work has been done in accordance with the approved plans and specifications.
2. Two complete sets of "AS-BUILT" drawings.

REFERENCES

- 1) Greeley & Hansen, Sanitary Engineers (together with) Connell Associates, Inc., Water Quality Management Plan for Metropolitan Dade County Florida, available through Metropolitan Dade County Planning Department, Miami, 1973.
- 2) Insurance Services Office, "Public Fire Protection Report on Hialeah, Florida", New York, December 1, 1975.
- 3) "Metropolitan Dade County Pollution Control Ordinance" Ordinance No. 67-95 December 19, 1967.
- 4) Metropolitan Dade County Ordinance No. 74-96 (Fire Flow) December 3, 1974.
- 5) Metropolitan Dade County Ordinance No. 75-104 (Fire Flow) November 18, 1975.
- 6) Metropolitan Dade County Water Policy Task Force "Report to the County Manager", September 26, 1975.
- 7) Miami-Dade Water and Sewer Authority "Rules and Regulations for Water Service", Revised April, 1975.
- 8) Perry, J. H. - Chemical Engineers Handbook 4th Edition McGraw-Hill, New York 1953.
- 9) Memorandum regarding Submittal of Engineering Drawings for Construction Permits for Water Distribution Systems, May 3, 1974.
- 10) Metropolitan Dade County Water and Sewer Board Rules and Regulations.
- 11) Rules of the State of Florida Department of Environmental Regulation - Chapter 17-22.16(4).

SECTION D-8

WATER SUPPLY - DISTRIBUTION SYSTEMS

A PORTION OF

PART 2 - PUBLIC WORKS MANUAL

4/12/77

EEO 7, HANDICAP EMPLOYER / SERVICES

PART 2 - DESIGN

SECTION D8 - WATER SUPPLY - DISTRIBUTION SYSTEMS

D8.01 - GENERAL

a. Scope

This section sets forth criteria, procedures, and minimum standards for the design of all water supply systems to be constructed in Dade County.

A public water system is one serving or designed to serve 25 or more persons, or otherwise making water available to public groups or to the public in general. Potable water (that which is satisfactory for drinking, culinary and domestic uses) must meet the quality standards of the Metropolitan Dade County Department of Environmental Resources Management, State of Florida Department of Health and Rehabilitative Services and the U.S. Public Health Service. Potable water is required for schools, private residences, hotels, apartment houses, eating places, stores, factories, camps, institutions, public buildings, and other places where water is served to employees, customers, patrons or the general public. This water must be secured from public water supplies, where available, or from another approved source where a public water supply is not available. Large hotels, institutions, or industrial plants may use their own private supplies provided these supplies meet the same standards as for public water system.

Every such system shall be designed by a Registered Professional Engineer, currently licensed in the State of Florida, and in accordance with the requirements of the Florida State Department of Environmental Regulation, the Dade County Department of Environmental Resources Management, the Metropolitan Dade County Health Department, the Dade County Fire Department, the construction requirements and standard specifications of this Manual, and, where applicable, the requirements of the Metropolitan Dade County Building and Zoning Department, and other public agencies. The term "system" used herein shall include extensions and modifications thereof. The Design Engineer shall furnish design calculations upon request, in addition, all engineering drawings showing water distribution mains shall indicate:

- (1) The design flows in gallons per minute and pressure in pounds per square inch. (9).
- (2) Where water and sewer mains cross with less than 18 inches vertical clearance, the sewer will be 20 feet of either cast iron pipe or concrete encased vitrified clay pipe, centered

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D8.01 - GENERAL

on the point of crossing. When a water main parallels a sewer main a separation of at least 10 feet should be maintained where practical. (11).

D8.02 - APPROVALS

a. Reference Documents

The applicable portions of the following documents are made part of this Manual by reference:

1. The Florida Sanitary Code
2. American Water Work Association Water Treatment Plant Design Manual
3. The latest edition of the South Florida Building Code
4. National Fire Protection Association Fire Protection Handbook

b. Approving Authorities

Generally, plans and specifications for all new systems or extensions of public water systems shall be submitted for review, comments and approval or permits to the following agencies:

1. Metropolitan Dade County Department of Environmental Resources Management.

All plans and specifications to construct or modify water systems for public use shall be submitted to this agency with the applicable form executed.

2. State of Florida, Department of Environmental Regulation via Department of Health & Rehabilitative Services per the Dade County Health Department.

All plans and specifications for construction of public water works facilities shall be submitted to the Sanitary Engineering Bureau of this agency.

3. Metropolitan Dade County Public Works Department

(a) All projects to be constructed within the unincorporated area of Dade County, or in rights-of-way of County maintained roads within Municipal boundaries, shall be submitted to this agency for a permit to occupy such right-of-way. A permit for construction may be issued provided:

1. Five (5) sets of construction plans, identical to the approved plans, are presented.
2. Satisfactory evidence is presented that all other applicable approvals and permits have been obtained.

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3. The required permit fee is paid as prescribed in Section 2-103.2, Metropolitan Dade County Code.
4. Certification that competent and adequate engineering surveillance of construction will be provided throughout the construction period, under the responsible charge of a Registered Engineer.

4. Central & Southern Florida Flood Control District

Plans for water works facilities within the right-of-way of this agency are required to be submitted directly to this agency for a permit.

5. Metropolitan Dade County Building and Zoning Department

All above grade structures require review and approval of this agency.

6. Railroad Permits

Permits shall be obtained from the applicable railroad company involved where utilities occupy railroad rights-of-way.

7. Other Approvals

Prior to approval of a project by the County, evidence of receipt of the applicable above-listed approvals and permits must be presented. Where applicable, the system design must be in conformance with the Metropolitan Dade County Master plan for Water Facilities, dated 1961 and as amended to date of application for approval.

c. Certification

When required by any of the agencies listed above, the engineer shall furnish minimum information when the work is completed.

- (1) A certification by the Design Engineer that the work has been done in accordance with the approved plans and specifications, except as shown on the "AS-BUILT"* drawings.
- (2) Two complete sets of "AS-BUILT" drawings and specifications. (If different than as approved, see note below.)
- (3) Bacteriological test results approved by the Dade County Health Department.
- (4) A summary of quantities of mains, connections, hydrants, meters and other items.
- (5) Final construction cost and identity of contractor.

*Note: All changes must have prior written approval of agencies 1 & 2 above.

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D8.03 - DESIGN

a. Location

Water mains shall be installed in public rights-of-way only on the north or west sides of the rights-of-way unless changed by reason of interference with existing utilities, the platting of half streets, or other approved valid reasons. These requirements may be modified in special cases only by specific approval. For required locations of water mains and other utilities in rights-of-way, see General Detail series G 2.1, "Utility Placement Within a Right-of-Way for residential and arterial streets."

Water mains will be extended within the public right-of-way, the entire length of the property being served. (10).

Dead ends in mains will not be approved except where unavoidable, such as at the ends of cul-de-sacs, in which case valves or hydrants will be provided for blowing off the line.

b. Definitions

1. Average daily demand (A.D.D.) is the average annual rate of water consumption and is usually expressed in gallons per day. The design rate used shall be based on adequately documented actual experience where available. In the absence of such data a value equal to 100% of the values recommended for sewerage in the Florida State Department of Health and Rehabilitative Services "Sewerage Guide" may be used.
2. Maximum daily demand is that average rate of flow which may prevail in any 24-hour period, and should be at least 225% of the A.D.D.
3. Peak Hour demand is that average rate of flow that may prevail in any one-hour period and should have a minimum value of 450% of the A.D.D.

c. Basis of Design

Sizes of mains will depend upon fire demand, special industrial and commercial requirements and the peak domestic demand, whichever is the greatest. Every system shall be designed to meet required flows under the following condition:

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c. Basis of Design (Continued)

Treatment and supply shall meet the requirements as determined by the maximum daily demand plus fire demand. Where treated water storage is provided, consideration of reduced requirements may be made. In every case the plant shall be capable of meeting not less than the Maximum Daily Demand.

d. Sizing

1. Trunk mains shall meet the requirements of peak hour demand or fire demand plus maximum daily demand. Provision must be made to size trunk mains for ultimate flows through areas consistent with the County's latest land use plan and not just for the immediate area demands.
2. Transmission facilities without distribution storage must provide sufficient capacity to meet maximum day demand plus fire demand or maximum hour demand, whichever is greater. Specifically, distribution systems shall be designed to meet:
 - (a) Peak hour plus industrial demand with a residual pressure of not less than 30 psi.
 - (b) Fire demand plus maximum daily demand with a residual of not less than 20 psi at the point of the fire demand.
 - (c) Daily storage on maximum days must be refilled within 24 hours after draft has started. Fire storage must be restored in 48 hours plus A.D.D.
3. The following formula derived from Sarchet, B.R. and A.P. Colburn: Ind. Eng. Chem., 32:1240 (1940) may be used to select pipe size: (See reference 8).

$$D_e = 0.443 (\text{GPM})^{0.45}$$

Where D_e = Economic pipe diameter in inches

GPM = Gallons per minute required to meet maximum demand.

4. Heavy sprinkler use and the resulting increased water demand shall be considered in sizing water mains.
5. In general a minimum of 8-inch diameter pipe will be required of mains requiring fire hydrants.
6. In general, designs should be based on the criteria that section lines will be 16-inch diameter mains and half-section lines will be 12-inch diameter mains.

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e. Hydraulic-Design

In computing pressure contours in distribution grids, friction losses in mains will be computed by the Hazen and Williams formula. The value of the "C" factor to be used in this formula is 100, except for mains of 12" diameter and larger where a "C" of 120 may be used.

In cases of extensions to existing systems, pressure contours in the extension will be computed on the basis of the entire system including extensions. Pressure contours will be computed over the entire system in order to demonstrate that the system meets the requirements stated in D8.03c above. (Node pressures, annotated, may be substituted for contouring in case of small systems, or additions covering areas no greater than one square mile).

f. Supply

Direct pressure distribution systems will be considered only in small systems where the use of storage tanks is not economically feasible. In any direct pressure system a hydro-pneumatic tank, with adequate control system, shall be used. All pumping systems shall have a reserve pumping unit for emergencies, and at least one of the pumps supplying domestic needs shall be dual-powered or shall have an auxiliary power source. Fire pumps shall be driven by internal combustion engines with dual electric drives optional.

Where an independent, questionable water supply is approved for processing, cooling, fire protection, irrigation, or other non-domestic use, the pipe lines used for such independent, questionable supply shall be unmistakably identified by marking of a distinctive yellow color. There shall be no physical connection between a safe approved potable water supply and a questionable supply or a sanitary or storm sewerage system which could allow unsafe water to enter the safe water system by direct pressure, vacuum, gravity or other means.

For water distribution systems designed in accordance with this Manual, the normal maximum pressures will generally fall within the range of 60 to 75 psi at ground elevation; however, pressures shall not exceed 100 psi. In a system using fire pumps, pressure will be allowed to rise to 125 psi for short periods during testing or operation of these pumps; however, where the pump curves indicate a shut-off head in excess of 125 psi, pressure relief valves shall be installed at the pumping station and set at 110 psig.

D8.04 - FIRE PROTECTION

- a. Actual flow requirements, spacing and location of fire hydrants shall be determined by the Metropolitan Dade County Fire Department or the Municipal Fire Department having jurisdiction. The following recommendations are to be used as guidelines in planning and it is recommended a plan be submitted to the Fire Department for approval prior to final design.

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1. Fire flows are determined on the basis of structural conditions and population of buildings. See Table I below for required fire flows by zoning classification.

TABLE I

REQUIRED FIRE FLOWS BY ZONING CLASSIFICATION

EU-M	The system shall deliver not less than
EU-2	500 GPM at 20 psi residual on the system.
EU-S	Each fire hydrant shall deliver not less
EU-1	than 500 GPM.
RU-1	The system shall deliver not less than
RU-2	750 GPM at 20 psi residual on the system.
	Each fire hydrant shall deliver not less
	than 500 GPM.
RU-TH	The system shall deliver not less than
RU-3	1500 GPM at 20 psi residual on the system.
RU-3M	Each fire hydrant shall deliver not less
RU-3B	than 500 GPM.
RU-4L	The system shall deliver not less than
RU-4M	2000 GPM at 20 psi residual on the system.
RU-4	Each fire hydrant shall deliver not less
Hospitals	than 750 GPM.
Schools	
RU-5A	The system shall deliver not less than
	1500 GPM at 20 psi residual on the system.
	Each fire hydrant shall deliver not less
	than 750 GPM.
RU-5	The system shall deliver not less than
	2000 GPM at 20 psi residual on the system.
	Each fire hydrant shall deliver not less
	than 750 GPM.
BU-1A	The system shall deliver not less than
BU-1	3000 GPM at 20 psi residual on the system.
BU-2	Each fire hydrant shall deliver not less
BU-3	than 1000 GPM.
IU-1	The system shall deliver not less than
IU-2	3000 GPM at 20 psi residual on the system.
IU-3	Each fire hydrant shall deliver not less
IU-C	than 1000 GPM.

In structures requiring standpipe or fire sprinklers, fire hydrants shall be provided not more than 150 feet from the siamese connection.

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2. Hydrant Spacing

- (a) Single story residential - hydrants shall be so located that the maximum hose travel distance, as measured in streets rights-of-way, will not exceed 500 feet to the center of the lot or to the edge of the structure being protected, and no more than 500 feet apart.
 - (b) Multi-story residential - hydrant spacing along a main shall not exceed 300 feet, nor shall a hydrant be more than 300 feet from the structure being protected.
 - (c) Commercial and industry - hydrant spacing along a main shall not exceed 300 feet nor shall a hydrant be more than 300 feet from the structure being protected.
 - (d) Schools, hospitals, institutions, prisons and nursing homes - two hydrants not more than 300 feet apart must be provided to protect each structure.
- b. Fire hydrant branches (from main to hydrant) shall be not less than six inches in diameter and as short as possible with a maximum permissible length of 50 feet. Each branch will be individually gate valved. Except where intermediate hydrants may be required on a long block, fire hydrants shall be at street intersections and located as shown on General Detail G2.1, "Utility Placement Within a Right-of-Way".
- c. All fire hydrants shall be of the break-away design, or as approved by the Fire Department having jurisdiction over the area under design. In commercial areas, but not in residential areas, fire hydrants shall be protected by guard posts from vehicular damage, as shown on Detail WS 6.2, except where traffic safety or lack of clear space will not allow their installation.
- 1. Hydrants to be serviced by the Dade County Fire Department shall have 2 - 2½ inch hose connections with a 4½ inch diameter pumper connection. Threads shall be American National Standard. The operating nut shall be National Standard 1½ inch point to flat. Drains will not be required.
 - 2. Fire hydrants to be serviced by departments other than Dade County may require slight modifications to the requirements noted above in 1.
- d. Hydrants shall not be located within three feet of any obstruction nor in front of entrance ways, and the pumper discharge shall face the nearest roadway. The center of the lowest outlet shall be not less than 18 inches above the surrounding grade and the operating nut shall not be more than four feet above the surrounding grade. No connections will be made to hydrants or hydrant lines, either for permanent or temporary use, except under emergency conditions by specific authority of the Dade County Fire Department.

Section D8 - Water Supply

HYDRANT SPACING (Continued)

- e. Unless otherwise approved by the County, all fire hydrants shall be conveyed to Dade County by plat or an approved instrument of dedication; and all maintenance and operation costs of fire hydrants, after acceptance of said dedication, shall be the responsibility of Dade County.
- f. Where required fire hydrants lie within a private property, appropriate easements and accessibility shall be dedicated to the utility serving the property.

D8.05 - VALVES AND SERVICES

- a. Valves shall be installed at intervals of not more than 5,000 feet in long transmission mains; at intervals of not more than 1300 feet in main distribution loops or feeders; and on all primary branches connected to these lines. In high value areas, valves will be installed so that the average length of pipe affected by a break will not exceed one block or 660 feet; elsewhere, the length shall not exceed two blocks or 1320 feet.

Except in cases of long blocks where additional valves will be required, valves shall be installed at street intersections. Typical valve locations shall be as shown on General Detail G2.1, "Utility Placement Within A Right-of-Way". Details of valve installation shall be as shown on Standard Water Supply Detail WS 1.1, "Typical Valve Setting".

- b. Air release and vacuum break valves will be installed at prominent peaks on long supply mains only. Air valves will not generally be necessary in the grid distribution system where air accumulations will normally be released through service lines. See Standard Water Supply Detail WS 2.1, "Air Relief Valve and Vault".

c. Services

The following suggested sizes of water meter and taps are listed as a guide:

<u>Meter Capacity</u>	<u>Main Size</u>	<u>Maximum Meter Connection</u>
5/8" 20 gallons per minute	2" *	1" Meter or less
1" 50 gallons per minute	3" *	1½" Meter or less
1½" 100 gallons per minute	4" *	2" Meter or less
2" 160 gallons per minute	6"	4" Meter or less
3" 300 gallons per minute	8"	6" Meter or less
4" 600 gallons per minute	12"	6" Meter or less

Buildings With Tank Type Toilets

<u>Type</u>	<u>Size Tap & Meter</u>	<u>Size Pipe from Meter To Building</u>	
Home	5/8"	3/4" or 1"	<u>Note: pipe size always next size larger than size meter recommended.</u>
Home	1"	1½"	
Apartments 2-4 Units	5/8"	1"	
Apartments 2-20 Units	1"	1½"	
Over 20 Units	Subject to review of needs		

Section D8 - Water Supply

Buildings With Flush Valve Type Toilets

<u>Type</u>	<u>Size Tap & Meter</u>	<u>Size Pipe from Meter To Building</u>
Homes or	1"	1½" Note: <u>pipe size</u>
Apartments 1-4 Units	1½"	2" <u>always next size</u>
Apartments 4-20 Units	Subject to	<u>large than size</u>
Apartments Over 20 Units	review of needs	<u>meter recommended.</u>

*Existing mains only, new mains min. size is 6-inch or 8-inch.

The above suggested data is based on normal water supply and pressures.

D8.06 - MATERIALS

a. General

All materials used in potable water distribution systems will be specified on the extension plans and must meet the minimum requirements of the AWWA and the NSF along with any additional requirements set forth below. Galvanized pipe, for example, is not acceptable for water mains.

Materials shall conform to the applicable standards of the associations and agencies listed below except as may be herein modified:

1. AWWA - American Water Works Association
 2. ANSI - (Formerly ASA & USASI) American National Standards Institute
 3. ASTM - American Society for Testing Materials
 4. NSF - National Sanitation Foundation
 5. FS - Federal Specification
- b. Cast iron pipe, fittings and joints shall conform to ANSI Standard Specifications A21.1, A21.4, A21.6, (or A21.8) A21.10, and A21.11. All gray iron pipe shall conform to either ANSI Specification A21.6, latest revision, or ANSI Specification A21.8, latest revision, with thickness and outside diameter as specified in Table 6.1 or 6.2 and 8.1 or 8.2 respectively, for Class 150 pipe. Pipe shall be cement lined and coated inside and out with a bituminous material.
- c. Asbestos - Cement pipe and joints shall conform to AWWA Standard Specifications C400 and C401. "Full Dimension" pipe shall be specifically required.

Section D8 - Water Supply

MATERIALS (Continued)

Fittings shall meet the applicable sections of ANSI Standard Specification A21.11 and shall be cement lined with coatings of bituminous material.

- d. Prestressed concrete pipe, joints and fittings shall conform to AWWA Standard Specification C301.
- e. Ductile Iron Pipe shall conform to the ANSI Standard Specifications A21.50 and A21.51, with wall thickness for pipe 12" and smaller, Class 3, and for pipe larger than 12", Class 2, as specified in Table 6 ANSI Specification A21.50 latest revision. Pipe shall be cement lined and coated as noted above for cast iron.
- f. PVC pipe shall conform to AWWA Standard C900-75.
- g. Galvanized steel pipe and fittings shall conform to FS WW-P-406C and FS WW-P-521f. Approvable only for service laterals under 2" I.D.
- h. Steel pipe and fittings shall conform to AWWA Standard Specifications C201, C202, C203, C205, C206, C207, C208 and C602. Pipe shall be designed in accordance with AWWA Manual M-11. Pipe shall be coated and lined in accordance with these specifications.
- i. Plastic tubing (for Services) shall be Type II - 160 psi tubing of PVC conforming to NSF Standards No. 14 and 15 and ASTM D 2241.
- j. Copper tubing, fitting and valves shall be Type K conforming to AWWA Standard Specification C800.
- k. Gate valves shall be iron body, bronze mounted double disc, parallel or inclined seats, non-rising stem, 2-inch square nut operated, mechanical joint or flanged ends type gate valves designed to meet the requirements of the AWWA Specification C500, latest revision. Valves shall open to the left (counter-clockwise). Valves up to and including size 12 inches shall have an "O" ring type pressure seal. Valves larger than size 12 inches shall have adjustable stuffing boxes in accordance with the above AWWA Specification.
- l. Butterfly valves used in mains 6" through and above 24" shall be manufactured in accordance with and meet the requirements of AWWA Standard C504-70. The valve bodies shall be made of cast iron and conform to ASTM Specification A126-Class B, or ASTM Specification A48-Class 40. The butterfly valves shall be factory tested in accordance with AWWA Standard Leakage and Hydrostatic Tests. A certified test report shall be furnished showing the valves have met the requirements of the test.

Section D8 - Water Supply

MATERIALS (Continued)

- m. Meters shall be as approved by the County and shall conform to the AWWA Standards. In order to reduce maintenance cost, all two inch or smaller meters to be installed on County system shall be the split case warm weather service type. Any meter installed in the Miami-Dade Water and Sewer Authority System shall be first approved by the Authority.
- n. Concrete for non-structural use shall have a minimum 28 day strength of 2000 psi.
- o. Valve boxes shall be cast iron and shall have the work "Water" or letter "W" cast in the cover.

D8.07 - CONSTRUCTION

- a. Installation of water mains shall conform to the applicable requirements of the following AWWA Standards:
 - 1. Cast or Ductile iron pipe - AWWA C600
 - 2. Cement asbestos pipe - AWWA C603
 - 3. Steel pipe - AWWA Manual M-11
 - 4. Other type pipes shall be installed in accordance to the recommendations of the manufacturer and in general conformance to AWWA C600.
- b. In addition to requirements of the foregoing, pipe laid in rock shall be bedded in gravel or crushed rock not larger than $\frac{1}{2}$ inch size. The gravel or crushed rock bed shall rise to the spring-line of the pipe.
- c. Where pipe is to be laid in a filled marsh, mangrove swamp, or in similar areas, special installation conditions shall be obtained in writing from the Director of Public Works. Such installations, which may include but not be limited to; jacketing, embedment and placing of other permissible materials will be required for the special environment in question.
- d. Services

Small meters (not larger than 1 inch) shall be located in meter boxes placed at $2\frac{1}{2}$ feet center offset from the property line. If there is an existing sidewalk, the meter box shall be set as close as feasible to the outer edge of the walk. Large meters shall be placed in concrete vaults (either traffic bearing or non-traffic bearing type depending on location) located in public right-of-way.

Section D8 - Water Supply

CONSTRUCTION (Continued)

Copper tubing service shall be installed with corporation stop at the main, or adaptor with isolation bushing if connected to galvanized fitting, and may be run straight-line to curb stop or meter yoke with stop.

Galvanized steel pipe services shall have goosenecks and branch goosenecks. All service pipe shall have corporation stop, and at the meter end there shall be a swing joint, riser and elbow preceding the curb stop, or meter yoke with stop. Straight-line meter setting with galvanized or approved plastic pipe will not be permitted. If the service is connected to a galvanized fitting at the main, there shall also be a swing joint at that point. Copper tubing goosenecks may be used in lieu of lead goosenecks, provided that the copper tubing gooseneck is at least 24 inches long.

For typical service connection details, see Standard Details Nos. WS 31., WS 3.2 and WS 3.3.

e. Other Requirements

1. All mains shall be blocked to withstand an operating pressure of at least 100 psi.
2. All cast iron joints, other than lead joints, shall be installed with two serrated brass wedges at the spring-line of the pipe for electrical continuity.
3. The minimum cover on all water mains for residential street other than arterial, shall be 30 inches except for 12 inch diameter pipe and above; in which case the minimum cover shall be 36 inches. Services which cross a street shall have 24 inches of cover and near side services shall have 18 inches of cover. (See General Detail 2.1, sheet 2 of 4 - "Utility Placement Within a Right-of-Way for Residential Streets".)
4. On all Arterial streets the minimum cover on all water mains shall be 36 inches or any greater amount necessary to insure that the operating nuts and valves shall have clearance below the bottom of the valve box covers, except in cases where this is not possible and special permission has been granted. (See General Detail 2.1, sheet 4 of 4 - "Utility Placement Within a Right-of-Way for Arterial Streets".)
5. Where a main passes under a railroad, the pipe will be encased in rigid conduit in accordance with the standard practice of the particular railroad company or in accordance with the criteria contained in the Manual of Recommended Practices of the American Railway Engineering Association. The latter standard shall be a minimum requirement of Dade County in the event the standard of any railroad shall be less stringent.
6. All lines shall be flushed and tested in accordance with the AWWA Standard C600.

REFERENCES

- 1) Greeley & Hansen, Sanitary Engineers (together with) Connell Associates, Inc., Water Quality Management Plan for Metropolitan Dade County Florida, available through Metropolitan Dade County Planning Department, Miami, 1973.
- 2) Insurance Services Office, "Public Fire Protection Report on Hialeah, Florida", New York, December 1, 1975.
- 3) "Metropolitan Dade County Pollution Control Ordinance" Ordinance No. 67-95 December 19, 1967.
- 4) Metropolitan Dade County Ordinance No. 74-96 (Fire Flow) December 3, 1974.
- 5) Metropolitan Dade County Ordinance No. 75-104 (Fire Flow) November 18, 1975.
- 6) Metropolitan Dade County Water Policy Task Force "Report to the County Manager", September 26, 1975.
- 7) Miami-Dade Water and Sewer Authority "Rules and Regulations for Water Service", Revised April, 1975.
- 8) Perry, J. H. - Chemical Engineers Handbook 4th Edition McGraw-Hill, New York 1963.
- 9) Memorandum regarding Submittal of Engineering Drawings for Construction Permits for Water Distribution Systems, May 3, 1974.
- 10) Metropolitan Dade County Water and Sewer Board Rules and Regulations.
- 11) Rules of the State of Florida Department of Environmental Regulation - Chapter 17-22.16(4).

R O A D S P E C I F I C A T I O N S

SECTIONS 24, 30, 33, 40, 51, 100, 132, AND 133

A PORTION OF

PART 2 - PUBLIC WORKS MANUAL

SECTION 24 CLEARING AND GRUBBING

- 24.01 **DESCRIPTION:** The work specified in this section consists of clearing and grubbing within the areas of right-of-way, and any other areas shown on the plans or designated by the Engineer. This work shall also include adequate disposal of all debris and refuse from this operation.
- 24.02 **CLEARING AND GRUBBING OPERATIONS:** Clearing and grubbing shall consist of the complete removal and disposal of all timber, brush, stumps, roots, grass, weeds, rubbish and all other obstructions resting on or protruding through the surface of the existing ground. In roadway cut areas, all stumps, roots, and other debris shall be removed to a depth of not less than one foot below ground surface. In areas under roadway embankments from which unsuitable material is to be removed, all stumps, roots, and other debris shall be removed to a depth of at least 12 inches below the original ground surface. In areas outside the grading limits, stumps and roots may be cut flush with the ground in lieu of being removed.

All loose boulders and debris lying on the ground shall also be removed and disposed of by the contractor.

Such individual trees as the engineer may designate and mark shall be left standing and uninjured. In order to minimize damage to trees that are to be left standing, trees shall be felled toward the center of area being cleared. When necessary to prevent damage to structures, or other trees or property, or to minimize danger to traffic, trees shall be cut in sections from the top downward.

Property obstructions which are to remain in place, such as buildings, sewers, drains, water or gas pipes, conduits, poles, walls, posts, bridges, etc., are to be carefully protected from damage and are not to be displaced except as might be directed by the Engineer for unusual cases.

- 24.03 **DISPOSAL OF MATERIAL:** Unless otherwise specified, all material resulting from clearing and grubbing shall become the responsibility of the contractor to dispose of in any legal manner and place he selects, outside the limits of the right of way. Under no circumstances shall the contractor allow any material resulting from clearing and grubbing to interfere with the public. There will be no burning of material without prior approval of the Public Works Department, the Fire Department, and the Pollution Control Officer.

SECTION 30 EXCAVATION AND EMBANKMENT

- 30.01 DESCRIPTION: The work specified in this section consists of excavating, removing and disposing of all unsuitable or excess materials within the limits of the work, and placing embankments to the proposed line, grade and cross section. It shall also include all excavation, borrow, filling, shaping, sloping necessary for the construction, preparation, and completion of all subgrades, shoulders, ditches, slopes, gutters, intersections, approaches, private entrances, canals, and canal slopes all in accordance with required alignment, grade and cross sections shown on the plans or standard details.
- 30.02 ROADWAY EXCAVATION: Roadway excavation shall consist of the excavation and satisfactory disposal of all materials not necessary for the construction of the roadway. Windrows of material shall not be used as forms for limerock.

The Contractor shall take the necessary steps to prevent the loss of material from the roadway due to the actions of wind or water. During construction of the roadway, the roadbed shall be maintained in such condition that it will be well drained at all times.

- 30.03 UNSUITABLE MATERIAL: All muck, peat, or sand and clay with a high percentage of organic material (EPF Soil Classification A-6, A-7, and A-8 or soils in groups A-6, and A-7 by AASHTO Specification M 145-73) shall be considered unsuitable material and shall be removed to natural limerock or a suitable foundation approved by the Engineer. Soils in group A-4 and A-5 must be removed but may be reused as specified in Section 30, Article .04. The unsuitable material shall be removed to at least the width of the proposed pavement and shoulders plus a foot on each side for each foot in depth of unsuitable material.

Where a layer of muck or unsuitable material lies below a layer of suitable subgrade material, all material shall be removed, and the unsuitable material shall be replaced with a suitable material; then the original suitable subgrade material may be utilized if replaced in the manner prescribed in Article .04. The suitable subgrade material shall be properly stockpiled so that it does not become mixed with unsuitable material.

- 30.04 EMBANKMENTS: Embankments shall consist of the construction of fill for the roadway and any of its components.

Materials used for embankments shall be limerock or limerock and silica sand (EPF Soil Classification A-1, A-2, or A-3). Soils in A-4 or A-5 Classification shall not be used unless they are blended with sufficient A-1, A-2, or A-3 soil so that the resultant mixture has a minimum California Bearing Ratio value of 25 at 95 percent of the maximum density as determined by AASHTO Specification T 180-74.

No piece of limerock that will not pass a 12-inch ring shall be

placed within the top 2 feet of the completed embankment. No piece of limerock that will not pass a 3½-inch ring shall be placed within the top 12 inches of the completed embankment. In no case shall stumps, roots, vegetation, or any other unsuitable material be used in the construction of embankments. The embankment material shall be so placed as to eliminate the segregation of large pieces of limerock and in such a manner that will not create voids. If voids are formed, they shall be eliminated to the satisfaction of the Engineer.

Embankments shall be constructed in layers of not more than 12 inches compacted thickness, and compacted to a density of not less than 95 percent of the maximum density as determined by AASHTO Specification T 155-74. Embankments over and around pipes or culverts shall be made with select materials approved by the Engineer. Compaction shall be performed as stated herein, but special care shall be taken to avoid damaging of the pipe or culvert. Embankments shall be kept symmetrical on all sides of pipe structures to avoid displacement. Hand tamping devices shall be used for compacting in and around pipe structures in 6-inch layers until a depth of 12 inches over the top of the pipe is obtained. Mechanical compactors shall then be used for compacting from 12 inches above the top of the pipe to the final grade in layers not exceeding 12 inches in compacted thickness.

- 30.05 FILLING UNDER WATER: After removal of muck and other deleterious materials from the roadway and necessary berm area and approval of the Engineer, areas stripped under water shall be filled with an acceptable fill to a maximum of 12 to 18 inches above the water table that existed prior to filling.

The surface of the fill shall then be compacted to comply with these specifications. If a saturated or "lob-lolly" condition exists that prevents the compaction from taking place, the Contractor shall cease operations until the water level has an opportunity to subside. Scheduling of operations should be such that if conditions warrant, the newly filled area may be left for a week to 10 days (or until density may be obtained). This may occur when a high carbonate soil is utilized for filling. After the proper density is obtained, the successive layers of fill shall then be placed and compacted in accordance with these specifications and to the satisfaction of the Engineer.

- 30.06 SUBGRADE: The work shall consist of bringing the bottom of the excavations and the top of the embankments of the roadway 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.

All submerged stumps, roots, and other unsuitable matter encountered in the preparation of the subgrade shall be removed and replaced with a suitable material.

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 where such a condition does not exist, the top 12" of subgrade shall be stabilized in accordance with Section 33.

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 Specification T 180-74 prior to the placement of the base course.

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 crown, elevation and density.

30.07 SHOULDERS, SLOPES, SWALES, AND GENERAL CONSTRUCTION: On roadways where no curb and gutter is required or called for on the plans, the base course and stabilized subgrade shall be extended as depicted in the standard details or shown on the plans.

All cut and fill slopes shall be constructed as shown on the approved plans. The Contractor shall be responsible for the stability of all slopes and shall replace any portion which has become displaced.

Where the plans call for the construction of shoulders, berms, swales, intersections, approaches, private entrances or any other general construction, such work shall conform to the lines, grades, cross sections as depicted in the standard details or shown on the plans.

30.08 CANAL EXCAVATION: When canal excavation is authorized by a Water Control Permit, all work shall be performed as specified in its Instructions and General Requirements.

SECTION 33 - STABILIZING

33.01 DESCRIPTION: The work specified in this section consists of the construction of a stabilized subgrade and shoulder where shown on the plans or standard details. Construction shall be to the uniformity, density, and bearing value specified hereinafter. Stabilization shall be obtained by constructing the subgrade of either selected materials from the roadway or other suitable stabilizing material. Such work shall be done in accordance with these specifications, lines, grades, and dimensions shown on the plans or standard details.

33.02 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.

Suitable stabilizing materials obtained from an existing base or pavement which is to be replaced or abandoned may be used providing that such materials contain no fragments larger than 3½ inches in diameter.

33.03 CONSTRUCTION METHODS: The stabilizing shall be constructed in accordance with the following:

- a. Stabilizing: Where the subgrade or shoulder does not possess the required bearing value, it shall be stabilized in accordance with the requirements specified in paragraphs (1) and (2) below:
 - (1) The materials may be stabilized either in two 6-inch layers of compacted thickness or to a full depth in one course (not exceeding 12-inch compacted thickness). If in one course construction, uniformity of blending of the stabilized material is not obtained to the satisfaction of the Engineer, the stabilizing shall be constructed in courses or layers of not more than 6-inch compacted thickness. The stabilizing material shall be applied separately for each course to be blended upon completion of stabilization. The grade of the stabilized subgrade and shoulder shall be at the elevation that will insure fulfillment of the requirements of the typical cross section when the job is completed.

- (2) The stabilizing material shall be applied in such quantity as is necessary to produce a CBR value of no less than 25 when compacted to a minimum field density of 95 percent of the maximum density obtained in accordance with AASHTO Specification T 180-74. It shall be incorporated with the subgrade material by plowing, disking, harrowing, blading, and mixing with rotary tillers until the mixed materials are of uniform bearing value throughout the width and depth of the layer being processed.
- b. Uniformity: The materials for any course of stabilizing, in both cuts and fills, shall be mixed thoroughly to produce material of uniform texture and bearing value throughout the width and depth of the course. In areas where no additional material is necessary in order to meet bearing value requirements, the material already in place shall be mixed thoroughly to produce uniformity.
- c. Size Limitation: All materials used in the stabilizing course shall pass a $3\frac{1}{4}$ -inch ring.
- d. Compaction: All portions of the stabilized subgrade or shoulder shall be compacted by rolling with any type of equipment that will produce the compaction required. Compaction shall continue until the entire depth to be stabilized has a density, determined from tests made on each six inches compacted thickness, of not less than 95 percent of the maximum density, as determined by AASHTO Specification T 180-74.

SECTION 40 - RESTORATION OF TRENCHES

- 40.01 DESCRIPTION: The work specified in this section consists of backfilling trenches and restoring surfaces disturbed by the installation or maintenance of underground facilities within the limits of a public right of way or easement. This work shall be done in accordance with these specifications and Standard Detail R-21.1. For the purpose of this Section a trench cut 200 feet or less in length shall be considered a "short trench", and a trench cut more than 200 feet in length shall be considered a "long trench". However at the discretion of the Engineer, a concrete slab may be required for restoring pavements less than three years old regardless of length of trench.

- 40.02 TRENCHES CUT IN NEW ROADWAY PRIOR TO THE CONSTRUCTION OF THE BASE COURSE: Before any excavation for underground facilities is begun, all required fill shall be in place and graded to subgrade elevation.

After the structure is installed and inspected the trench and space around the structure to a level plane one foot above the structure shall be backfilled in six-inch layer (compacted thickness) and shall be compacted to a density of not less than 95 percent of the maximum density as determined by AASHTO Specification T-180 (modified Proctor). Material shall be of selected fine earth material, 100 percent of which passess a one-inch sieve. Backfilling and compaction shall be carried out evenly on both sides of the structure in approximately level layers, and shall be performed in such a manner so as not to crack, damage or displace the structure.

The remaining portion of the trench from a level plane one foot above the top of the structure to the top surface of the subgrade or to the bottom of the base course shall be backfilled and compacted in layers not exceeding eight (8) inches to a density not less than 98% of maximum density as determined by AASHTO Specification T-180 (modified Proctor). All material used for backfill shall be of quality acceptable to the Engineer and shall be free from large lumps, wood or other extraneous material.

Trenches for direct-burial cable or conduit shall be not less than six inches in width and shall be deep enough to provide a minimum cover of 30 inches whenever possible. (See Standard Detail R-21.1) The cables shall be spaced at least three inches apart both horizontally and vertically and separated by clean sand and selected earth material, 100 percent of which passess a one-inch sieve. A three-inch bed of sand shall be used for the bottom of cables, and shall be covered by three inches of sand prior to backfilling, performed as specified above.

The material may be compacted by a hand tamper, a powered hand tamper, a vibrating tamper or mechanized power tamper provided such compaction meets the required density as specified above. The excavation should be kept free of ground water and surface water until the backfilling is completed. Backfilling and compacting by means of hydraulic methods will not be permitted except as may be approved by the Engineer.

40.03 REPAIR TO TRENCHES CUT ACROSS PAVEMENT OR SHORT TRENCHES CUT PARALLEL TO THE ROADWAY CENTER LINE REQUIRING RESTORATION OF BASES COURSE WITH OR WITHOUT A SURFACE COURSE:

- a. Backfill and Compaction: Backfill and compaction shall be performed as specified in Article 40.02.
- b. Reinforced Concrete Slab:
 - (1) A reinforced concrete slab is required for all cases within this Article.
 - (2) The thickness of the slab shall be a minimum of six inches, but not less than the thickness of the existing concrete pavement.
 - (3) The width of the slab shall be no less than two feet greater than the width of the trench in order to provide a minimum bearing width of one foot on each side.
 - (4) Material
 - (a) The slab shall be constructed of Class I Concrete, and shall have a minimum strength of 3,000 PSI.
 - (b) The concrete slab shall be reinforced with No. 6 gauge, six inches by six inches, wire mesh which shall meet the requirements of AASHTO Specification M-55.
- c. Finished Grade: The finished grade of the concrete slab shall be one inch below the existing pavement or flush with the base for cuts in base course only.
- d. Roadway Surface: For all cases where a permanent pavement exists the concrete slab and the surrounding pavement edges shall be tack coated and a one inch Type S-I Asphaltic Surface Course shall be placed on the slab, in accordance with Section 133.

40.04 REPAIR TO LONG TRENCHES CUT PARALLEL TO THE ROADWAY CENTER LINE REQUIRING RESTORATION OF BASE COURSE WITH OR WITHOUT SURFACE COURSE:

a. Backfill and Compaction: Backfill and compaction shall be performed as specified in Article 40.02.

b. Limerock Base Course:

(1) A limerock base course is required for cases falling within this Article.

(2) A reinforced concrete slab as specified in Article 40.03-b may be substituted for the limerock base.

(3) The base course shall have a minimum compacted thickness of eight inches or equal to the existing base course thickness if greater than eight inches.

(4) The width shall be no less than two feet greater than the width of the trench.

(5) The materials and construction of the base course shall be in accordance with Section 51 of these specifications.

(6) Finished grade of the concrete slab shall be one inch below the existing pavement or flush with the base for cuts in rock base only.

c. Existing Concrete Pavement: Restoration of existing concrete pavement shall be in accordance with sub-article 40.03-b.

d. Roadway Surface: Where permanent pavement exists, the base course shall be primed, tack coated and surfaced with one inch of Type S-I Asphaltic Concrete as prescribed by Section 133 of these specifications. Care shall be taken to tack coat and bond the edges of surrounding pavement.

40.05 MISCELLANEOUS RESTROATION: Trenches cut across driveways, sidewalks, parkways, and concrete curbs, or curb and gutter shall be backfilled and compacted in accordance with Article 40.02. The surface restoration shall be as follows:

- a. Driveways: A minimum of six inches of limerock base, but not less than the thickness of the existing base, shall be placed above the subgrade. The width of the base shall be not less than two feet greater than the width of the trench. The finish surface shall match the existing surface in type and thickness of material.
- b. Sidewalk: Sidewalk shall be restored in full sections or blocks to a minimum thickness of four inches and six inches at driveways. Concrete sidewalk shall be constructed as specified in Section 145.
- c. Parkways and Easements: Parkways shall be restored to match exactly the existing section of parkway. Care shall be taken to prevent damage to trees, shrubs or bushes growing in the parkway area.
- d. Concrete Curb or Curb and Gutter: All concrete curb or curb and gutter shall be restored to the existing height and cross section in full sections or lengths between joints.

40.06 SPECIAL REQUIREMENTS: The restoration of all trenches and road surfaces disturbed by the installation or repair of underground facilities shall be completed as soon as reasonable and practical.

No more than 1000 feet of continuous trench shall be opened at any one time under any single permit. Where deemed necessary by the Engineer in the interest of public safety, convenience or traffic maintenance, the length of continuous open trench permitted may be reduced to less than 1000 feet. In general it is not anticipated that any trench would be restricted to less than 600 feet except in a case of unusual circumstance.

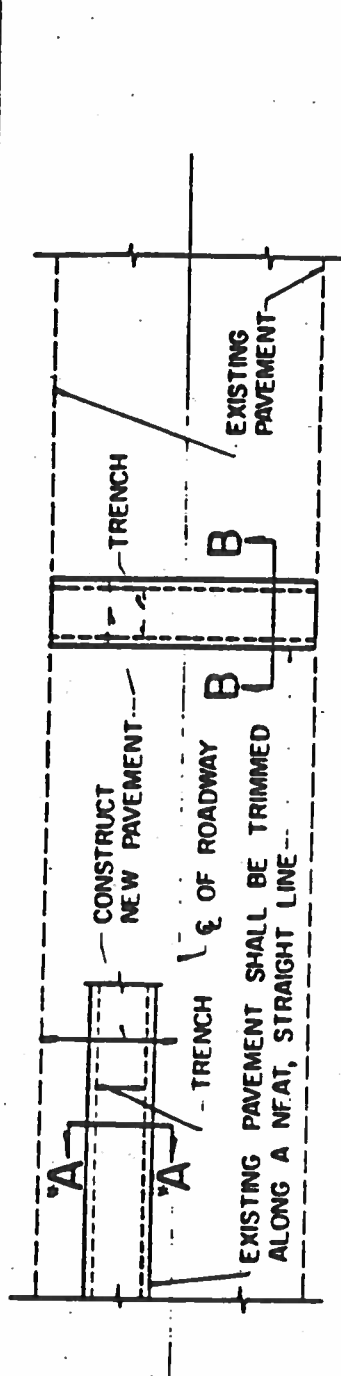
The Contractor shall be responsible for the safety of any existing underground structure encountered during any part of the work. Incorrect locations or elevations shown on any plans shall not relieve the Contractor of his responsibility for insuring the safety of underground structures.

In areas where traffic is to be maintained, a temporary asphalt mix shall be placed over the trench immediately after backfilling if the permanent pavement cannot be laid within a reasonable and practical time as determined by the Engineer. The temporary pavement shall be laid even with existing pavement as not to create a bump or a depression, and shall be maintained in a condition satisfactory to the Engineer.

The existing pavement shall be trimmed to neat, straight lines parallel or perpendicular to the roadway center line; the width being equal to the maximum required by the trench excavation, before the permanent pavement replacement is made. The pavement replacement shall be smooth and even with

the existing pavement; a bump or depression may justify the complete removal and replacement of the surface restoration. Pavement restoration shall be made in accordance with Standard Detail R-21.1.

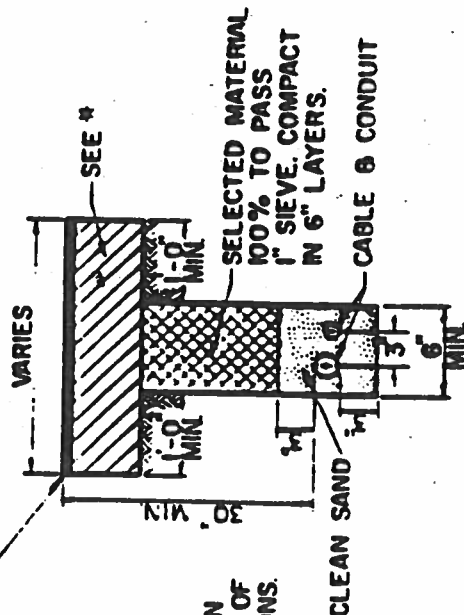
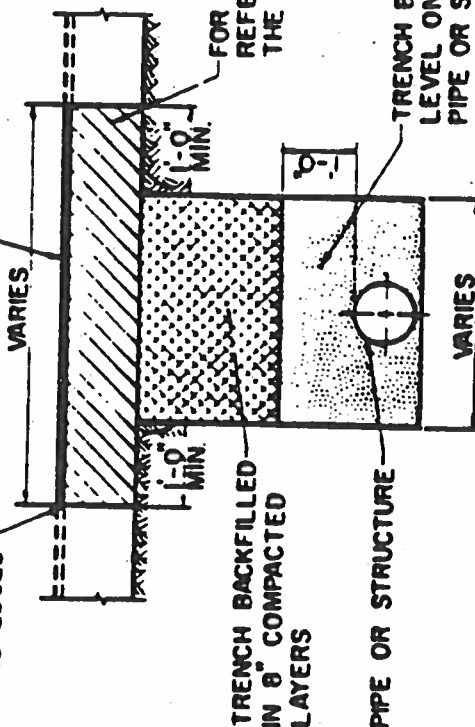
- 40.07 TRAFFIC MAINTENANCE: Traffic maintenance shall conform to the requirements specified in Section C.2 of the Public Works Manual.



PLAN

ASPHALTIC CONCRETE THICKNESS AND TYPE TO BE THE SAME AS ADJACENT ROADWAY. IT SHALL BE 1" THICK WHEN CONCRETE SLAB IS USED FOR BASE.

TACK COAT ALL SURFACES AND EDGES



SECTION A-A & B-B

DIRECT BURIAL CABLE OR CONDUIT

* NOTE

PAVEMENT RESTORATION FOR LONGITUDINAL CUTS SHALL INCLUDE FULL LANE WIDTH RESURFACING FOR EACH LANE WITHIN WHICH THE CUT EXTENDS. IN SOME CASES IT WILL BE NECESSARY TO OVERLAY MORE THAN ONE (1) LANE W/ASPHALTIC CONCRETE TO SATISFY PAVEMENT SLOPE.

ITEM	CROSS REF.	SPEC. REF.
PAVMT. RESTORATION		SEC. 40
UTILITY PLACEMENT	0-2.1	
ASPHALTIC CONCRETE		SEC. 133
BASE COURSE		SEC. 9-5A

METROPOLITAN
DADE COUNTY
PUBLIC WORKS
DEPARTMENT

APPROVED
E.S./E

REVISED
5/17/72
7 14 '82

STANDARD ROAD DETAIL
PAVEMENT RESTORATION FOR
TRENCHES CUT IN PUBLIC
RIGHTS-OF-WAY

R
21.1
SHEET 1 OF 1

SECTION 51 LIMEROCK BASE

51.01 DESCRIPTION: The work specified in this section consists of the construction of a base course composed of limerock. It shall be constructed upon the prepared subgrade in accordance with these specifications and in conformity with the lines, grades, notes and typical cross sections shown on the Plans or Standard Details.

Unless otherwise specified, the minimum compacted thickness of the limerock base shall be:

*1. On limerock subgrade or stabilized subgrade where specifically approved in writing by the Engineer, not less than 6 inches.

2. On sand or high sand content subgrade, not less than 8 inches placed in two equal lifts.

*If more than 6 inches, place in two equal lifts.

51.02 MATERIALS: Limerock shall be obtained from pits from which all overburden has been removed. It shall show no tendency to air slake or undergo chemical change under exposure to weather, nor shall it contain more than 0.5 percent of organic matter or objectionable matter. Limerock shall contain by weight, not less than 50 percent of carbonates of calcium and magnesium and not more than 2 percent of oxides of iron and aluminum. Any other constituents other than carbonates and oxides shall be silica.

The limerock shall be graded as follows:

Passing 3/4" Sieve	-	Not less than 97%
Passing 3/4" Sieve	-	Not more than 70%

All fine material shall consist entirely of dust of fracture. The limerock shall be uniform in quality and shall not contain hard or flinty pieces in sufficient quantity to prevent proper bonding or to prevent obtaining a smooth surface, free from pits or pockets.

51.03 EQUIPMENT: All equipment necessary for the proper construction of the work shall be on the project, in first-class working condition, and shall have been approved by the Engineer prior to its use.

Rollers shall be of the steel-wheel type, weighing not less than 10 tons. Blade graders shall weigh not less than 3 tons and shall have a wheel base not less than 15 feet and a blade length of not less than 12 feet.

51.04 FORMS: Forms will be required for the edges of the base course and may be of either steel or wood. They shall be of sufficient height to

extend to the upper surface of the loose spread limerock while seated firmly on the subgrade. The forms shall be of sufficient thickness and sturdiness that no buckling or misalignment will occur after they are set true to line and grade and substantially staked in place. They shall also be sufficiently uniform in dimensions that there will be no difficulty in obtaining proper alignment and grade.

The Contractor, with permission from the Engineer in lieu of using forms, may construct each side of the base 6 inches wider than the designed width. In this case, all material shall be cleaned out to a vertical face at the stake line prior to placing material.

51.05 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.

51.06 SPREADING LIMEROCK: The limerock shall be spread uniformly, and all segregated areas of fine or coarse rock shall be removed and replaced with well-graded rock.

51.07 COMPACTING AND FINISHING BASE: After the spreading is completed, the entire surface shall be scarified and shaped so as to produce the exact grade and cross section after compaction.

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 diskings 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 involve manipulation of the entire width and depth of the base as a unit. 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 obtainable under AASHTO Specification T 18C-74.

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.

Unless otherwise directed by the Engineer, the surface shall be hard-planned with a blade grader immediately prior to the application of the prime coat to remove the thin glazed or cemented surface of the base. This hard-planing shall be done in such a manner that only the glazed or cemented surface will be removed, leaving a granular or porous condition that will allow free penetration of the prime material. The materials planed from the base shall be removed from the base area.

The hard-planing operations, if required, shall follow the surface-testing operations specified in Article 51.08.

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.

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 checks by rescarifying, reshaping, adding base material where necessary and recompacting.

51.08 TESTING SURFACE: The finished surface of the base course shall be checked for conformance to the required crown and grade. 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 hereinbefore.

51.09 THICKNESS DETERMINATIONS: 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.

The measurements shall be taken in holes through the base of not less than 2 inches in diameter. Where the compacted base is deficient by more than one-half inch from the thickness called for on the Plans, the Contractor shall correct such areas by scarifying and adding limerock. The affected areas shall then be brought to the required state of compaction and to the required thickness and cross section.

51.10 PRIMING AND MAINTAINING: A prime coat shall be applied for the full width of the roadway base as shown on the Standard Details. The prime coat shall be applied only when the base meets the specified density requirements and the moisture content does not exceed 70 percent of the optimum moisture content of the base material. At the time of priming, the base shall be firm unyielding and in such condition, that no undue distortion will occur.

The hard-planing specified in Article 51.07 shall be done immediately preceding the application of the prime and after the base has been found to meet all other requirements.

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.

Application of the prime coat shall be performed as specified in Article 100.06.

SECTION 100 PRIME AND TACK COATS

100.01 DESCRIPTION: The work specified in this section consists of an application of bituminous material on previously prepared base or existing pavement in accordance with these specifications and in conformity with the line, grades, dimensions, and notes shown on the Plans or Standard Details.

100.02 MATERIALS:

- a. Prime Coat: The material used for the prime coat shall be one of the following:
 - (1) Tar, Grades RT-2 and RT-4 shall meet the requirements of AASHTO Specification M52-42 (1974).
 - (2) Cutback asphalt, Grade RC-70 or RC-250 shall meet the requirements of AASHTO Specification M81-70.
 - (3) Cutback asphalt, Grades MC-0 and MC-1 shall meet the requirements of AASHTO Specification M82-73.
- b. Tack Coat: The material used for the tack coat shall be one of the following:
 - (1) Asphalt cement, Penetration Grade 85-100 shall meet the requirements of AASHTO Specification M20-70.
 - (2) Emulsified asphalt, Grade RS-2 shall meet the requirements of AASHTO Specification M140-70.

100.03 EQUIPMENT: 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 manifold shall be equal to the width of the application required, within an allowable variation of two inches. The outside nozzle at each end of the manifold 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, except that, when the application covers less than the full width, the end nozzle at the junction line shall have the same opening as the interior nozzles. All nozzles shall be in perfect working condition with no blockage.

The distributor equipment shall be equipped and operated so that bituminous material at even heat may be applied uniformly on variable widths of surface at readily determined and controlled

rates of from 0.025 to 0.2 gallons per square yard, with a pressure range of from 25 to 75 pounds per square inch, and with an allowable variation from any specified rate not to exceed 5 percent.

Distributor equipment shall be in perfect working order and include a tachometer, pressure gauge, volume measuring devices, and a thermometer for reading temperatures of tank contents. Equipment for heating bituminous material shall consist of a retort or steam coils so designed that steam will not be introduced into the material.

- 100.04 CLEANING THE BASE: Before applying any bituminous material, all loose material, dust, dirt, and foreign material, which might prevent proper bond with the existing surface, shall be removed. Particular care shall be taken to clean the outer edges of the strip to be treated in order to insure that the prime or tack coat will adhere.

When the prime or tack coat is applied adjacent to curb and gutter, or any other concrete 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.

- 100.05 WEATHER LIMITATIONS: No bituminous material shall be applied when the air temperature is less than 40° F in the shade or when the weather conditions or the condition of the existing surface is unsuitable.

- 100.06 APPLICATION OF PRIME COAT: After the base has been finished and the glazed finish removed as specified in Section 51, Article .07, 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 slightly sprinkled with water immediately in advance of the prime coat.

The temperature of the prime material shall be such to insure uniform distribution. The material shall be applied with a pressure distributor as specified in Article .02. 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 lime-rock base the rate of application shall not be less than 0.10 gallons per square yard.

100.06 Application of Prime Coat - (continued)

Following the application, the prime shall be allowed to stand without being disturbed for a period of at least 24 hours or until the prime is dry enough that it will not be picked up by traffic equipment.

In case the prime is damaged by rain, it shall be reprimed.

A light uniform application of clean sand shall be applied and rolled with a traffic roller unless approval is obtained to do otherwise from the Engineer. The sand shall be non-plastic, shall be free from silt and rock particles and shall not contain any sticks, vegetation, grass roots or organic matter. After the sand covering has been applied, the surface may be opened to traffic. If traffic is mounding sand so as to prevent proper curing of the prime, the Engineer may require that sand be swept from prime up to 24 hours before surface is applied.

100.07 APPLICATION OF TACK COAT: In general, a tack coat will not be used on primed bases except in areas which have become excessively dirty and cannot be cleaned or where the prime has cured and lost all its bonding effect.

No tack coat shall be applied until the primed base or leveling course has been cleaned and is free from sand, dust or other objectionable material.

The tack coat shall be applied with a pressure distributor as specified in Article 100.03. It shall be heated to a suitable consistency and applied in a thin uniform layer at the rate of between 0.05 and 0.15 gallons per square yard.

The tack coat shall be applied sufficiently in advance of the laying of the wearing surface to permit curing, but shall not be applied so far in advance or over such an area as to lose its adhesiveness as a result of being covered with dust or other foreign material. Suitable precautions shall be taken by the Contractor to protect the surface while the tack coat is drying until the wearing surface is applied.

SECTION 132 ASPHALTIC CONCRETE BINDER COURSE

- 132.01 DESCRIPTION: The work specified in this section consists of a binder course composed of a mixture of aggregate and asphaltic cement laid upon a prepared base in conformance with the specifications, and in conformity with the lines, grades and cross sections shown on the Plans or the Standard Detail.

The plant and equipment providing the asphaltic concrete binder course shall meet the requirements of and operate in accordance with the latest "Standard Specifications for Road and Bridge Construction of the Florida Department of Transportation", together with any of its supplements.

132.02 MATERIALS:

- a. Asphaltic Cement, Viscosity Grade AC-20, Penetration Grade 60 minimum shall meet the requirements of AASHTO Specification M20-70.
- b. Coarse Aggregates
 - (1) The coarse aggregate shall be composed of clean, durable limerock. When subjected to the Los Angeles Abrasion Test, the loss shall not exceed 45 percent.
 - (2) Extraneous Substances: All coarse aggregates shall be washed and free from disintegrated pieces, salt, alkali, vegetable matter, and adherent coating.

The weight of the extraneous substances shall not exceed the following percentages:

	<u>Percent</u>
Clay Lumps	0.05
Soft Fragments	10.00
Free Shells	1.00
Sticks (wet)	0.03
Los by Decantation	1.25

In addition, the sum of the percentages of all materials listed above shall not exceed 10 percent.

- (3) Gradation: (percent by weight of coarse aggregate passing square opening laboratory sieves)

The following gradations represent the extreme limits for the various sizes indicated, which shall determine the suitability for use of coarse aggregate from all sources of supply. The gradation of coarse aggregate from any one source shall be held reasonably uniform and not subject to the extreme percentages of gradation.

The gradation requirements for coarse aggregates are as follows:

<u>Passing Sieve</u>	<u>Percent</u>
1-1/2"	100
3/4"	60-85
3/8"	10-35
No. 10	0-5

Coarse aggregate may be shipped as one aggregate or the gradation may be obtained, at the asphalt plant, by combining in the proper proportions aggregates shipped in separate sizes.

- c. Fine Aggregates: Fine aggregate shall consist of natural sand, limerock screenings, or a combination thereof, composed of clean, tough, angular grains, free from clay loam or other foreign matter. Limerock screenings shall be produced from materials complying with the abrasion requirements for coarse aggregate specified in Article .02, Subarticle .02 (1).

Any screenings used in the combination of aggregate shall contain not more than 15 percent of material passing the No. 200 sieve and shall be washed if necessary to meet this requirement.

The natural sand portion of the fine aggregate other than screenings shall be siliceous containing not more than 10 percent of material passing the No. 200 sieve.

Fine aggregate containing any appreciable amount of phosphate shall not be used.

Fine aggregate, when tested by means of laboratory sieves, shall meet the following requirements:

<u>Passing</u>	<u>Retained On</u>	<u>Percent by Weight</u>
No. 4		98-100
No. 4	No. 10	0-15
No. 10	No. 40	15-50
No. 40	No. 80	30-60
No. 80	No. 200	8-40
No. 200		0-10

- 132.03 GENERAL COMPOSITION OF MIXTURE: The mineral aggregate shall be so graded, and the prescribed constituents (prepared as hereinafter set out) shall be combined in such proportions as to produce a mixture conforming to the following composition limits by weight:

MINERAL AGGREGATE COMBINATION

<u>Constituent</u>	<u>Passing Sieve</u>	<u>Retained Sieve</u>	<u>Percent By Weight</u>
Coarse Aggregate	1½"	¾"	10 - 30
	¾"	No. 10	40 - 72
Total Coarse Aggregate		10	65 - 85
Fine Aggregate	No. 10		15 - 35
Total Mineral Aggregate.			100

Total Mix

Total Mineral Aggregate.	93.0 - 96.5
Asphalt Cement (Bitumen)	3.5 - 7.0*

*For highly absorptive aggregates, the upper limits for bitumen may be raised.

Oversize aggregate shall be restricted by scalping screens having an opening of 1-5/8 inch square.

- 132.04 FORMULA FOR JOB MIX: The general composition limits prescribed in Article 132.03 are master ranges of tolerances to govern mixtures made from any materials meeting the specifications, and they are maximum and minimum for all cases. A closer control appropriate to the job materials will be required for the specific project in accordance with the job formula.

No work shall be started on the specific project until the Engineer has approved the job mix formula and the formula is on file at the Public Works Department.

Materials that will be used to make up the approved job mix should be stockpiled in sufficient quantity to meet the demands for the entire project in progress. If this is not practicable, care must be taken to insure adequate quality control of the materials used in each job mix. Should the source of supply for the materials used in the job mix be changed or should the materials from the source vary appreciably from the materials used in the job mix formula, the job mix formula must be altered accordingly.

After the job mix formula is established, each mix for the project shall meet the approved formula within the following tolerances:

<u>Passing Sieve</u>	<u>Retained Sieve</u>	<u>Tolerance Percent by Weight Plus or Minus</u>
1½"	¾"	8
¾"	No. 10	8
No. 10		5
(Bitumen)		0.4

In no case shall a job mix that is within the tolerances stated above be such that it falls out of the master range.

The temperature of the mixture at the plant and at its destination shall be within 25° F. of that set for the mix.

The laboratory compacted mixture shall have a density of not less than 95 percent nor more than 97 percent of the calculated theoretical density of a voidless mixture composed of the same material in like proportions.

Samples of the mixture in use will be taken as many times daily as is necessary in the opinion of the Engineer. The mixtures shall be maintained uniformly throughout the project within the above tolerances.

Job materials found to have characteristics requiring for a balanced mix, a content of bituminous material less than indicated in the formula prescribed above will be rejected or adjusted to form a blend which will produce a balanced mixture under the terms of the formula. Where job materials otherwise meeting specifications are found, on account of highly absorptive or other special characteristics, to produce an acceptable balanced mix only if the bituminous material content is increased over the amount specified, the mixture may be accepted provided that the job mix shall be adjusted to require the use of such additional bituminous material content.

132.05 PREPARATION OF ASPHALT CEMENT: The asphalt cement shall be delivered to the asphalt plant at a temperature not to exceed 350 F and shall be maintained within a range of 230 F to 350 F in advance of mixing operations. Heating within these limits shall be constant and wide fluctuations of temperature during a day's production will not be permitted.

132.06 PREPARATION OF AGGREGATES: Stockpiling coarse aggregate shall be done in such a manner so the aggregate will not segregate.

All aggregates to be blended or proportioned shall be placed in separate bins at the cold hopper and proportioned by means of calibrated gates or other approved devices. When two or more aggregates are blended, the use of two or more bins shall be employed for the blending of such material.

The aggregates shall be heated and dried at the paving plant before entering the mixer.

The temperature of the aggregate shall be so controlled that the temperature of the completed mixture at the plant will fall within the permissible range allowed by these specifications.

132.07 PREPARATION OF MIXTURE:

- a. Batch Mixing: The dried aggregate, prepared as described hereinbefore and combined in batches to meet the job mix formula by weighing each separate bin size, shall be conveyed to the empty mixer.

The hot asphalt cement, accurately measured, shall then be introduced, and the mixing continued until the mixture is thoroughly uniform and homogeneous. The total mixing time in no case shall be less than 50 seconds. Each batch must be kept separate throughout the weighing and mixing operations.

- b. Continuous Mixing: The dried aggregate, prepared as described hereinbefore and proportioned to meet the job mix formula by volumetric measurement, shall be introduced into the mixer. The hot asphalt cement shall be introduced into the mixer in synchronization with the feeding of aggregate. The quantity shall be measured by volume. Mixing shall be sufficient to produce a thoroughly uniform and homogeneous mixture.

- c. General: The ingredients shall be heated and combined in such a manner as to produce a mixture which shall be

at a temperature, when discharged, between the limits of 270° F and 350° F.

- 132.08 TRANSPORTATION OF MIXTURE: The mixture shall be transported in tight vehicles previously cleaned of all foreign material and, if necessary, each load shall be covered with a waterproof canvas cover of sufficient dimensions to protect it from weather conditions. The inside surface of the truck bodies shall be thinly coated with soapy water, or a mixture of water with not more than 5 percent of lubricating oil, but no excess of either shall be used. After the truck bodies are coated and before any mixture is placed therein, they shall be raised so that all excess water will drain out. Kerosene, gasoline or similar products shall not be used.
- 132.09 LIMITATIONS FOR SPREADING: The mixture shall be spread only when the surface is properly prepared and is intact, firm, cured, and dry. No mixture shall be spread when the air temperature is less than 40° F nor when the spreading cannot be finished and compacted during daylight hours.
- 132.10 PLACING MIXTURE: Upon arrival, the mixture shall be dumped into the approved mechanical spreader and immediately spread and struck off to the full width required and to such appropriate loose depth for each successive course that when the work is completed, the required thickness or weight of mixture per square yard will be secured. An excess amount of mixture shall be carried ahead of the screed at all times. Hand raking shall be done behind the machine as required. No spreader boxes to be used unless authorized by the engineer.

In limited areas, where, on account of irregularities or unavoidable obstacles, the use of mechanical spreading and finishing equipment is impracticable, the mixture may be spread by hand, when so authorized by the Engineer.

The mixture shall be laid only when the surface to be covered is dry and only when weather conditions are suitable. All defective areas in the foundation shall be replaced as directed at least ten days in advance of laying the mixture.

All structures which will be in actual contact with the asphaltic mixture, not including the face or surface of curbs or gutters and the vertical faces of existing pavements, shall be painted with a uniform coating of asphalt material to provide a closely bonded, watertight joint.

When necessary, due to the traffic requirements, the mixture

shall be laid in strips in such manner as to provide for the passage of traffic. When the road is closed to traffic, the mixture may be laid the full width of pavement, by machines traveling in echelon.

In no case shall the mixture be laid while rain is falling or when there is water on the surface to be covered.

Before any rolling is started, the binder surface shall be checked, any inequalities adjusted, and all drippings, fat sandy accumulations from the screed, and fat spots from any source shall be removed and replaced with satisfactory material.

Straightedging and back-patching shall be done after initial compaction has been obtained and while the material is still hot.

No skin patching shall be done. When a depression is to be corrected while the mixture is hot, the surface shall be well scarified before the addition of fresh mixture. If irregularities occur greater than the limits specified and are not corrected while the mixture is still hot, the irregularities shall be cut out the full depth of the layer and replaced with fresh mixture.

132.11 COMPACTING MIXTURE: After the spreading, the mixture shall be rolled when it has set sufficiently or come to the proper condition to be rolled, and when the rolling does not cause undue displacement or shoving.

The initial rolling shall be longitudinal. Where the lane being placed is adjacent to a previously placed lane, the center joint shall be pinched or rolled prior to rolling the rest of the lane.

After rolling the center joint, the rolling shall resume at the outer edge or low side of the road and shall progress towards the center or high side overlapping each previous roller path by at least one-half the width of the roller wheel.

The motion of the roller shall at all times be slow enough to avoid displacement of the mixture, and any displacement shall at once be corrected by the use of rakes and fresh mixture where required. The rolling shall include all transverse, longitudinal, diagonal and, where practicable, crescent rolling, as may be necessary to obtain the maximum density.

The seal rolling, with steel wheel rollers weighing from 8 to 12 tons, shall follow as close behind the spreader as is possible without picking up or displacing the material.

Rolling shall be continued for such length of time as may be necessary to provide a dense, uniformly compacted pavement. Seal rolling shall be followed by rolling with a traffic roller.

In all places inaccessible to a roller, such as adjacent to curbs, headers, gutters, bridges, manholes, etc., the required compaction shall be secured with tamps. Depressions which may develop before the completion of the rolling shall be remedied by loosening the mixture laid and adding new material to bring such depressions to a true surface.

Should any depressions remain after final compaction has been obtained, the mixture shall be removed sufficiently and new material added to form a true and even surface.

The mixture, after compaction, shall be of the thickness shown on the Plans or Standard Details. The surface, after compaction, at no place shall show an excess of asphalt, and any area showing such excess, or other defect, shall be cut out and replaced with fresh mixture and immediately compacted to conform with the surrounding area. Any mixture which becomes loose or broken, mixed or coated with dirt or in any way defective prior to laying the wearing course shall be removed and replaced with fresh mixture which shall be immediately compacted to conform with the surrounding area.

Gasoline or oil from rollers shall not be allowed to deposit on the pavement and any pavement damaged by such deposits shall be removed and replaced.

Any mixture remaining unbonded after rolling shall be removed and replaced.

132.12 JOINTS: At the end of each day's work or whenever the laying is to be discontinued for such length of time as to allow the mixture to become chilled, transverse joints shall be formed either by laying a board, of the compacted thickness of the pavement, across the width of strip being spread and rolling the mixture against the board or by the use of paper or sand, provided in either case the asphalt is cut back to well bonded material of the required thickness before placing additional asphalt. In lieu of forming a joint the contractor may saw a joint before beginning new work. Such joint must be approved by the Engineer before placing new material. When fresh mixture is laid adjacent to the exposed edge of the joints, trimmed or formed as provided above, it shall be placed in close contact with the exposed edge so that an even, well-compacted joint is produced after rolling.

132.13 SURFACE REQUIREMENTS: For the purpose of testing the finished surface, a 15-foot straightedge and a standard templet cut to the

true cross section of the road shall at all times be available on the work. The Contractor shall provide or designate some employee whose duty it is to handle the straightedge and templet in checking all rolled surfaces under the direction of the Engineer.

The finished surface shall be such that it will not vary more than $1/4$ -inch from the templet cut to the cross section of the road, nor more than $3/16$ -inch from the 15-foot straightedge applied parallel to the center line of the pavement. Any irregularity of the surface exceeding the above limits shall be corrected. Depressions which may develop after the initial rolling shall be remedied by loosening or removing the mixture and adding new material to bring the areas to a true surface. No skin patching shall be done. Such portions of the completed pavement as are defective in surface compaction or in composition, or that do not comply with all other requirements of these specifications shall be taken up and replaced with suitable mixture properly laid in accordance with these specifications and at the expense of the Contractor.

SECTION 133 TYPE S-1 ASPHALTIC CONCRETE SURFACE COURSE

- 133.01 DESCRIPTION: The work specified in this section consists of the construction of an asphaltic concrete surface course composed of a mixture of aggregates, mineral filler and asphalt cement properly laid upon a prepared base, existing surface course or a newly constructed binder course in accordance with these Specifications and in conformity with the lines, grades, thickness, and typical cross section shown on the Plans or Standard Details.

The plant and equipment providing asphaltic concrete surface course shall meet the requirements of and operate in accordance with the latest "Standard Specifications for Road and Bridge Construction of the Florida Department of Transportation", together with any of its supplements.

133.02 MATERIALS:

- a. Asphalt Cement, Viscosity Grade AC-20, Penetration Grade 60 minimum shall conform to the requirements specified in AASHTO Specification M20-70.

b. Coarse Aggregate

- (1) Shall conform to the requirements specified in Section 132, Subarticle .02-6 (1) and (2).

- (2) Shall conform to the following gradation:

<u>Percent (by weight) Passing</u>	<u>Sieve Size</u>
100	1/2"
90-100	3/8"
30-60	No. 4
0-10	No. 10
0-5	No. 16

- c. Fine Aggregate: Shall conform to the requirements specified in Section 132, Article .02-c.

- d. Mineral Filler: Shall conform to the requirements specified in AASHTO Specification M17-70. Ground phosphate will not be allowed as a mineral filler.

133.03 GENERAL COMPOSITION OF MIXTURE: The mineral aggregate shall be so graded, and the prescribed constituents prepared as hereinafter set out, shall be combined in such proportions as to produce a mixture conforming to the following general composition limits by weight:

MINERAL AGGREGATE COMBINATION

<u>Constituent</u>	<u>Passing Sieve</u>	<u>Retained on Sieve</u>	<u>Percent</u>
Coarse Aggregate	1/2"	3/8"	0-12
	3/8"	No. 4	15-46
	No. 4	No. 10	10-44
Total Coarse Aggregate	--	No. 10	50-65
Fine Aggregate	No. 10	No. 40	5-30
	No. 40	No. 80	11-30
	No. 80	No. 200	3-20
Filler	No. 200	--	3-7
Total Fine Aggregate and Filler	No. 10	--	35-50
Total Mineral Aggregate	--	--	100
Total Mix			
Total Mineral Aggregate	--	--	91-95½
Asphalt Cement (Bitumen)	--	--	4½-9*
Total Mix	--	--	100

*For highly absorptive aggregates, the upper limit may be raised.

Oversized aggregate shall be restricted by scalping screens having an opening of 1/2-inch square.

133.04 FORMULA FOR JOB MIX: The formula for the job mix shall be as specified in Article 133.03 except that the allowable tolerances shall be as follows:

<u>Passing Sieve</u>	<u>Retained on Sieve</u>	<u>Tolerance Percent By Weight</u>
3/8"	No. 4	5
No. 4	No. 10	5
No. 10	No. 40	4
No. 40	No. 80	3
No. 200		2
(Bitumen)		0.4

The asphaltic content shall be such for the material used that when the mixture is tested, in accordance with ASTM Designation D-1559, the stability shall be at a maximum with an optimum asphalt cement content. The minimum stability value shall be 1500 pounds, and the flow value shall be between 0.09 inches and 0.15 inches at maximum stability.

- 133.05 PREPARATION OF ASPHALTIC CEMENT: The asphaltic cement shall be so heated as to secure even heating between 270° and 350° F.
- 133.06 PREPARATION OF AGGREGATES: The preparation of aggregates shall be as specified in Section 132, Article .06.
- 133.07 PREPARATION OF MIXTURE: Preparation of mixture shall conform to the requirements specified in Section 132, Article .07.
- 133.08 TRANSPORTATION OF MIXTURE: Transportation of mixture shall be as specified in Section 132, Article .05.
- 133.09 LIMITATIONS OF SPREADING: Limitations for spreading the mixture shall be as specified in Section 132, Article .09.
- 133.10 PLACING MIXTURE: Placing mixture shall be as specified in Section 132, Article .10.
- 133.11 COMPACTING MIXTURE: The compacting of the mixture shall be in accordance with Section 132, Article .11 with the following additional requirements.

The seal rolling with steel-wheel rollers weighing from 8 to 12 tons shall follow as close behind the spreader as is possible without picking up, displacing, or blistering the material. Rolling with the self-propelled pneumatic-tired roller shall follow as soon as possible and as close behind the seal rolling as the heat of the mixture will permit. This rolling shall be done such that the self-propelled traffic roller shall cover every area.

of the surface with at least six passes. Rolling with the self-propelled pneumatic-tired roller shall proceed at a speed from 6 to 12 miles per hour and the rate of rolling shall not exceed 3,000 square yards per hour per roller. A sufficient number of self-propelled pneumatic-tired rollers shall be used so that the rolling of the surface for the required number of passes within this maximum rolling rate shall not delay any other phase of the placing operation nor result in excessive cooling of the mixture before the rolling is complete. In the event that the rolling is not properly maintained to schedule as outlined above, the laying operation shall be discontinued until the rolling operations are sufficiently caught up.

Final rolling shall be done with the 8 to 12 ton tandem steel roller and shall be done after the seal rolling and pneumatic-tired rolling is completed, but before the pavement temperature has dropped below 140°F. This rolling shall be continued until all roller marks and tire marks have been eliminated. After final compaction, the finished pavement shall at no point have a density less than 95 percent of the laboratory-compacted density.

133.12 JOINTS: At the end of each day's work or whenever the laying is to be discontinued for such length of time as to allow the mixture to become chilled, transverse joints shall be formed either by laying a board, of the compacted thickness of the pavement, across the width of strip being spread and rolling the mixture against the board or by the use of paper or sand, provided in either case the asphalt is cut to well bonded material of the required thickness before placing additional asphalt. In lieu of forming a joint, the contractor may saw a joint before beginning new work. Such joint must be approved by the Engineer before placing new material.

133.13 SURFACE REQUIREMENTS: Surface requirements shall be as specified in Section 132, Article .13.

133.14 PROTECTION OF PAVEMENT: After the completion of the pavement, no vehicular traffic of any kind shall be permitted on the pavement until it has set sufficiently.

SECTION 145

C O N C R E T E S I D E W A L K S P E C I F I C A T I O N S

A PORTION OF

PART 2 - PUBLIC WORKS MANUAL

SECTION 145 CONCRETE SIDEWALK

- 145.01 DESCRIPTION: The work outlined in this Section consists of the construction of concrete sidewalk in accordance with these specifications, and in conformity with the line, grades and dimensions shown on the plans and on the Standard Details.
- 145.02 CONCRETE: The concrete used for sidewalk construction shall be Class I concrete and shall attain a minimum compressive strength of 3,000 psi in 28 days.
- 145.03 REINFORCEMENT: Where the plans call for steel fabric reinforcement to be placed in the sidewalk, such reinforcement shall meet the requirements of AASHTO Specification M 55.
- 145.04 SUBGRADE: In the area where the sidewalk slab is to be constructed, the existing ground shall be excavated or filled, as the case may require, to such an elevation that its finished surface will be uniformly parallel to, and four or six inches, as the case may be, below the proposed surface of the finished sidewalk.

All roots, vegetation, and other deleterious materials shall be removed from the sidewalk area. All fill shall be clean limerock or limerock and sand mixtures of quality acceptable to the Engineer. All fill shall be placed in layers not exceeding six (6) inches in compacted thickness, each layer uniformly compacted to a minimum field density of 90% of the maximum density obtainable under AASHTO T 180-70.

Subgrade fill, unless retained by existing curbs or walls, shall have a surface width equal to that of the slab plus one (1) foot on each side thereof. Side slopes on private property shall have a maximum one (1) foot vertical to a four (4) foot horizontal slope, unless otherwise specified by the Engineer. Slopes within the right of way shall conform with those required for the particular typical section.

Areas requiring excavation for the construction of the sidewalk slab shall have a finished bottom width sufficient for the slab and for the placement and removal of the forms employed. The top six (6) inches of subgrade in this case shall be uniformly compacted to a minimum field density of 90% of the maximum density obtainable under AASHTO T 180-70, unless the excavation is into natural limerock.

SECTION 145 - CONCRETE SIDEWALK

145.04 SUBGRADE (Cont'd)

After forms are set, and just prior to the pouring of the sidewalk slab, the subgrade shall be wetted and checked for elevation, and where found to be above or below the proper grade it shall be regraded and recompact. A movable templet approved by the Engineer shall be provided for checking the finished subgrade.

- 145.05 DEPTH OF SIDEWALK: Sidewalk in residential areas shall be a minimum of four (4) inches in depth except where the sidewalk is part of a driveway or a tee-turn-around in which case the depth shall be increased to a minimum of six (6) inches.

In all other areas, such as commercial or industrial where the sidewalk is subject to vehicle loading; the sidewalk shall have a minimum thickness of six (6) inches which shall extend at least (5) feet each side of the area designated for vehicle crossing.

- 145.06 FORMS: Forms for this work may be made of either wood or metal. They shall be straight, free from warp or bends, and of sufficient strength (when staked) to resist the pressure of the concrete without springing. Forms shall have a depth equal to the depth of the concrete being deposited against them.

The forms shall be set plumb, properly aligned, and with their bottom in full and continuous contact with the subgrade. Forms shall be thoroughly cleaned and lightly oiled before concrete is placed against them.

- 145.07 PLACING CONCRETE: The concrete shall be deposited evenly and slightly in excess of the required finished depth, and shall be tamped and spaded until mortar covers the entire surface. It shall then be struck-off by means of a wood or metal screed used perpendicular to the forms, to obtain the required grade and to remove surplus water and laitance.

No concrete shall be placed until the subgrade is properly prepared and the forms are set and inspected.

- 145.08 FINISHING CONCRETE: The concrete shall be given a wooden float finish. The surface variation shall not be more than $\frac{1}{4}$ inch under a ten foot straight edge, parallel to the centerline, nor more than $\frac{1}{8}$ inch under a five foot straight edge transverse to the centerline. All edges and expansion joints of the sidewalk shall be carefully finished with an edging tool having a radius of $\frac{1}{4}$ inch. Finally, the sidewalk shall be broomed perpendicular to the forms to produce an even textured surface.

SECTION 145 – CONCRETE SIDEWALK

145.09 JOINTS:

- a. Type "A" (Open Joint): Type "A" joints shall be formed by staking or otherwise securing a metal bulkhead in place and placing concrete on both sides. The bulkhead shall be $\frac{1}{2}$ inch thick and equal in depth to the sidewalk. After the concrete has set sufficiently to preserve the shape of the joint, the bulkhead shall be removed. Then after the sidewalk has been finished over the joint, the slot shall be edged with a finishing tool having a $\frac{1}{2}$ inch radius. After the concrete has hardened and become dry, the open joint shall be thoroughly cleaned of all debris and loose material for the full section of the sidewalk.
- b. Type "B" (Contraction Joint): Type "B" joints shall be formed with a $\frac{1}{8}$ " thick metal bulkhead which shall be placed to a depth of $1\frac{1}{2}$ inches. After the concrete has set sufficiently to preserve the shape of the joint, the bulkhead shall be removed. Then after the sidewalk has been finished over the joint, it shall be edged with a finishing tool having a $\frac{1}{2}$ inch radius.

The Type "B" joint may also be formed by sawing the concrete. A slot approximately $\frac{3}{16}$ inch wide and not less than $1\frac{1}{2}$ inches deep shall be cut with a concrete saw after the concrete has set, and within the following periods of time:

Joints at not more than 5-foot intervals within 12 hours after finishing. Remaining joints within 48 hours after finishing.

- c. Type "C" (Expansion Joint): Type "C" joints shall be constructed by securing $\frac{1}{2}$ inch premolded expansion joint material, equal in depth to the concrete, and placing the concrete directly against it. The joint material shall be secured during concrete placement so that it is held vertical and in a straight line. The premolded expansion joint material shall meet the requirements of AASHTO Specification M 153 (ASTM D 1752).

145.10 CURING THE CONCRETE: Curing the concrete shall be as specified in Section 522 of the Florida Department of Transportation Specifications with the following modifications:

The impervious coating may be either clear or white pigmented membrane curing compound.

The impervious coating may be used after the preliminary curing period with other materials or it may be used initially and for the entire 72-hour curing period.

SECTION 145 - CONCRETE SIDEWALK

145.10 CURING THE CONCRETE (Cont'd)

The impervious conating shall be applied by the hand-operated spray equipment with nozzles capable of thoroughly atomizing the curing compound so as not to mar the surface and, when necessary, equipped with an appropriate wind guard to assure uniform application.

The compound shall be applied in a single coat, continuous operation at a uniform coverage of at least one gallon per each 200 square feet.

Surfaces covered by membrane curing compound shall remain undisturbed for a period of 72 hours after beginning of initial curing.

- 145.11 PROTECTION OF NEWLY FINISHED SURFACES: The Contractor shall have available at the site, an adequate quantity of suitable covering material to protect the surface of concrete which has not hardened, from damage by rain.

Forms shall not be removed from freshly placed concrete until it has set for at least 12 hours.

- 145.12 PRIVATE PROPERTY REPAIRS: All structures, living trees, shrubs or grassed areas on private property, removed for the convenience of the Contractor or damaged in any way while work is in progress, shall be repaired or replaced to its original condition in a manner acceptable to the Engineer.

All concrete entrance walks and driveways, as required, shall be extended or cut back to an existing joint or to a sawed joint provided by the Contractor. Slopes for the altered walks and driveways shall not be greater than one vertical to eight horizontal. In place of sloping walks, steps shall be constructed when requested by property owners. Risers shall not exceed seven (7) inches and treads shall not be less than twelve (12) inches wide. Forms shall be set and concrete shall be replaced to match existing concrete work both in surface texture and color as closely as possible.

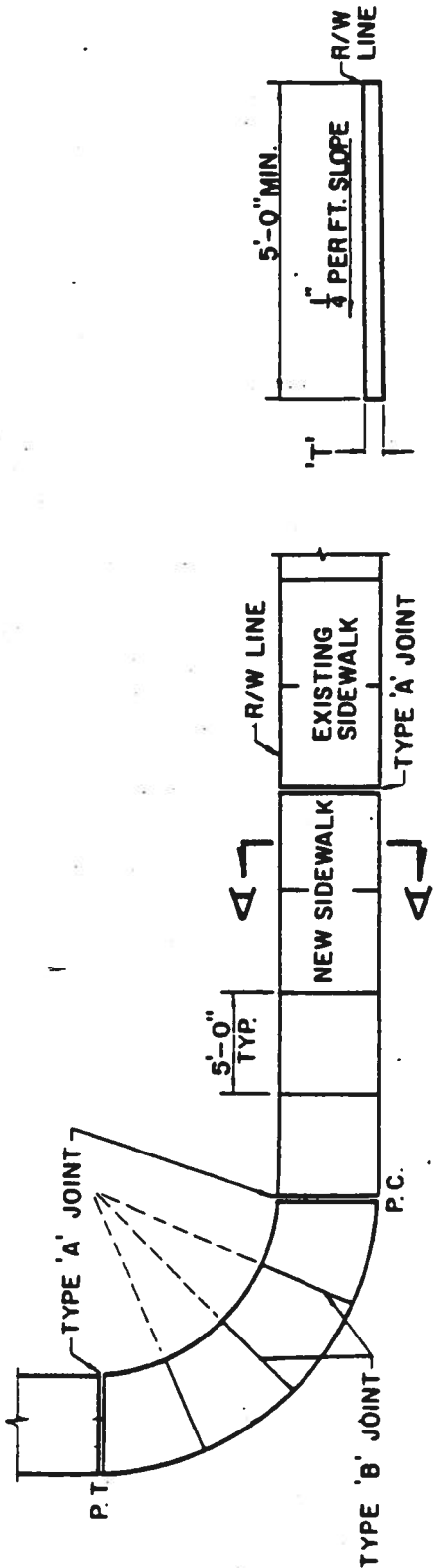
Each property owner is responsible for any walls, fences, hedges, trees, mail boxes or other improvements which encroach upon the right of way, and shall remove or relocate the same at his expense.

The Contractor shall cooperate with the owner in an effort to facilitate removal prior to construction.

SECTION 145 - CONCRETE SIDEWALK

145.13 CLEAN UP: Pavements, driveways, swales and other areas affected by this work shall be swept or otherwise cleaned and restored to its original condition as approved by the Engineer.

145.14 INSPECTION: All work pursuant to this Section will be subject to inspection during its progress as specified in Section C-1 of the Design and Construction Manual.



SECTION A-A

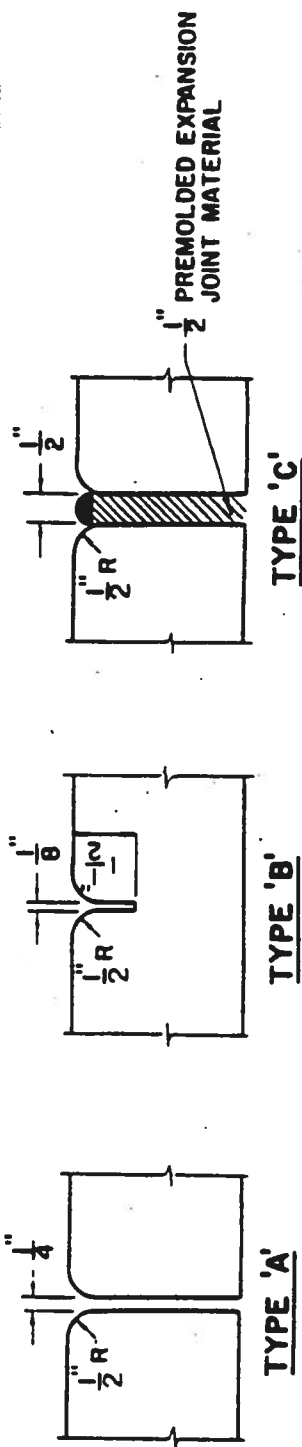
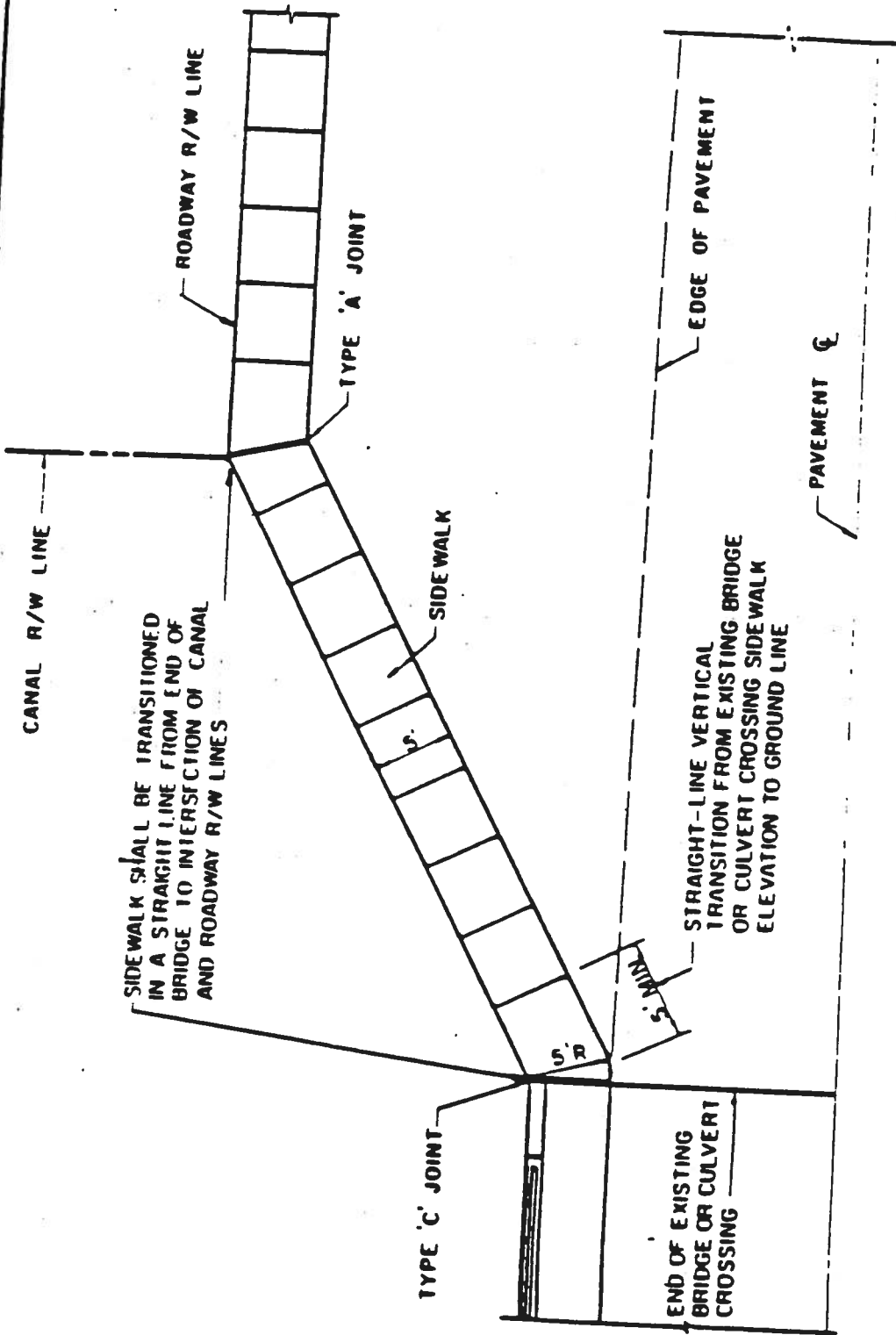


TABLE OF SIDEWALK THICKNESS - 'T'	
LOCATION	'T'
RESIDENTIAL AREAS	4"
AT DRIVEWAYS AND OTHER AREAS	6"

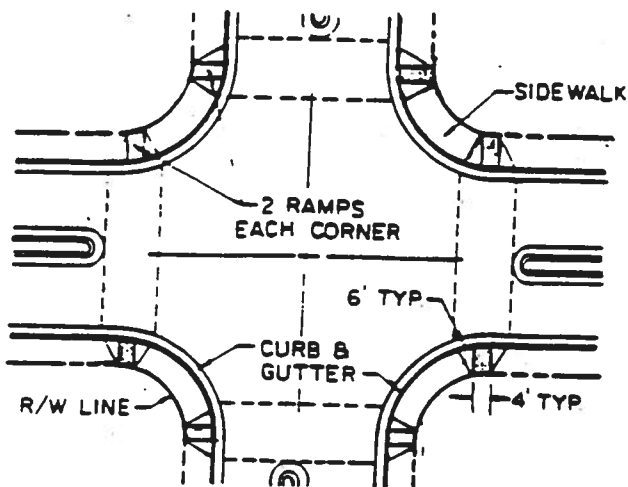
TABLE OF SIDEWALK JOINTS	
TYPE	LOCATION
'A'	P.C. AND P.T. OF CURVES. JUNCTION OF EXISTING AND NEW SIDEWALKS.
'B'	5'-0" CENTER TO CENTER ON SIDEWALKS.
'C'	WHERE SIDEWALK ABUTS CONCRETE CURBS, DRIVEWAYS, AND SIMILAR STRUCTURES.



NOTE FOR NEW CROSSING CONSTRUCTION, SEE APPROPRIATE BRIDGE & CULVERT SECTION STANDARD DETAIL

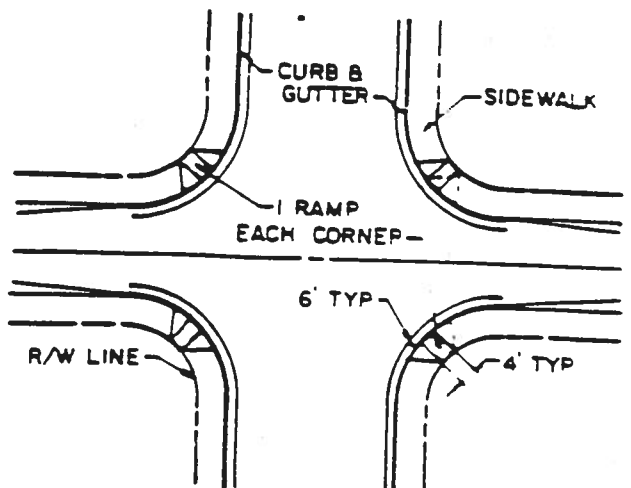
SIDEWALK CONST	ITEM	R-13.1 CROSS REF	SEC 104 SPEC. REF

METROPOLITAN DADE COUNTY PUBLIC WORKS DEPARTMENT	APPROVED	REVISED	STANDARD ROAD DETAIL STANDARD SIDEWALK TRANSITION	R 13.2 SHEET 1 OF 1
	6 / 5 / 6	5 / 17 / 72		
		3 / 6 / 77		



**2 MAJOR ROADWAYS
(CURB & GUTTER)**

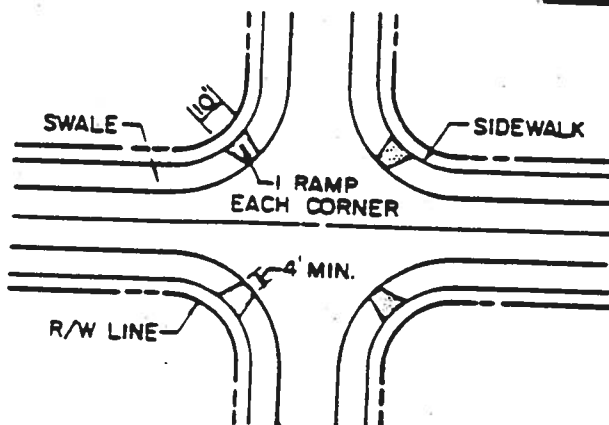
REF: Sec. 2a (1)(a)*



**LOCAL ROADWAY OR ENTRANCE
TO MAJOR SHOPPING CENTER
(CURB & GUTTER)**

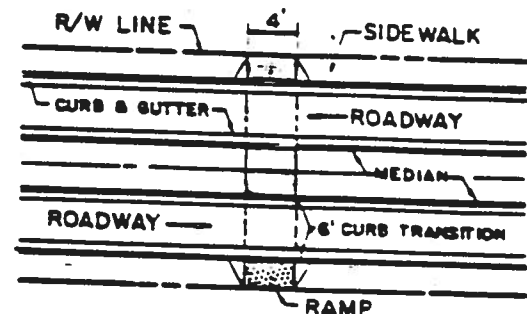
REF: Sec. 2a (1)(b)*

ROADWAY INTERSECTIONS



**(RESIDENTIAL ROADWAYS)
2 MAJOR ROADS, LOCAL & MAJOR
ROADWAY, & 2 LOCAL ROADWAYS
(SWALE)***

REF: Sec. 2b (1)*



**MID-BLOCK AT NORMAL
PEDESTRIAN CROSSING
(SWALE or CURB & GUTTER)***

REF: Sec. 2a (2)*

NOTES

1. Max. slope of ramps = 12:1 (for sidewalk widths greater than or equal to 6'-0").
2. Ramps may be 4" thick in residential areas.
3. Colors: All pedestrian ramps shall contrast visually with adjoining sidewalk surfaces. (i.e., locations within Dade Co. and outside of Coral Gables shall be integral colored "Coral Gables Beige".) Pedestrian ramps within Coral Gables, Miami Beach, and Key Biscayne shall have no color additive. All other construction (i.e., sidewalk, connections, etc.) shall match the adjoining sidewalk color.

* Alternate asph. conc. sidewalk ramp (same thickness), may be used as approved by Director of Public Works Department.

* For all references, see Dade County Public Works Department "Policy on pedestrian ramps in Public Rights-Of-Way".

CURB & GUTTER	R 15.2	
ASPH. CONC. S. COURSE		SEC. 133
CONC. DRIVEWAY	R 12.6	
CONC. SIDEWALK	R-13.1	SEC. 145
ITEM	CROSS REF.	SPEC. REF.

METROPOLITAN
DADE COUNTY
PUBLIC WORKS
DEPARTMENT

APPROVED
9 / 15 / 72

REVISED

4 / 5 / 74

6 / 4 / 86

STANDARD ROAD DETAIL
PEDESTRIAN RAMPS
IN PUBLIC RIGHTS-OF-WAY

R
133

SECTION 168

S T R E E T N A M E S I G N S P E C I F I C A T I O N S

A PORTION OF

PART 2 - PUBLIC WORKS MANUAL

SECTION 168 STREET NAME SIGN

168.01 DESCRIPTION: The work specified in this Section consists of furnishing, preparing, painting, fabricating, assembling and installing street name signs. Such work shall be done in accordance with these Specifications and in conformity with Standard Details No. R-18.1 and R-18.2.

168.02 MATERIAL:

- a. Posts: The sign post shall be formed from domestic Aluminum, 6063 T6 Schedule 40, 2" round x .154" in appropriate lengths.
- b. Sign Blanks: Each sign blank shall be rectangular in shape, 7" or 12" high by appropriate length to accommodate the message or messages. The blank shall be formed of domestic aluminum .080 gauge 5052-H38 alloy, with an Alodine 1200, power spray finish-7 step method, free from burrs or sharp edges with surfaces flat and smooth without dents.
- c. Bolts: The bolts used shall be cadmium plated and shall consist of four 1/8" x 1" bolts for fastening each pair of signs at the ends and four 5/16" x 2 1/2" bolts for attaching the signs to the post.
- d. Reflective Sheeting: Reflective sheeting shall be in conformance with the U.S. Department of Transportation, Federal Highway Administration Standard Specifications of Roads and Bridges on Federal Highway Projects, Section 633.06, Sheet Reflective Materials. The material shall be Type 3 encapsulated Lens Sheeting.
- e. Concrete: The concrete utilized for the post installation shall be Class I, having a minimum compressive strength of 2,500 psi at 28 days.

168.03 PAINTING: The signs shall be prepared by a reverse screen process using transparent green paint on white Type 3 sheeting. Alternate preparation may be by the use of Type 3 green color, reflective sheeting with white Type 3 pressure sensitive or heat activated numbers and letters.

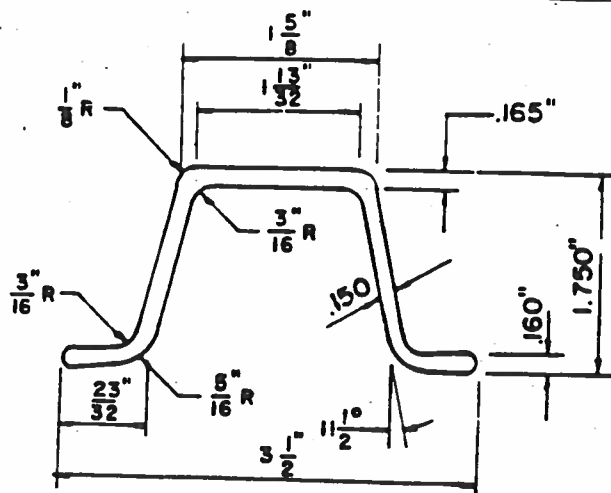
SECTION 168 STREET NAME SIGN

168.04 FABRICATION: The fabrication shall be of materials and workmanship which will present a pleasing appearance. The finished posts shall be straight and have a smooth uniform finish free from defects affecting strength, durability or appearance. Bolt holes shall be punched on centerline and spaced both horizontally and vertically as shown on Standard Detail R-18.1. All holes and sheared ends shall be commercially free from burrs. Each set of name signs shall be bolted to the sign post with 5/16" bolts. Each set shall then be bolted at each end edge with 1/8" bolts.

168.05 INSTALLATION: Each installation shall consist of four signs (2 signs back-to-back) on one sign post. Installations shall be made in accord with Standard Detail R-18.1.

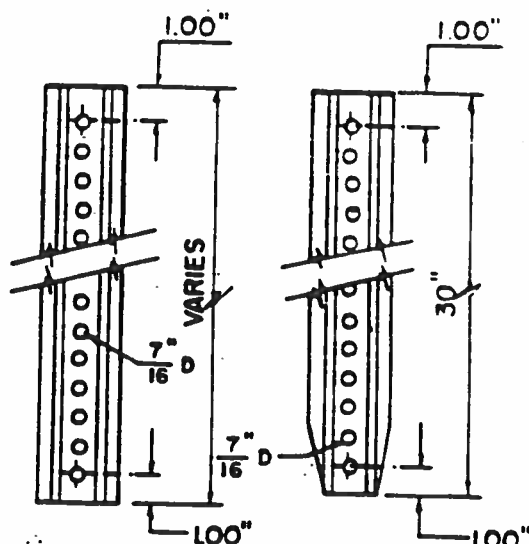
The concrete utilized for the post installation shall be Class I, having a minimum compressive strength of 2,500 psi at 28 days, conforming to the requirements of Section 345 of the current edition of the Florida Department of Transportation's Standard Specifications for Road and Bridge Construction. No concrete shall be left on the aluminum post and the area of the installation shall be clean and appear as neat as possible to its original condition. Sidewalk flags must be repaired so that there are no bumps or depressions and appear as a part of the flag. If sod is removed in any appreciable area, it will also be replaced.

168.06 STREET SIGN LOCATION: The street signs shall be located as shown on Standard Detail R-18.2.



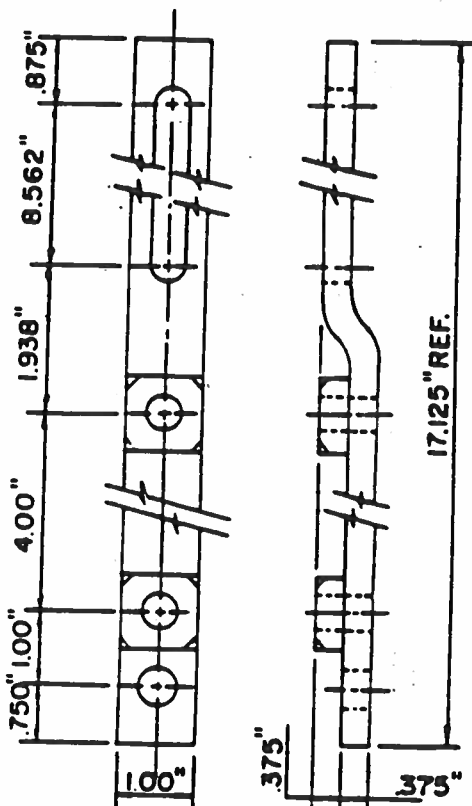
SIGN POST & BASE POST

WEIGHT - 3.00 LBS/FT.

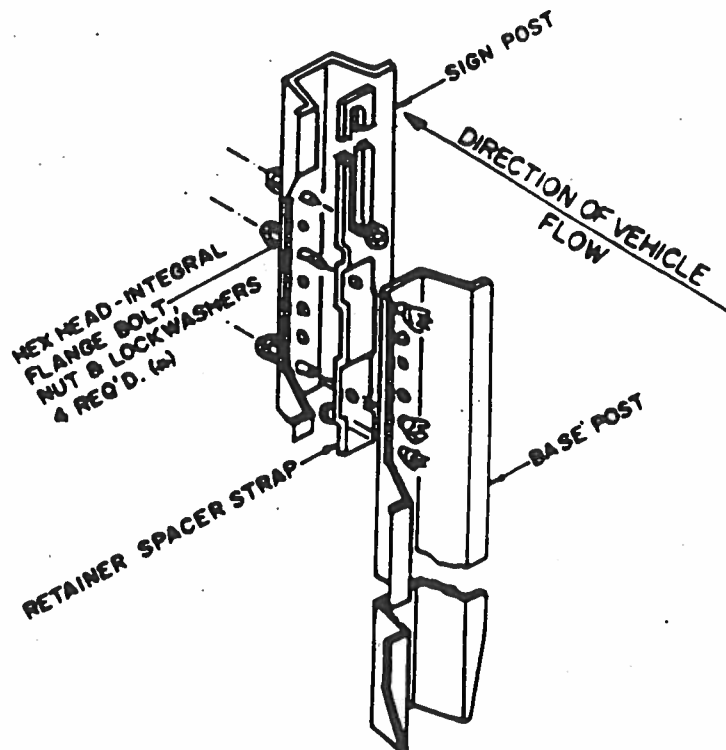


SIGN POST

BASE POST



RETAINER SPACER STRAP



(*) $\frac{5}{16}$ - 18 UNC \times 1 $\frac{3}{4}$ " BOLT - PER ASTM A-354, GRADE BD (GRADE B)

NUT - PER ASTM A-563, GRADE DH.

LOCKWASHER - HEAVY DUTY EXTERNAL TYPE.
FINISH: CADMIUM PLATED PER ASTM A-165-80, TYPE OS.

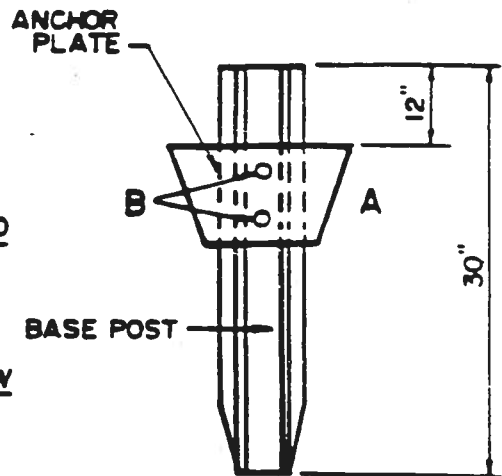
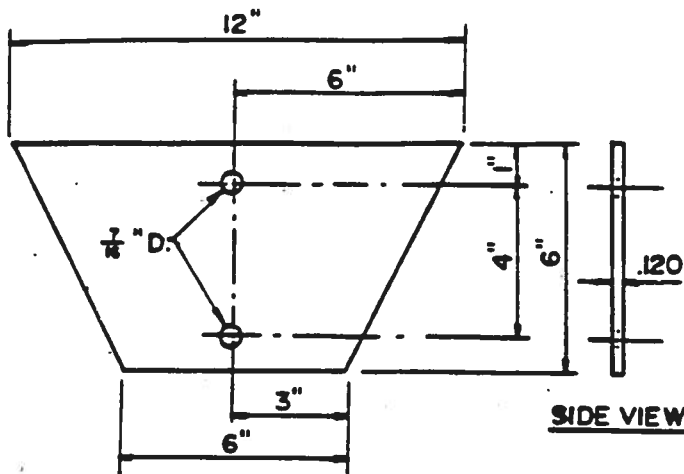
METROPOLITAN
DADE COUNTY
PUBLIC WORKS
DEPARTMENT

APPROVED
6/4/86

REVISED

STANDARD ROAD DETAIL
STREET SIGN POST
ASSEMBLY

R
18.1
SHEET 1 OF 4

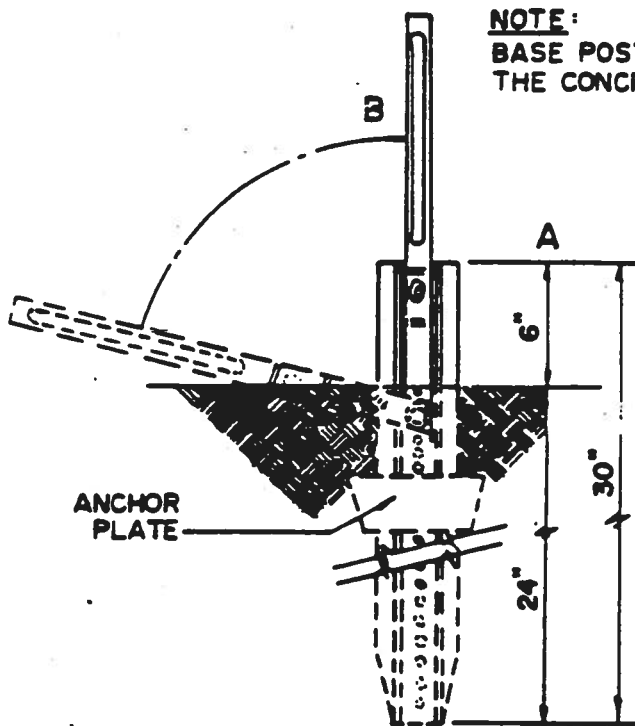


LARGE ANCHOR PLATE

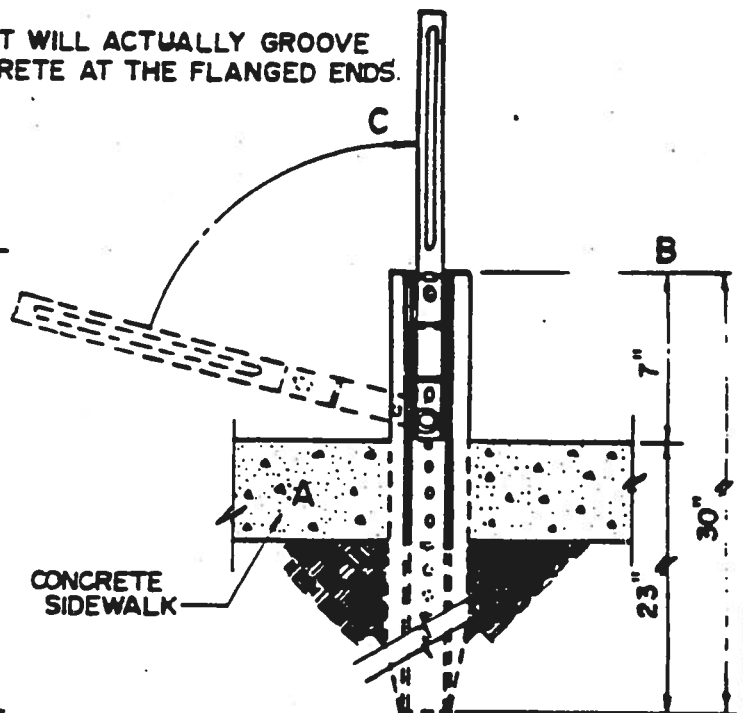
- A LINE-UP 6" x 12" ANCHOR PLATE WITH 30" BASE POST.
 B ATTACH ANCHOR PLATE TO BASE POST WITH TWO (2) $\frac{1}{2}$ " - 18 UNC x 2" BOLTS, NUTS, AND LOCKWASHERS.

NOTE:

BASE POST WILL ACTUALLY GROOVE THE CONCRETE AT THE FLANGED ENDS.



- A. DRIVE BASE POST TO SIX (6) INCHES ABOVE GROUND
 B. ROTATE STRAP TO VERTICAL POSITION
 C. TO BE USED ON LOOSE FILL AND SANDY SOILS.



PRIOR TO DRIVING BASE POST:

- A. BORE A 3" DIAMETER HOLE THROUGH THE CONCRETE FLAG
 B. DRIVE BASE POST TO SEVEN (7) INCHES ABOVE GROUND.
 C. ROTATE STRAP TO VERTICAL POSITION.

METROPOLITAN
 DADE COUNTY
 PUBLIC WORKS
 DEPARTMENT

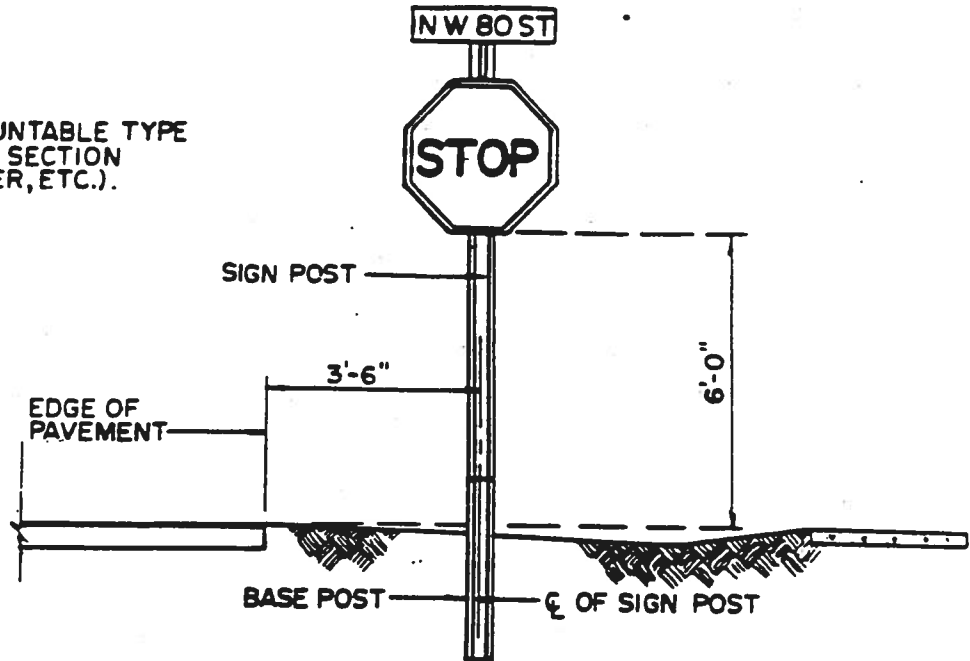
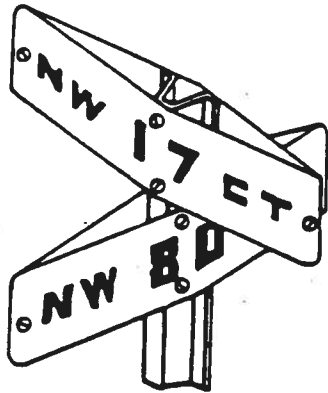
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 APPROVED
 6/4/86

REVISED

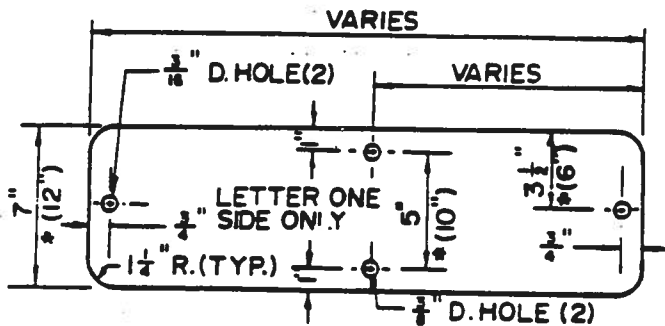
STANDARD ROAD DETAIL
 STREET SIGN POST
 TYPICAL INSTALLATION

R
18.1
 SHEET 2 OF 4

USED ON ANY MOUNTABLE TYPE
CURB AND GUTTER SECTION
(ie- VALLEY GUTTER, ETC.).

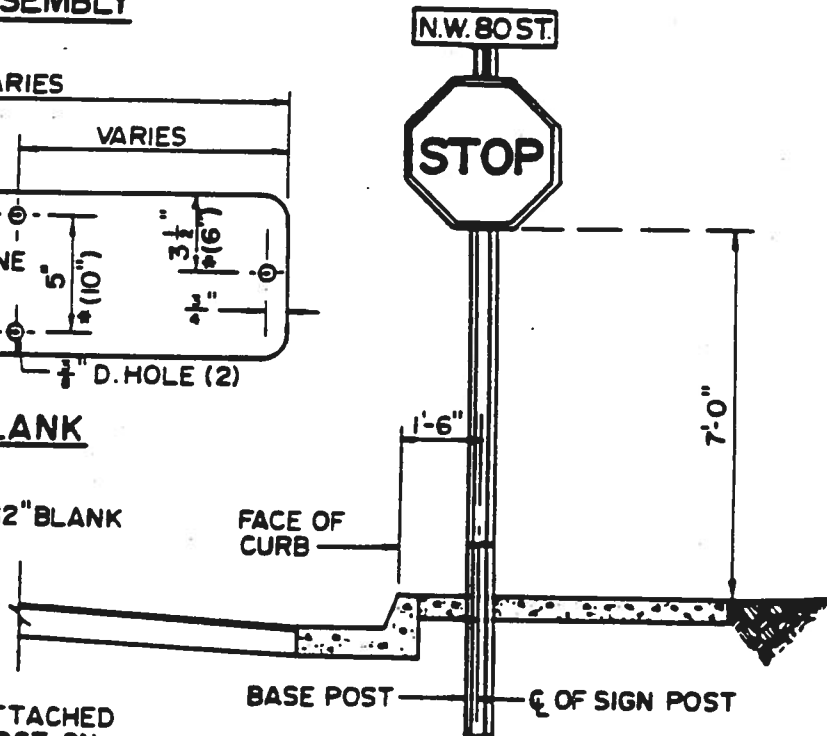


TYPICAL SIGN ASSEMBLY



SIGN BLANK

(*) DIMENSIONS FOR 12" BLANK



NOTE:

STREET NAME SIGN ATTACHED
PERPENDICULAR TO POST ON
APPROVED MOUNTING BRACKET
ONLY.

ROADSIDE SIGNS

METROPOLITAN
DADE COUNTY
PUBLIC WORKS
DEPARTMENT

MT
APPROVED
6/4/86

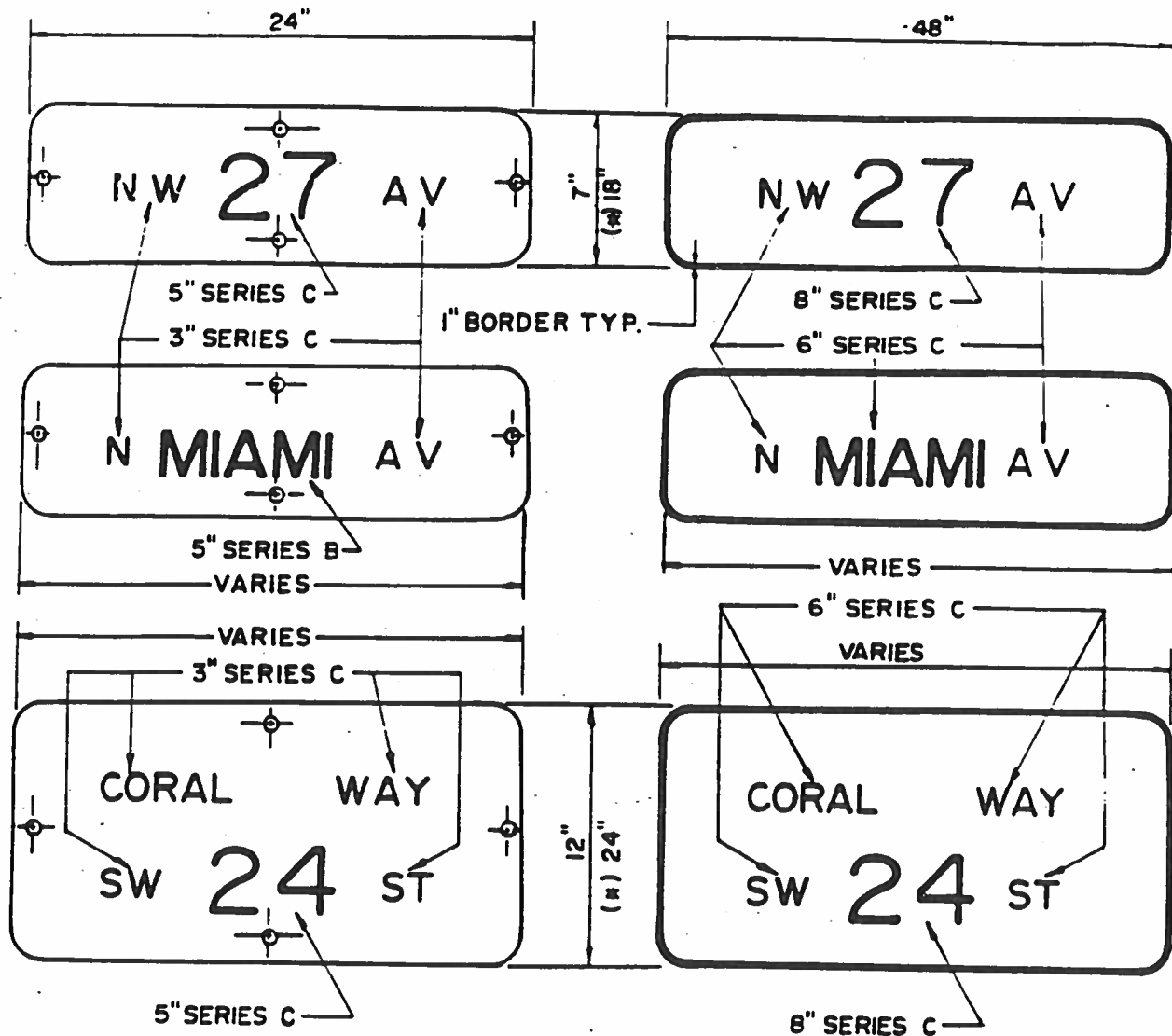
REVISED

STANDARD ROAD DETAIL

STREET/STOP NAME SIGN
ASSEMBLY & FABRICATION

R
18.1

SHEET 3 OF 4



GROUND MOUNT
(SINGLE AND DUAL MESSAGE)

SPAN WIRE OR MAST MOUNT
(SINGLE AND DUAL MESSAGE)

NOTE:

SIGN MESSAGES SHALL BE SILVER ON GREEN BACKGROUND. SHEETING SHALL BE TYPE B ENCAPSULATED LENS (COMMONLY KNOWN AS "HIGH INTENSITY"), SHEETING SHALL INCLUDE A TYPE I PRECOATED PRESSURE SENSITIVE ADHESIVE BACKING AS PER "STANDARD SPECIFICATIONS FOR CONSTRUCTION OF ROADS AND BRIDGES ON FEDERAL HIGHWAY PROJECTS," SECTION 633.06, SHEET REFLECTIVE MATERIALS.

(*) DIMENSIONS FOR SPAN WIRE OR MAST ARM MOUNT SIGNS.

STREET NAME SIGN		SEC 160
STREET SIGN LOCATION	R-18.2	SEC 160
ITEM	CROSS REF	SPEC REF

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DADE COUNTY
PUBLIC WORKS
DEPARTMENT

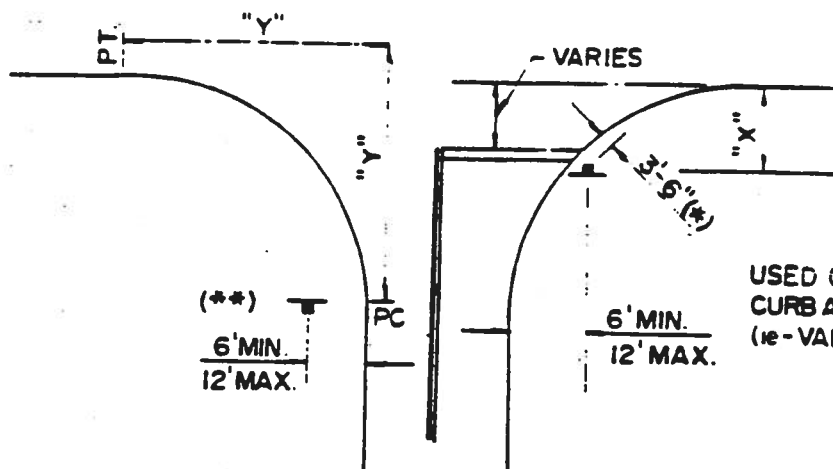
11/4/86
APPROVED
6/4/86

REVISED

STANDARD ROAD DETAIL
SIGN MESSAGE DETAILS

R
18.1

SHEET 4 OF 4



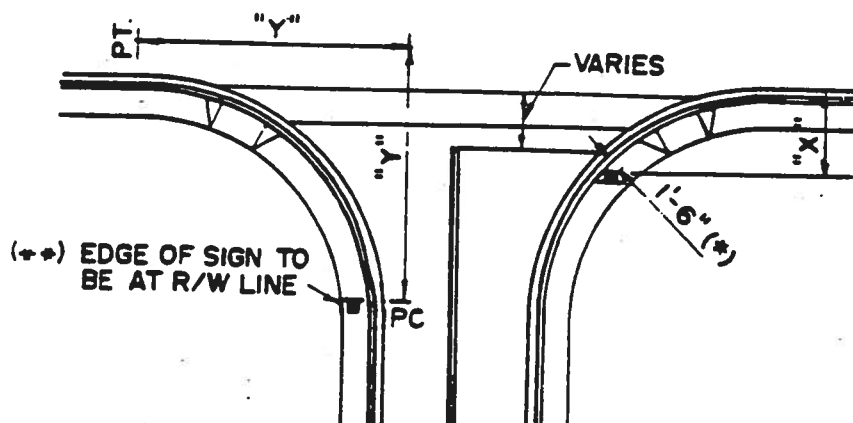
USED ON ANY MOUNTABLE TYPE
CURB AND GUTTER SECTION
(ie - VALLEY GUTTER, ETC.)

"X" MEASURED FROM EDGE OF PAVEMENT
TO C OF SIGN POST.

"Y" DIMENSION DETERMINES RADIUS OF
EDGE OF PAVEMENT.

(*) SEE R 18.1 SHEET 3 OF 4 FOR ADDITIONAL
INFORMATION.

RADIUS "Y"	"X"
0' TO 20'	12'
30'	12'
35'	15'
40'	18'
45'	21'
50'	24'



MAJOR/MINOR INTERSECTIONS

THE MINOR STREET WILL HAVE STOP/STREET NAME SIGNS
INSTALLED AT BOTH CORNERS. (ABOVE STOP SIGN-SEE R 18.1 SHEET 3)

MINOR INTERSECTIONS

IF THRU STREET RUNS NORTH/SOUTH, THE STREET NAME SIGN
WILL BE INSTALLED ON NORTHEAST CORNER, ABOVE STOP SIGN.

IF THRU STREET RUNS EAST/WEST, THE STREET NAME SIGN
WILL BE INSTALLED ON NORTHWEST CORNER, ABOVE STOP SIGN.

NOTE (**)

IN CASES WHERE THE STREET DEAD ENDS AND HAS NO INTERSECTING STREETS, A WARNING
SIGN, NO OUTLET (W14-2), MUST BE INSTALLED ON THE OPPOSITE SIDE OF THE STREET.

METROPOLITAN
DADE COUNTY
PUBLIC WORKS
DEPARTMENT

APPROVED
6/4/86

REVISED
7/7/88

STANDARD ROAD DETAIL
STREET/STOP SIGN
LOCATION

R
18.2
SHEET 1 OF 1

S T O R M D R A I N A G E S P E C I F I C A T I O N S

SECTIONS 310, 320, 340, 350, 355, 360, AND 361

A PORTION OF

PART 2 - PUBLIC WORKS MANUAL

SECTION 310 EXCAVATION, TRENCHING AND BACKFILLING FOR PIPE STRUCTURES

- 310.01 DESCRIPTION: The work covered by this Section consists of furnishing all plant, labor, equipment, and material for the performance of all operations in connection with the excavation, trenching, and backfilling for underground utilities. All work as shown on the Plans or Standard Details shall conform to the lines, grades, dimensions and notes provided thereon.
- 310.02 SAFETY RULES: In performing the operations of excavation and trenching, the Contractor shall abide by the Regulations for Excavations and Trenching Operations, ET-1958, as adopted by the Florida Industrial Commission.
- 310.03 EXCAVATION:
- a. General: The Contractor shall perform all excavation of every description and of whatever substances encountered to the depths indicated on the Plans, Standard Details, or as otherwise specified. During excavation, material suitable for backfilling shall be piled in an orderly manner a sufficient distance from the banks of the trench to avoid overloading and prevent slides or cave-ins. Unless otherwise indicated, excavation shall be by open cut except where tunneling or jacking is permitted or required to allow continuous vehicle access or to prevent cutting a newly placed pavement.
 - b. Pipe Trench Excavation: Pipe trenches shall be of necessary width for the proper laying of the pipe and the banks shall be as nearly vertical as practicable. The bottom of the pipe trench when in hard rock shall be graded to a minimum of 4 inches below the outside bottom of the pipe and refilled to bedding level with sand or other suitable bedding material to provide uniform bearing and support for each section of the pipe at every point along the entire length, except for the portions of the pipe sections where it is necessary to excavate for bell holes and for the proper sealing of pipe joints. Bell holes and depressions for joints shall be dug after the gravel bed has been placed. In order that the pipe rest upon the gravel for as nearly its full

length as practicable, the holes and depressions shall be only of such length, depth and width as required for properly making the particular type of joint.

When materials in the bottom of the trench are not suitable for placement of pipe, the Contractor shall excavate and remove such unsuitable material to the width and depth ordered by the Engineer. The trench shall then be backfilled with suitable material and compacted or thoroughly tamped in 4 inch layers, to provide a uniform and continuous bearing, and should match approximately the density of the soil in which the trench was cut.

- c. Pipe Trench Width: The maximum clear width of trench measured at the spring line, without under-cutting the banks, shall be in accordance with the following table.

<u>SIZE OF PIPE</u> (Inches)	<u>WIDTH OF TRENCH</u> (Inches)
6	24
8	36
10	36
12	36
15	36
18	40
21	42
24	48
27	54
30	60
36	66
42	76
48	84
54	91
60	98
66	109
72	112
78	120

The minimum width of trench shall be of such width as to leave, on each side of the bottom without under-cutting the banks, at least six inches (6") clear space between the bell of pipe and the sheeting or the sides of the trench where no sheeting is used.

- d. Trench Bottom: If no extra excavation is required as specified in Sub-article 310.03 c, the trench bottom shall be rounded so that the bottom of the pipe rests firmly for as nearly the full length of the barrel as proper jointing operations will permit.

This part of the excavation shall be done manually only a few feet in advance of the pipe laying by men skilled in this type of work.

- e. Excavation for Appurtenances: Excavation for manholes, catch basins and similar structures shall be sufficient to leave at least 12 inches in the clear between their outer surfaces and the embankment.
- f. Tunneling: No tunneling will be allowed, except by special permission of the Engineer.

- 310.04 BRACING AND SHORING: The Contractor shall furnish, place and maintain such sheeting, bracing, etc., as may be required to support the sides of excavation. Bracing and shoring shall be used to prevent any movements which may injure the pipe or other underground facility, diminish the width of excavation or otherwise delay the work or endanger adjacent pavements or other structures. Care shall be taken to prevent voids outside of the sheeting, but if voids are formed they shall be filled immediately to the satisfaction of the Engineer.

The Contractor shall be liable for damages to persons or property resulting from the work of constructing all utility structures occasioned by negligence or otherwise growing out of the failure on the part of the Contractor to leave in place in the trench sufficient sheeting and bracing to prevent any caving or moving of the ground adjacent to the bank of the trench.

- 310.05 BACKFILLING: Backfilling and restoration of trenches shall conform to the requirements specified in Section 40 of the Road Specifications.
- 310.06 REFILLING TRENCH IF WORK IS STOPPED: If the work is stopped on the whole, or if any part of the trench is left open for an unreasonable length of time as determined by the Engineer, the Contractor shall refill or construct bridging of such trench or part thereof, in order to provide temporary access for vehicles and pedestrians.
- 310.07 PUMPING: The Contractor shall do all the pumping or dewatering necessary in order that the construction may proceed in a workmanlike manner. He shall provide for the disposal of the water removed from the excavation in such manner that will not affect public health or injure private property. The disposal of any pumping shall not be placed in any existing sanitary sewer or allowed to impede the use of the streets or sidewalks by the

public, nor shall the disposal be in any storm sewer or seepage drain when sedimentation is likely to clog the sewer or reduce seepage. All drainage structures which may be affected shall be cleaned immediately prior to completion of work.

310.08 STREET DRAINAGE: All gutters, drains, swales, culverts and sewers shall be kept clean and open at all times for surface drainage. No damming or ponding of water in gutters or other drainage facilities will be permitted except to such limited extent as the Engineer considers necessary.

SECTION 320 DRAINAGE PIPE

- 320.01 DESCRIPTION: The work specified in this Section consists of furnishing drainage pipe, conforming to these specifications and of the particular type, size, and dimensions shown on the Plans or Standard Details; and installing such pipe at the locations called for and in conformity with the lines and grades shown on the Plans or Standard Details.

This Section also includes the furnishing and construction of such joints and such connections to existing pipes, catch basins, inlets, manholes etc., as may be required to complete the work as indicated on the Plans.

320.02 MATERIALS:

a. Concrete Pipe

(1) 10 inch Diameter Standard Concrete Pipe: This pipe shall meet the requirements of ASTM C-14.

(2) Reinforced Concrete Pipe: All concrete pipe, 12 inch diameter or larger, shall meet the requirements of ASTM C-76.

b. Corrugated Metal Pipe: This pipe shall meet the requirements of AASHTO Specification M-36.

c. Cast Iron Pipe: Pipe of diameter 12 inches and over shall conform with the requirements of AASHTO Specification M-64 and pipe smaller than 12 inches in diameter shall meet the American Standards A 21.2-1953.

d. Standard Strength Clay Pipe: This type of pipe shall meet the requirements of ASTM C-13.

e. Extra Strength Clay Pipe: This type of pipe shall meet the requirements of ASTM C-200.

f. Mortar: Mortar shall be mixed to a ratio of one part by volume of Portland Cement and two parts by volume of sand. The mortar shall be of the desired consistency for caulking and filling the joints of the pipe. Ten percent (10%) hydrated lime by volume may be added to the mortar.

- g. Rubber Gaskets and Joint Material for Concrete Pipe: Rubber gaskets, joint rings, castings and plates for fittings shall meet the requirements of ASTM C-361. With the additional requirement that the gasket used shall be of such cross sectional area and perimeter as to properly fit the space provided in the pipe joint in which it is to be used.

Prior to use, the gasket shall be stored in as cool a place as practicable.

- 32.03 LAYING PIPE: No pipe may be laid when water is above the spring line. The spring line being defined as the horizontal center line of the pipe. The Contractor shall be responsible for all dewatering of trenches as required by the Engineer.

Each piece or section of pipe shall be cleaned and inspected just before being lowered into the trench. Any section that has been damaged in handling, or is found to be defective to a degree which will materially affect the function and service of the pipe, shall be rejected for installation. Pipes having defects that have not caused their rejection are to be so laid that those defects will be in the upper half of the sewer. If any difficulty is found in fitting the pieces together, this fitting is to be done on the surface of the street before laying the pipe, and the tops plainly marked in the order in which they are to be laid. No pipe is to be trimmed or chipped to fit.

Each pipe shall be laid to the line and grade given by the Engineer. All pipes shall be laid with bells or grooves uphill and tongue end fully entered into the hub. Each pipe is to be solidly and evenly bedded, and not simply wedged up before finishing each joint. Some suitable device is to be used to find that the inverts coincide. No length of pipe shall be laid until the two proceeding lengths have been thoroughly embedded in place, so as to prevent any movement or disturbance of the finish joint.

As the pipes are laid through the work, they must be thoroughly cleansed and protected from dirt and water, and no water will be allowed to flow in the trench in any case during construction. No walking on or working over the pipes after they are laid will be permitted, except as may be necessary to backfill and compact the soil to a depth of one foot above the top of the pipe.

Any sections of the pipe which is not in true alignment, or which shows any settlement after laying, shall be taken up and relaid. No pipe shall be laid except in the presence of the Engineer or his authorized inspector.

Whenever the pipe laying is discontinued, as at night, the unfinished end is to be securely protected from displacement by caving of the banks or from other injury, and a suitable stopper is to be inserted therein.

320.04. JOINTS: All concrete pipe shall be carefully laid with the tongue end fully entered into the adjacent hub and true to the lines and grades given. All joints shall be thoroughly wet before applying mortar to the joint. The outside of the joint shall be sealed by the diaper method which consists of the wrapping of the joint with a band of canvas, duck or other suitable cloth material. After one of the edges of the cloth bank or "diaper" has been tightly stretched against the female section of the joint and the tie-wire firmly connected, the other edge of the band shall be stretched against the circumference of the other section of the pipe in such a manner that an opening is provided at the upper side of the pipe through which the mortar shall be poured and manipulated so as to completely encircle the joint.

The diaper shall cover at least the lower two-thirds of the perimeter of the pipe and shall extend on each side of the joint after the sealing is completed to the following minimum distances: $2\frac{1}{2}$ inches for pipe up to 36 inches in diameter; 3 inches for pipe 36 to 54 inches in diameter, and $3\frac{1}{2}$ inches for pipe over 54 inches in diameter. The bead shall be at least two inches high at the center both within the diaper and outside the diaper.

If necessary to facilitate the movement of mortar around the diaper, the water content of the mortar used inside the diaper shall be increased as directed by the Engineer.

The inside of the joint shall be solidly filled with mortar and shall be wiped and finished smooth.

After the initial set, the mortar on the outside shall be protected from the air and sun with a cover of wetted earth or burlap, and shall be kept protected for such period as is necessary to obtain satisfactory curing.

Bituminous joints may be used when the ground water is below the invert of the pipe. Jointite sewer joint compound, G-K compound, Genasco Pipe Joint Asphalt, Carey Sewertite Joint Compound or an approved equal may be used as joint material.

Twenty-four hours before any bituminous joint is poured, the inside of the bell and the outside of the spigot shall be thoroughly primed by the use of the regular commercial primer recommended by the manufacturer of the bituminous jointing compound to be used for the joints. In the absence of any such commercial primer a gasoline cutback of the bituminous jointing compound shall be used, all as approved by the Engineer.

After priming, the hemp and oakum gasket shall be properly placed and caulked, and then the spigot inserted into the hub to its full depth. The joint shall then be filled with a bituminous joint compound, using a proper form therefor and completely filling the joint at one pour.

Where rubber gasketed joints are to be used, the joint assemblies of pipe shall be manufactured to the exact dimensions, so that when the pipes are drawn together in laying the pipe, the rubber gaskets will be uniformly compressed around the periphery of each joint. Where metal joint rings are used, as part of a rubber gasketed joint, such portions which will be exposed after manufacture shall be protected from corrosion by a method approved by the Engineer. Pipe joint surfaces shall be such that the joints will be self-centering when the pipe is laid, and provisions must be made to retain the gasket in proper position.

The completed joint shall be such that it will remain tight within the limits of the exfiltration or infiltration test set forth in Article 320.06.

When the Plans or Standard Details call for pipe to be laid with open joints, such joints shall be constructed as shown on Standard Detail SD-1.1.

- 320.05 CORRUGATED METAL PIPE: This pipe shall be bedded firmly on the bottom of the trench and the joints securely made. When the pipe is perforated, it shall be laid with the perforations down. The pipe shall be handled in such a way that the zinc coating will not be broken, and any pipe showing such breakage of the zinc coating shall not be used.

When bituminous coating is used or specified, the pipe shall be coated in accordance with the requirements of AASHTO M-190.

320.06 INFILTRATION OR EXFILTRATION TEST:

- a. Criteria: The County will reject any section of sewer pipe in a positive system if the infiltration or exfiltration exceeds 1,000 gallons per inch of pipe diameter per mile of pipe per twenty-four (24) hours.
- b. Method of Test: The pipe sewers and manholes shall be tested by submitting them to pressure equal to a two foot (2') head of water and measuring the rate of exfiltration. The static level during the testing

shall be maintained two feet (2') above the crown. Where the crown of the pipe is below the water table at the time and place of testing, the static level during testing shall be maintained two feet (2') above the water table. All labor, materials and equipment for the test shall be furnished by the Contractor at his expense as required by the Engineer.

320.07 BACKFILLING AND SURFACE RESTORATION: Trenches cut for the installation of drainage pipe shall be backfilled and the surface restored in accordance with Section 40 of the the Road Specifications.

SECTION 340 STORM SEWER MANHOLES

340.01 DESCRIPTION: The work specified in this Section consists of constructing storm sewer manholes either "precast" or "cast in place" with Class I concrete and reinforcing steel or of brick masonry with the necessary metal frame and cover. They shall be constructed in accordance with these specifications and in conformity with the Plans or Standard Details.

340.02 MATERIALS:

- a. Concrete: Concrete shall be Class I concrete.
- b. Reinforcing Steel: All steel reinforcement shall be either intermediate or hard grade and shall conform to the requirements of ASTM A-15 or ASTM A-16. All reinforcement bars larger than $\frac{1}{4}$ inch diameter shall be deformed bars conforming to the requirements of ASTM A-305.
- c. Brick Masonry: Brick used in masonry shall be either clay or shale brick meeting the requirements of ASTM C-62 or concrete building brick meeting the requirements of ASTM C-55.
- d. Mortar: Mortar shall be as specified in Sub-article 320.02-f.
- e. Frame and Cover: The quality of materials used in the manufacture of frame and cover shall be Class 30, grey iron castings which conforms to the requirements of ASTM Designation A-48 (AASHTO M-105). They shall be cast to the size and dimensions shown on Standard Detail SD-4.4, or an approved equal.

Castings shall be of uniform quality, free from blow holes, porosity, hard spots, shrinkage, defects, cracks or other injurious defects. Castings shall be boldly filleted at angles and arises shall be sharp and perfect. They shall be smooth well cleaned by blasting.

All castings are to be manufactured true to pattern and with satisfactory fit of component parts. The frame and cover shall be of a non-rocking design or

with machined ground surfaces so fitting parts will not rattle or rock under traffic. The weight of the frame and cover shall be within a two pound tolerance of those weights shown on the Standard Details. All castings shall be clean and neatly finished with a coating of coal-tar pitch varnish.

340.03 CONSTRUCTION: Manholes shall be built at the points indicated on the Plans or as directed by the Engineer. Manholes shall be constructed in accordance with Standard Details SD-2.6 and SD-3.6.

Brick masonry in manholes shall be built of brick and mortar of the specified quality. Every fifth course of brick shall be laid as stretchers, the remainder being laid as headers. Every brick shall have full mortar joints on the bottom and sides which shall have been formed at one operation by placing sufficient mortar on the head and forcing the brick into it. Horizontal joints shall not exceed three eighths of an inch ($3/8$ ") and the vertical joints on the inside of the manhole shall not exceed one-fourth of an inch ($1/4$ ").

In the walls of manholes a limited amount of half-brick may be used not exceeding one-third ($1/3$) of the whole, if properly bonded with whole brick.

Brick manholes shall have a plaster coat of mortar one-half of an inch ($1/2$ ") in thickness on the inside and outside. Mortar shall be as specified in Sub-article 320.02-f.

Reinforced concrete manholes shall be constructed of Class I concrete. The placing and handling of reinforcing steel shall be as shown and called for on plans and approved by the Engineer. Forms shall be designed and constructed so that they may be removed without injury to the concrete and shall be left in place for at least 24 hours after the concrete is poured. Concrete shall be thoroughly tamped while placing and shall be cured for at least three days after removal of forms. All holes and voids on the surface shall be filled with sand cement mortar.

When the manhole is completed, a frame and cover as previously specified shall be set in place to the line and grade given by the Engineer and then bolted down as shown on the Standard Details.

- 340.04 PRECAST CONSTRUCTION: The Contractor may, at his option, use precast manholes constructed in accordance with Standard Detail SD- 3.6.
- 340.05 PLACING PIPE: Inlet and outlet pipe shall be of the same size and kind as the connecting pipe shown on the Plans. They shall extend through the walls for a distance beyond the outside surface sufficient for the intended connections, and the concrete shall be constructed around them neatly so as to prevent leakage along their outer surface. The inlet and outlet pipes shall be flush with the inside surface of the wall.
- 340.06 STEPS: When called for on the Plans or ordered by the Engineer, steps of the type shown on Standard Detail SD-4.6 or an approved equal shall be set in place on the inside of the manhole. They shall be firmly built in the wall starting two feet above the bottom and placed not more than 15 inches apart. The steps shall project between 6" and 8" from the finished inside face of the manhole.

SECTION 350 CATCH BASINS

350.01 DESCRIPTION: The work specified in this Section consists of constructing catch basins precast or cast in place with type Class I concrete and reinforcing steel or brick masonry with the necessary metal frame and grate. They shall be constructed in accordance with these specifications and in conformity with the Plans or Standard Details.

350.02 MATERIALS:

- a. Concrete: Concrete shall be Class I concrete.
- b. Reinforcing Steel: Reinforcing steel shall be as specified in Sub-article 340.02 b.
- c. Brick Masonry: Brick used in masonry shall be as specified in Sub-article 340.02 c.
- d. Mortar: Mortar shall be as specified in Sub-article 320.02 f.
- e. Frame and Grate: The quality of materials used in the manufacture of frame and grate shall be Class 30, grey iron castings which conforms to the requirements of ASTM A-48 (AASHTO Specification M-105). They shall be cast to the size and dimensions shown on Standard Detail SD-2.3 or an approved equal. Castings shall be of uniform quality, free from blow holes, porosity, hard spots, shrinkage, defects, cracks or other injurious defects. Castings shall be boldly filleted at angles and aries shall be sharp and perfect. They shall be smooth and well cleaned by blasting.

All castings are to be manufactured true to pattern and with satisfactory fit of component parts. The frame and grate shall be of non-rocking design or with machined ground surfacrs so fitting parts will not rattle or rock under traffic. The weight of the frame and cover shall be within a two pound tolerance of those weights shown on the Standard Details. All castings shall be clean and neatly finished with a coating of coal-tar pitch varnish.

350.03 CONSTRUCTION: Catch basins shall be built at the points indicated on the Plans or as directed by the Engineer. They shall be constructed in accordance with the size dimension and notes shown on Standard Detail SD-2.1.

Catch basins shall be located within the right of way as shown on Standard Detail SD-2.4 or SD-2.5. The pavement around catch basins constructed in the swale shall conform to the following specifications:

- a. Limerock Base: Section 51.
- b. Type I Asphaltic Concrete: Section 133.

Swale areas adjacent to the paved area around catch basins shall be properly graded to lead storm water into the catch basin.

Brick masonry in catch basins shall be built of brick and mortar of the specified quality. All brick shall be saturated with water before being laid. The brick shall be laid using the shovejoint method so as to bond them thoroughly into the mortar. Headers and stretchers shall be so arranged as to bond the mass thoroughly. A limited amount of half-brick may be used not exceeding one-third ($1/3$) of the whole, if properly bonded with whole brick. Joints shall be finished properly as the work progresses and shall be not less than $\frac{1}{4}$ inch and not more than $\frac{1}{2}$ inch in thickness. No spalls nor bats shall be used except for shaping around irregular openings or when unavoidable at corners. Only experienced bricklayers shall be employed on this work.

Brick catch basins shall have a plaster coat of mortar one-half of an inch ($\frac{1}{2}$ ") in thickness on the inside and outside, mortar shall be as specified in Sub-article 320.02 f.

When the catch basin is to be constructed of concrete, the forms shall be placed to the depth shown on the Plans or as directed by the Engineer. The placing and handling of reinforcing steel shall be as specified in Section 340.b. After the concrete has been poured, it shall be thoroughly tamped and spaded. After the concrete has hardened sufficiently, the forms shall be removed and the concrete covered with suitable material to keep it moist for a period of three days or longer if necessary. It shall be protected, in a satisfactory manner, from the elements until thoroughly hardened.

After the concrete has been cured as specified above, the frame of the casting shall be set in a full mortar bed.

350.04 PRECAST CONSTRUCTION: The Contractor may, at his option, use precast catch basins constructed in accordance with Standard Details SD-2.2.

350.05 PLACING PIPE: Inlet and outlet pipe shall be of the same size and kind as the connecting pipe. They shall extend through the walls for a distance beyond the outside surface sufficient for the intended connections. The concrete shall be placed around them neatly so as to prevent leakage along their outer surface. The inlet and outlet pipes shall extend three inches inside the inner surface of catch basin.

A $\frac{1}{2}$ inch mesh galvanized screen with removable clamp, as approved by the Engineer, shall be placed on the outlet pipe.

SECTION 355 INLETS

355.01 DESCRIPTION: The work specified in this Section consists of constructing a swale inlet or a curb inlet with Class I concrete, reinforcing steel and the necessary frame, grate, or cover. They shall be constructed in accordance with these specifications and in conformity with the Plans or Standard Details.

355.02 MATERIALS:

- a. Concrete: Concrete shall be Class I concrete, minimum strength 3,000 PSI.
- b. Reinforcing Steel: Reinforcing steel shall be as specified in Sub-article 340.02 b.
- c. Mortar: Mortar shall be as specified in Sub-article 320.02 f.
- d. Frame Grate and Cover: The quality of materials used in the manufacture of frame and cover shall be Class 30, grey iron castings which conforms to the requirements of ASTM Designation A-48 (AASHTO Specification M-105). The frame and grate for the swale inlet shall be cast to the size and dimensions shown on Standard Detail SD-2.3, and the frame and cover for the curb inlet shall be cast to the size and dimensions shown on Standard Detail SD-3.3 or an approved equal. Castings shall be of uniform quality, free from blow holes, porosity, hard spots, shrinkage, defects, cracks or other injurious defects. Castings shall be boldly filleted at angles and arises shall be sharp and perfect. They shall be smooth and well cleaned by blasting. All castings are to be manufactured true to pattern and with satisfactory fit of component parts. The frame and grate shall be of a non-rocking design or with machined bearing surfaces so fitting parts will not rattle or rock under traffic. The weight of the frame and cover shall be within a two pound tolerance of these weights shown on the Standard Details. All castings shall be clean and neatly finished with a coating of coal-tar pitch varnish.

355.03 CONSTRUCTION: Inlets shall be built at the point indicated on the Plans or as directed by the Engineer. They shall be constructed in accordance with the size, dimensions and notes shown on Standard Detail SD-3.1 or SD-3.2.

When inlets are to be cast in place, the forms shall be set to the depth shown on the Plans or as directed by the Engineer. The placing and handling of reinforcing steel shall be as specified in Section 227. After the concrete has been poured, it shall be thoroughly tamped and spaded. After the concrete has hardened sufficiently, the forms shall be removed and the concrete covered with a suitable material to keep it moist for a period of three days or longer if necessary. It shall be protected, in a satisfactory manner, from the elements until thoroughly hardened.

After the concrete has been cured as specified above, the frame shall be set in a full bed of mortar.

Swale inlets to be constructed in a driveway or swale shall be located as required for catch basins (Standard Details SD-2.4 or SD-2.5).

The pavement around inlets constructed in the swale shall conform to the following specifications:

Limerock Base	-	Section 51
Type I Asphaltic Concrete	-	Section 133

Swale areas adjacent to the paved area around inlets shall be properly graded to lead storm water into the inlets.

SECTION 360 SEEPAGE DRAIN

360.01 DESCRIPTION: The work specified in this Section consists of constructing a seepage drain in accordance with these specifications and conforming to the dimension and notes of Standard Detail SD-1.1.

360.02 MATERIALS:

a. Ballast Rock:

All ballast rock shall be locally procured and shall be obtained from fresh water sources. It shall be washed and free of deleterious matter. It shall not have more than 45 percent loss of section as specified by M 63 of AASHTO Specifications governing the Los Angeles Abrasion Test. It shall not show more than a 10 percent loss in 10 cycles as specified by M 63 of AASHTO Specifications governing the soundness test. The ballast rock shall meet the gradation requirements as specified by M 43 of AASHTO Specifications for size number 24 ($2\frac{1}{2}$ to $\frac{3}{4}$ -inch) or number 4 ($1\frac{1}{2}$ to $\frac{3}{4}$ -inch). The County reserves the right to have sample tests made of the material at selected intervals by an approved laboratory at its expense.

b. Pipe: Pipe shall be as specified in Section 320.

c. Concrete: Concrete shall be Class I concrete.

360.03 CONSTRUCTION: The seepage drain shall be excavated to the depth required in accordance with Section 310.

Ballast rock shall be placed in the trench to the level of the bottom of the proposed pipe. The the bell and spigot pipe shall be laid with all joints open, as shown on the typical section of Standard Detail SD-1.1. A wooden wedge or other approved method shall be used to center the spigot in the bell.

After the pipe has been laid and approved, ballast rock shall be placed carefully so as not to displace the pipe, around and over the pipe to the depth shown on Standard Detail SD-1.1. One layer of 30 lb. felt shall be placed over the rock. The trench shall then be backfilled and the surface restored in accordance with Section 40 of the Road Specifications.

Where the seepage drain is permitted to be constructed under pavement areas, an 8 inch reinforced concrete slab as shown on Standard Detail SD-1.1 shall be placed continuous over the drain.

SECTION 361 SEEPAGE TRENCH

361.01 DESCRIPTION: The work specified in this Section consists of constructing a seepage trench in accordance with the specifications and conforming to the dimensions and notes shown on the Plans or Standard Details.

361.02 MATERIALS:

- a. Concrete: Concrete shall be Class I concrete as specified except as noted herein.
- b. Inlet Pipe: Inlet pipe shall conform to the requirements of Section 320.

361.03 CONSTRUCTION: The seepage trench shall be excavated to the required depth in accordance with Section 310.

Inlet pipe shall be provided and laid in accordance with Section 320. A concrete collar may be constructed of Non Structural concrete (N.S. concrete is a concrete meeting a compressive strength of not less than 2,000psi) and cast in place to the size required by the Engineer.

A concrete slab shall be placed as shown on Standard Detail SD-1.2 for the entire length of the trench.

Catch basins, frame grate and leveling course when permitted shall be constructed on the concrete slab in accordance with Section 350.


Surfaces disturbed by the installation of a seepage trench shall be restored in accordance with Section 40 of the Road Specifications.

Memorandum

MIAMI-DADE
COUNTY

Date: July 1, 2020

To: Honorable Harvey Ruvin
Clerk of the Courts

From:  Alice N. Bravo, P.E., Director
Department of Transportation and Public Works

Subject: Revision to Standards of the Public Works Manual

2020 JUL -1 PM 2:57

CLERK, CIRCUIT & COUNTY CLERK
MIAMI-DADE COUNTY, FLA.
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In accordance with Section 2-100 (d) of the Code of Miami-Dade County, I am hereby filing with you the below revisions to the Public Works Manual:

Adoption of the attached Second Edition of the Utility Accommodation & Appurtenance Specifications for Public Rights of Ways, a portion of Part 2 of the Public Works Manual, which would supersede the First Edition, recorded May 21, 2009.

**Utility Accommodation & Appurtenance Specifications
For Public Rights of Ways**

Sections 370, 375, 380, 385

**A portion of
Part 2 of the Public Works Manual**

**Second Edition
Supersedes UAM First Edition Recorded May 21, 2009**

Recorded: 7-1-20

Section 370

GENERAL PROVISIONS

370.01 Intent, Purpose, and Authority:

- (a) It is the intent of Miami-Dade County to promote the public health, safety and general welfare by: (i) adopting and administering reasonable rules and regulations not inconsistent with State and Federal law for the placement or maintenance of cables, conduits, cabinets, transformers, pedestals, handholes, manholes, utility poles, wireless communications facilities (including small wireless facilities), wireless support structures, auxiliary structures, and any other appurtenances related to utility installations in the public rights-of-way within the County that are owned or maintained by Miami-Dade County; (ii) establishing reasonable rules and regulations necessary to manage the placement and maintenance of utility installations in County-owned or –maintained public rights-of-way by all companies and their contractors and minimizing the disruption to the public rights-of-way; and (iii) treating providers of communications services in a nondiscriminatory and competitively neutral manner when imposing rules or regulations governing the placement or maintenance of telecommunication facilities in County-owned or –maintained public roads and public rights-of-way.
- (b) This Manual has been adopted in accordance with § 2-100(d) of the Code. The standards set forth herein shall be applicable to County-owned and -managed rights-of-way within the unincorporated and all incorporated areas.

370.02 Definitions: The following definitions shall apply to the terms set forth in this Manual:

- (a) “Antenna” means communications equipment that transmits or receives electromagnetic radio frequency signals used in providing wireless services.
- (b) “Applicable Codes” means uniform building, fire, electrical, plumbing, or mechanical codes adopted by a recognized national code organization or local amendments to those codes enacted solely to address threats of destruction of property or injury to persons, and includes the National Electric Safety Code and the 2017 edition of the Florida Department of Transportation Utility Accommodation Manual, the Public Works Manual, the Miami Dade County Roadway Lighting Manual, the Florida Building Code, FHWA Manual on

Uniform Traffic Control Devices, FDOT Standard Specifications for Road and Bridge Construction, FDOT Roadway and Traffic Design Standards, FDOT Roadway and Traffic Design Standards, the Florida Green Book, American Association of State Highway and Transportation Officials (AASHTO) guidance, and American Society of Civil Engineers (ASCE) standards.

- (c) "Applicant" means a person who submits an application for a permit in accordance with this Manual.
- (d) "Application" means a request submitted by an applicant in accordance with this Manual, including a request submitted by an applicant for a permit to collocate small wireless facilities or to place a new utility pole used to support a small wireless facility, as defined in § 337.401(7)(b)4., Fla. Stat.
- (e) "Appurtenance" means any at-grade installation of a cabinet, splice box, transformer, amplifier, pedestal, auxiliary structure, or any other equipment associated with any utility; appurtenance does not include any equipment that may be attached to a utility pole.
- (f) "Code" means the Code of Ordinances of Miami-Dade County, Florida.
- (g) "Collocate" or "collocation" means to install, mount, maintain, modify, operate, or replace one or more wireless facilities on, under, within, or adjacent to a wireless support structure or utility pole. The term does not include the installation of a new utility pole or wireless support structure in the public rights-of-way.
- (h) "Communications Space" means the zone on a utility pole that is used primarily for the placement of cable television, broadband, fiber, and telephone wires used to deliver communications services.
- (i) "Communications service" means the transmission, conveyance, or routing of voice, data, audio, video, or any other information or signals, including video services, to a point, or between or among points, by or through any electronic, radio, satellite, cable, optical, microwave, or other medium or method now in existence or hereafter devised, regardless of the protocol used for such transmission or conveyance. The term includes such transmission, conveyance, or routing in which computer processing applications are used to act on the form, code, or protocol of the content for purposes of transmission, conveyance, or routing without regard to whether such service is referred to as voice-over-Internet-protocol services or is

classified by the Federal Communications Commission as enhanced or value-added. The term does not include:

- (1) Information services.
 - (2) Installation or maintenance of wiring or equipment on a customer's premises.
 - (3) The sale or rental of tangible personal property.
 - (4) The sale of advertising, including, but not limited to, directory advertising.
 - (5) Bad check charges.
 - (6) Late payment charges.
 - (7) Billing and collection services.
 - (8) Internet access service, electronic mail service, electronic bulletin board service, or similar online computer services.
- (j) "Communications service provider" means a person or entity providing any lawful communications service.
- (k) "County" shall mean Miami-Dade County, a political subdivision of the State of Florida. The County shall be the "authority," for purposes related to § 337.401(7)(b)5, Fla. Stat.
- (l) "Director" means the Director of DTPW, or the Director's designee.
- (m) "DTPW" or "Department" means the Miami-Dade County Department of Transportation and Public Works or successor department responsible for management of rights-of-way.
- (n) "FCC" means the Federal Communications Commission.
- (o) "FDOT" means the Florida Department of Transportation.
- (p) "Manual" means this "Utility Accommodation & Appurtenance Specifications for Public Rights of Ways," Sections 370, 375, 380, 385, a Portion of Part 2 of the Public Works Manual of Miami-Dade County, Florida, Second Edition.
- (q) "Micro wireless facility" means a small wireless facility having dimensions no larger than 24 inches in length, 15 inches in width, and 12 inches in height and an exterior antenna, if any, no longer than 11 inches.
- (r) "RER" means the Miami-Dade County Department of Regulatory and Economic Resources or successor department.
- (s) "Right-of-way" means a public road or publicly-owned rail corridor.

- (t) "Small wireless facility" means a wireless facility that meets the following qualifications:
 - (1) Each antenna associated with the facility is located inside an enclosure of no more than 6 cubic feet in volume or, in the case of antennas that have exposed elements, each antenna and all of its exposed elements could fit within an enclosure of no more than 6 cubic feet in volume; and
 - (2) All other wireless equipment associated with the facility is cumulatively no more than 28 cubic feet in volume. The following types of associated ancillary equipment are not included in the calculation of equipment volume: electric meters, concealment elements, communications demarcation boxes, ground-based enclosures, grounding equipment, power transfer switches, cutoff switches, vertical cable runs for the connection of power and other services, and utility poles or other support structures.
- (u) "Utility" means electric transmission, voice, telegraph, data, or other communications services lines or wireless facilities; pole lines; poles; railways; ditches; sewers; water, heat, or gas mains; pipelines; fences; gasoline tanks and pumps; or other structures or equipment related to a utility as defined in Title XXVII of the Florida Statutes.
- (v) "Utility company" means a person or entity who owns, operates, manages, or controls a provider of utility services, and includes its employees, agents, servants, partners, principals, and subcontractors.
- (w) "Utility pole" means a wood, steel, concrete, or fiberglass, slender, cylindrical, or square pole or other similar structure on which is situated a utility that is used in whole or in part to provide communications services or for electric distribution, lighting, traffic control, signage, or similar function. The term includes the vertical support structure for traffic lights but does not include a horizontal structure to which signal lights or other traffic control devices are attached and does not include a pole or similar structure 15 feet in height or less unless the County grants a waiver for such pole. Utility pole may also be referred to as pole, power (electricity) pole, street light pole, telegraph pole, telegraph post, or telephone pole.
- (x) "Utility service" means the provision of electric, water, wastewater, heat, gas, communications, railway, or other such infrastructure or service through a utility.
- (y) "Wireless facility" means equipment at a fixed location that enables wireless communications between user equipment and a

communications network, including radio transceivers, antennas, wires, coaxial or fiber-optic cable or other cables, regular and backup power supplies, and comparable equipment, regardless of technological configuration, and equipment associated with wireless communications. The term includes small wireless facilities. The term does not include:

- (1) The structure or improvements on, under, within, or adjacent to the structure on which the equipment is collocated;
 - (2) Wireline backhaul facilities; or
 - (3) Coaxial or fiber-optic cable that is between wireless structures or utility poles or that is otherwise not immediately adjacent to or directly associated with a particular antenna.
- (z) "Wireless infrastructure provider" means a person who has been certified under chapter 364, Fla. Stat., to provide communications service or under chapter 610 to provide cable or video services in this state, or that person's affiliate, and who builds or installs wireless communication transmission equipment, wireless facilities, or wireless support structures but is not a wireless services provider.
- (aa) "Wireless provider" means a wireless infrastructure provider or a wireless services provider.
- (bb) "Wireless services" means any services provided using licensed or unlicensed spectrum, whether at a fixed location or mobile, using wireless facilities.
- (cc) "Wireless services provider" means a person or entity who provides wireless services.
- (dd) "Wireless support structure" means a freestanding structure, such as a monopole, a guyed or self-supporting tower, or another existing or proposed structure designed to support or capable of supporting wireless facilities. The term does not include a utility pole, pedestal, or other support structure for ground-based equipment not mounted on a utility pole and less than 5 feet in height.

370.03

Use of County public rights-of-way; construction requirements; alteration of the system; access by County; issuance of permit; pole attachment agreement requirement. Subject to all applicable provisions of the County, including obtaining permits for appurtenances, utility poles, and antennas pursuant to this Manual, a utility company may perform all necessary work to construct, occupy, and maintain its utilities in County-owned or -maintained rights-of-way. The utility must comply at all times with all applicable policies, procedures, and directives of DTPW and RER consistent with applicable law.

- (a) Other permits required.
- (1) Prior to the installation, placement, or removal of any conduits, cables, pole or pole lines, appurtenances, or other utilities, or the start of any other type of construction on the County's public rights-of-way, the utility company shall, pursuant to the requirements of existing or subsequently enacted County ordinances, obtain all required permits from, and where applicable pay all fees to, DTPW and RER.
 - (2) Final approval to commence work that is subject to this Manual shall not be granted until the applicant demonstrates that it has obtained all permits required for compliance with Applicable Codes.
- (b) The issuance of a permit by the County shall not be construed by the utility company as a warranty that the placement of a utility or the start of construction is in compliance with all applicable rules, regulations, or laws.
- (c) All construction and maintenance of the utility's installation within County public rights-of-way incident to the utility company's provision of service shall, regardless of who performs installation or construction, be and remain the responsibility of the utility company.
- (d) The utility company's work performance, construction, reconstruction, restoration, installation and maintenance of equipment, and job sites shall be in compliance with all Applicable Codes.
- (e) The utility company's work, while in progress, shall be properly protected at all times with suitable barricades, flags, lights, flares or other devices as required by the FHWA Manual on Uniform Traffic Control Devices, FDOT Roadway and Traffic Design Standards, and any requirements of DTPW to protect all members of the public having occasion to use the portion of the streets involved or adjacent property.
- (f) The utility company shall at all times employ due care and shall install, maintain, and use commonly accepted methods and devices for preventing failures and accidents that are likely to cause damage, injuries or nuisances to the public.
- (g) All of the utility's structures and lines, equipment, and connection in, over, under, and upon the public rights-of-way, wherever situated or located, shall at all times be kept and maintained in a safe, suitable, substantial condition, and in good order and repair.

- (h) All transmission and distribution structures, poles, fixtures, lines, appurtenances, and utilities erected by the utility company within the rights-of-way shall be so located as to cause minimum interference with the proper use of streets, alleys, and other public ways and places, and to cause minimum interference with the rights and reasonable convenience of property owners who may join any of the said street, alleys, or other public ways and places.
- (i) Any concrete foundation that is installed above the grade of the right-of-way shall be removed or lowered to grade if the utility it supports is removed.
- (j) Construction and maintenance of cables, conduits, cabinets, transformers, pedestals, handholes, manholes, poles, auxiliary structures, and any other appurtenance related to utility installations in rights-of-way within the County shall be constructed, operated, and maintained in such a manner that it does not violate Americans with Disabilities Act (ADA), as it may be amended from time to time, and regulations promulgated thereunder.
- (k) For poles or ground-mounted appurtenances being installed to support wired or wireless communications facilities, except small wireless facilities, construction plans submitted for review should be drawn to scale and show dimensions of all surface features existing in or proposed for the rights-of-way within a radius of 50 feet from the proposed location of installation. A provider shall identify the following features:
 - (1) Rights-of-Way
 - (2) Public utility easements
 - (3) Recorded easements
 - (4) Property lines
 - (5) Drainage features
 - (6) Existing utilities
 - (7) Driveways
 - (8) Landscaping
 - (9) Any other feature or structure installed in the applicable right-of-way not identified above, as required by DTPW.
- (l) Anyone seeking to attach a utility to a utility pole owned or managed by Miami-Dade County shall be required to enter into a pole attachment agreement with the County prior to installation. Pole attachment agreements relating to wireless facilities shall comply with § 337.401, Fla. Stat.

- 370.04** **Protection of Underground utilities:** In connection with excavation in the public rights-of-way, utilities, where applicable, shall comply with the requirements of Article XIII.5 of Chapter 21 of the Code.
- 370.05** **Chapter 8AA of the Code of Miami-Dade County; abandonment of utility:** Chapter 8AA shall apply to the public rights-of-ways to the extent consistent with applicable federal and state law. At a minimum, abandonment of wireless facilities installed in the public rights-of-way shall be subject to § 8AA-166 of the County Code.
- 370.06** **Restoration:** In accordance with § 2-103.1 of the Code, within 30 days (except, in urban center or urban area districts or within the Rapid Transit Zone, within 15 days) of completion of the construction, maintenance, or repair of the utility:
- (a) The utility company shall restore the public rights-of-ways, including sidewalks, curbs, gutters, and landscaping to their pre-existing condition, including any aesthetic enhancements thereto, except as provided herein.
 - (b) Where restoring the pre-existing condition is not legally permissible, for example because of ADA requirements, the utility company shall make the minimum improvements necessary within the area of disturbance and such additional area as may be necessary to bring the right-of-way into compliance with the applicable law, and shall restore the remainder, including any pre-existing aesthetic enhancements disturbed or damaged during construction, to the pre-existing condition to the maximum extent feasible.
 - (c) The utility shall also repair any adjacent private property damaged during construction, maintenance, or repair.
- 370.07** **Approved excavation bridging methods:** If the work is stopped on the whole, or if any part of the trench is left open for an unreasonable length of time as determined by the DTPW, the contractor shall refill or construct bridging of such trench or part thereof, in order to provide temporary access for vehicles and pedestrians:
- (a) Steel plates placed in any part of a roadway surface shall be pinned with railroad type spikes a minimum of four (4) inches long and three quarters (¾) of an inch in diameter with a minimum of two pins per side of each plate to prevent the steel plates from shifting or moving. Asphalt is required around the entire perimeter of the steel plates and shall be maintained by the contractor.

- (b) Temporary asphalt mix shall be placed over the trench immediately after backfilling, the temporary pavement shall be laid even with existing pavement as not to create a bump or a depression, and shall be maintained by the contractor.
- (c) Unless DTPW determines that it is impractical or a variance is obtained in accordance with this Manual, pavement less than three years old shall not be cut. This prohibition does not apply to installation on sidewalks or swales or to permits for the collocation of small wireless facilities or the installation, modification, or replacement of utility poles used to support the collocation of small wireless facilities.

370.08 **Bridging method for sidewalk:** When a sidewalk or portion thereof is removed, the utility company must comply with the ADA and provide pedestrian access at all times. Immediately after work is complete, or work has been secured until the next work period, ADA access around the worksite must be provided. If access cannot be provided around the work site because of site conditions, then the path must be immediately restored using one of the following methods:

- (a) Temporary asphalt mix shall be placed immediately after backfilling. The temporary pavement shall be laid even with existing sidewalk as not to create a bump, depression or a vertical separation exceeding one quarter ($\frac{1}{4}$) of an inch per foot and shall be maintained by the contractor.
- (b) Steel plates shall also be allowed to bridge damaged or missing sidewalks; however, the leading edges perpendicular to pedestrian traffic shall not exceed a quarter of an inch ($\frac{1}{4}$ ") in vertical separation.
- (c) Any other method approved by the County Engineer or designee that meets the ADA standards.

370.09 **Limits of restoration:** The limits of asphalt restoration shall be in accordance to standard detail R21.1 pages 1, 2 & 3 or as approved by the County Engineer or designee.

- (a) Patches to concrete sidewalks shall not be allowed. The sidewalk shall be saw cut to the nearest joints (Type A, B or C as described in the Public Works Manual) and the entire width and length to the joints of the sidewalk flag shall be replaced and installed to match existing.
- (b) Patches to plain concrete or stamped concrete driveway approaches shall not be allowed. If an aforementioned approach is cut or damaged by a utility, then the approach shall require full

reconstruction from the edge of pavement to the right-of-way line or as required by the County Engineer or designee.

- (c) Utilities shall be responsible for the maintenance of roadway and trench restorations to include the patch, full lane restoration and all other utility related issues for the lifetime of the utility.

370.10 General Utility Company Responsibilities:

- (a) Where a utility does not comply with the County's requirements in effect as of the date the permit is approved, the permit is void and the utility will have to be brought in to compliance or removed from the right-of-way at no cost to the County.
- (b) The Utility Company shall indemnify, defend, and save harmless the County from any damage, cost, or expense arising in any manner from the Utility Company's exercise of the privileges granted by the utility permit, unless the damage, cost, or expense is caused by the County's negligence, gross negligence, or willful conduct.
- (c) No utility company shall have a vested right or interest in the location of any utility, including, without limitation, appurtenances, poles, antennas, and wire-holding structures. Whenever DTPW determines that the utility is unreasonably interfering with the convenient, safe, or continuous use, or the maintenance, improvement, extension or expansion of the right-of-way, DTPW may require the utility company to remove or modify its utility at the utility company's own expense, to the extent provided by §§ 337.403 and 337.404, Fla. Stat., or other applicable law.

370.11 Traffic Control Plan (TCP) Submittals: The Utility Company shall submit one of the following: (i) a Traffic Control Plan (TCP) with the applicable series 600 indexes of the FDOT Design Standards and Manual on Uniform Traffic Control Devices (MUTCD); (ii) a TCP that is signed and sealed by a qualified licensed Florida professional engineer or a person with Advanced Maintenance of Traffic certification; or (iii) a TCP prepared by a person who is exempted from engineering license requirements as provided by § 471.003, Fla. Stat.

370.12 Commencement of Work: The Utility Company shall not begin work until the required DTPW representative as indicated on the utility permit is on site or other arrangements have been made with DTPW.

370.13 Erosion Control Plans: The Utility Company is required to provide the County an erosion control plan for the utility work if requested by DTPW. If

the requested plan or applicable permit is not provided, DTPW may stop the work until such information is provided to FDOT.

370.14 **Final Inspection of Work:** Upon Completion, the Utility Company shall provide DTPW with an engineer's certification attesting that all work was done per the approved plans.

370.15 **Legally Established Non-Conforming Utilities:** Permits and approvals issued prior to the recordation of this Second Edition shall remain in full force and effect. But the utility shall be required to comply with the requirements of this Second Edition if:

- (a) Such permit or approval expires or is abandoned, revoked, or otherwise terminated; or
- (b) if the utility is modified 50 percent or more, as determined by DTPW, unless the modification involves a wireless communications facility subject to an exemption set forth in section 370.16.

370.16 **Exemptions:**

- (a) County-owned or -operated utility installations shall be exempt from this Manual.
- (b) Pursuant to section 337.401(3)(g) and (7)(e), Fla. Stat., provided that right-of-way permits for work that involves excavation, closure of a sidewalk, or closure of a vehicular lane are obtained, permits pursuant to this Manual shall not be required for the following work:
 - (1) Routine maintenance;
 - (2) Performance of service restoration work on existing facilities;
 - (3) Repair work, including, but not limited to, emergency repairs of existing facilities or extensions of such facilities for providing communications services to customers;
 - (4) Replacement of existing wireless facilities with wireless facilities that are substantially similar or of the same or smaller size;
 - (5) Installation, placement, maintenance, or replacement of micro wireless facilities that are suspended on cables strung between existing utility poles in compliance with applicable codes by or for a communications services provider authorized to occupy the rights-of-way and who is remitting taxes under chapter 202, Fla. Stat., provided that the provider provides to DTPW an initial letter from or on behalf of such provider, which is effective upon filing, attesting that the micro wireless facility dimensions comply with the limits of this subsection; or

- (6) Maintenance, repair, replacement, extension, or upgrade of existing aerial wireline communications facilities on utility poles or for aerial wireline facilities between existing wireline communications facility attachments on utility poles by a communications services provider.
 - (7) The term “extension of existing facilities” includes:
 - (i) extensions from the rights of way into a customer’s private property for purposes of placing a service drop; or
 - (ii) extensions from the rights of way into a utility easement to provide service to a discrete identifiable customer or group of customers.
- (c) Pursuant to section 337.401(3)(g) and (7)(e), Fla. Stat., a communications service provider performing service restoration on an existing facility shall also be exempt from right-of-way work permits, provided that the work is done in compliance with the 2017 edition of the FDOT Utility Accommodation Manual. The provider shall provide notice of such work to DTPW within 30 days after restoration, and DTPW may require an after-the-fact permit for work that would otherwise have required a permit.

370.17 **Variances from this Manual:** Consistent with the authority granted by section 2-100 of the Code, the Director may authorize a variance from the specifications set forth in this Manual in accordance with this section. Where a variance has been requested in response to the denial of an application pursuant to this Manual, this variance process shall be considered an administrative review of the denial of an application for purposes of § 337.401(7)(d)9., Fla. Stat. This variance process shall also govern requests for a “waiver” for purposes of § 337.401(7), Fla. Stat.

- (a) A variance request must be made in writing to the Director and must address with specificity, including supporting technical information, the following criteria:
 - (1) a map depicting the area to be served (the “targeted area”);
 - (2) that underground installation is not feasible or practicable;
 - (3) that any proposed poles, antennae, and appurtenances are compatible with the area surrounding the proposed installation and with equipment historically used throughout the County for other utility services, including camouflage design requirements set forth in Section 380.01; and
 - (4) that approval will not nullify the intent and purpose of the standards set forth herein to provide uniform construction requirements for the protection and safety of the general public.

- (b) Except for variances related to small wireless facilities and associated utility poles, for variances related to wireless facilities and associated poles proposed to address (i) a deficiency of coverage or capacity in communications services, (ii) a signal interference problem, or (iii) the need to densify a wireless service network, introduce new wireless services, or otherwise improve wireless services to the extent required by FCC Order No. 18-133 (adopted Sept. 27, 2018, eff. Jan. 14, 2019), 83 F.R. No. 199, at 51867, the applicant shall address with specificity the following additional criteria:
- (1) How the requested variance will address the deficiency, interference problem, or need in the targeted area;
 - (2) That the requested variance is the minimum necessary to address the deficiency, interference problem, or need in the targeted area, including a demonstration of alternative sites for collocation within 200 feet that would satisfy the specification and the reason each site was rejected (providing the documentation as required in Section 380.03); and
 - (3) That the variance will uphold the principles of competitive neutrality and nondiscrimination, as required by § 337.401, Fla. Stat., and the Federal Telecommunications Act of 1996, 47 U.S.C. § 253.
- (c) The Director's decision to grant or deny a variance application shall be based on the criteria set forth above.
- (1) If the Director determines that the variance should be granted, the Director shall prescribe any conditions that the Director deems necessary to protect, or deems desirable to further, the public interest.
 - (2) The Director's decision as to any such variance request shall be provided in writing to the applicant and shall identify the provisions under which the denial is based.
 - (3) The Director's decision to grant or deny a variance request shall be deemed final upon transmittal of the written decision to the applicant.
- (d) *Time for Review.*
- (1) *Variance as original application.* Except as provided herein for variances related to design standards for small wireless facilities, where an application for variance relating to wireless facilities, including associated appurtenances, is filed prior to any application for a permit for the facility, the variance application shall be processed under the same timeframes for review of initial applications for permits for wireless facilities, and if the variance is denied, the variance application may be

- resubmitted and shall be processed under the same timeframes for review of resubmitted permit applications.
- (2) *Variance as appeal or waiver.* Where a variance application concerns an application that has previously been submitted and resubmitted in accordance with section 370.18, then the Director shall issue a written decision within 45 days of the date the written request for variance is submitted.
 - (3) *Variance from design standards for small wireless facilities.*
 - (i) Where a variance application concerns any of the following design standards as applied to a small wireless facility, then the Director shall issue a written decision within 45 days of the date the written request for variance is submitted, regardless of whether it is submitted as an original application or as an appeal or waiver. This paragraph shall apply only to variances of the following provisions:
 - a. 375.04
 - b. 380.02(g)
 - c. 380.03(g)
 - d. 385.04(c)
 - (ii) It is provided, however, that if an application requests variances that are not enumerated in the above paragraph (i), then DTPW may separately address each variance request within the time for review that would otherwise apply had the requests been individually applied for.
 - (4) *Variances not related to wireless applications.* Variance applications that do not relate to wireless facilities shall be processed under the same timeframes for review of initial applications for wireless facilities, except that the Director may make reasonable extensions to those time frames with or without the applicant's consent.

370.18 **Form and Time for Review of Applications for Wireless Facility Permits:** In furtherance of the requirements of the Advanced Wireless Infrastructure Deployment Act, section 337.401(7), Fla. Stat., each application for a permit for a wireless facility, including any associated appurtenance and any new or replacement utility pole for the sole purpose of locating a wireless facility, shall be processed in accordance with this section.

- (a) *Form.* Applications shall be submitted on a form acceptable to the Director.

- (1) Applicants shall provide an email address at which DTPW may serve them with correspondence relating to each application.
 - (2) *Consolidated application for small wireless facilities.* In accordance with § 337.401(7)(d)10., Fla. Stat., an applicant seeking to permit small wireless facilities, including associated appurtenances but excluding new utility poles, may, at the applicant's discretion, file a consolidated application and receive a single permit for the collocation of up to 30 small wireless facilities. It is provided, however, that a consolidated application that is limited to an identified node or reasonably compact geographic area may include new or replacement utility poles.
 - (i) In conducting its review of a consolidated application, DTPW may separately address each proposed facility for completeness and final determination.
 - (ii) The time frames for review of each proposed facility shall be based on the submittal date of the consolidated application.
- (b) *Completeness review.* DTPW shall have 14 days after receiving an application to determine whether the application is complete.
- (1) DTPW shall serve its completeness determination to the email address provided by the applicant.
 - (2) If an application is deemed incomplete, DTPW shall specifically identify the missing information.
 - (3) If DTPW does not serve notice of incompleteness on the applicant within the 14-day period, the application shall be deemed complete.
- (c) *Request to modify proposed location of small wireless facility.* Within the 14-day completeness review period, (i) when an application involves a small wireless facility without a new utility pole, DTPW may request that the small wireless facility be moved to another location in the right-of-way and placed on an alternative existing County utility pole or support structure or on a new utility pole; or (ii) when an application involves a new utility pole for the purpose of installing a small wireless facility, DTPW may request that the pole be moved to another location in the right-of-way.
- (1) DTPW's request to modify the proposed location shall be served on the email address provided by the applicant.
 - (2) If the facility is part of a combined application, any facilities not subject to a request to modify the proposed location shall continue to be processed under the review timeframes set forth in this section. DTPW shall provide written notice of the

facilities in the combined application that will follow the standard review process.

- (3) For 30 days after service of DTPW's request, DTPW and the applicant may negotiate the alternative location, including any objective design standards and reasonable spacing requirements for appurtenances.
- (4) At the conclusion of the 30-day negotiation period, if the applicant accepts the alternative location, the applicant shall submit written notice to DTPW of its acceptance, and the application shall be deemed granted for any new location for which there is agreement and, where the negotiated facility is part of a combined application, for all other locations that DTPW did not provide written notice that they would be considered under the standard review process.
- (5) If an agreement is not reached within the 30-day negotiation period, the applicant shall submit written notice of nonagreement to DTPW.
- (6) If the applicant does not submit written notice of acceptance or nonagreement by the end of the 30-day negotiation period, the negotiation shall be deemed to have resulted in nonagreement.
- (7) During the negotiation period, review time frames under this section shall not be tolled.
- (8) In accordance with § 337.401(7)(d)4., Fla. Stat., if no agreement is reached, DTPW shall issue a final determination on the initial application within 90 days of the filing of the application, regardless of the time for completeness review, request to modify location, or the negotiation period. If the application is denied, the timeframes for resubmittals set forth in this section shall apply.

- (d) *Final determination.* In accordance with § 337.401(7)(d)8., Fla. Stat., DTPW shall have 60 days within which to approve, approve with conditions or modifications or both, consistent with applicable law, or deny a complete application.

- (1) The 60-day period shall commence from the date the application is received, not the date the application is deemed complete. Where an application has been deemed incomplete, the 60-day period shall re-commence when the application is resubmitted.
- (2) DTPW shall serve its final determination to the email address provided by the applicant.
- (3) If DTPW does not serve its final determination on the applicant within the 60-day period, the application shall be deemed approved.

- (4) If the application is denied, DTPW shall specify in writing the basis for denial, including the specific provisions on which the denial was based.
- (e) *Resubmittal of denied application.* If the application is denied, the applicant shall have 30 days from the date of service of the denial within which to cure the identified deficiencies and to resubmit the application.
 - (1) Review of a resubmitted application shall be limited to the deficiencies cited in the denial of the initial application.
 - (2) DTPW shall have 30 days from the date the applicant submits a revised application within which to approve, approve with conditions or modifications or both consistent with applicable law, or deny the revised application.
 - (3) If DTPW does not serve its determination on the applicant within the 30-day period, the application shall be deemed approved.
- (f) *Extensions.* The applicant and DTPW may mutually agree to extend the deadlines in this section.

Section 375

At-Grade Appurtenances

375.01 **Intent and Applicability:** It is the intent of this section to address all facilities located at grade that service underground utilities, overhead lines, or any other type of facility in the public rights-of-way. It is provided, however, that power meters, disconnects, or ancillary wireless communications equipment associated with a small wireless facility or other miscellaneous equipment that is attached to a utility pole shall be governed by Section 385, addressing pole attachments, and not this section.

375.02 **Appurtenance size restrictions:** No appurtenance placed in public rights-of-way or public utility easements shall exceed a volume of 60 cubic feet or a height of 72 inches.

375.03 **Appurtenance installation:**

- (a) Except as provided in this Manual for small wireless facilities, no at-grade appurtenance installations will be allowed in the public rights-of-way within 25 feet of an identified public utility easement abutting to the public right-of-way unless installation in the easement is prohibited by the terms of the easement or by law, in which case it may be installed in the public right-of-way in compliance with the terms of this Manual. The distance is to be measured using conduit length, as it would be installed along the public right-of-way or public utility easements.
- (b) An at-grade appurtenance in the public rights-of-way shall be mounted with its widest side parallel to the street.
- (c) All appurtenances shall be marked with the name of the utility company. The information shall be inconspicuous and no larger than one-inch lettering.
- (d) Appurtenances shall not display any advertising.
- (e) Unless approved by DTPW to better camouflage appurtenances, or where necessary to permit installation of a small wireless facility, or for safety reasons, which determination DTPW may make through the permit review process without need for a variance application, at-grade appurtenances shall not be placed in the right-of-way:
 - (1) within 15 feet of a fire hydrant;
 - (2) within 20 feet of a crosswalk;
 - (3) within 30 feet of the approach to a stop sign or traffic control signal box located at the side of the road;

- (4) in a place or manner which blocks an existing access to a property;
 - (5) within 75 feet of the center of the intersection of two streets;
 - (6) within 6 feet of a tree;
 - (7) within 30 feet of a bus stop;
 - (8) within 5 feet of the centerline above a drainage facility; or
 - (9) within 10 feet of any turn radius.
- (f) No new utility installation shall interfere with any other utility, including stormwater, sewer, water, gas, electric, or communications, that is pre-existing in the public rights-of-way.
 - (g) Appurtenances shall comply with Stopping Sight Distance and Sight Triangle requirements as defined in the Florida Green Book and FDOT Index 546, as may be amended from time to time.
 - (h) All appurtenances shall comply with the "Minimum Width of Clear Zone" standards as set forth in the Florida Green Book, as may be amended from time to time. DTPW may require guardrail, curb & gutter, or any other device if deemed necessary to protect the motoring public from a roadside hazard.
 - (i) Underground utility vaults shall be flush with the swale or sidewalk area. The cover shall be HS-20 loading and made of an anti-corrosive material.

375.04 Design Standards for Appurtenances:

- (a) Screening. DTPW may require the utility company to install and maintain, and may direct the design of, landscaping or mechanical screening around the appurtenance. Screening shall be appropriate to the climate and context of the surrounding area and shall be required of similarly situated appurtenances on an equivalent basis.
- (b) Appurtenances shall have graffiti-resistant paint or finishes.
- (c) Appurtenances shall not display any advertising.
- (d) An appurtenance associated with a utility pole for wireless facilities shall be a flat, non-reflective color that is similar to the predominant color of other appurtenances within 500 feet.

375.05 Utility Handholes, Manholes, Pull Boxes: Notwithstanding any other provisions of this Manual to the contrary, utility handholes, manholes, and

pull boxes shall not be considered appurtenances and shall only be subject to the following requirements.

- (a) All utility handholes, manholes and pull boxes located in the public rights-of-way shall be able to resist HS-20 loading. No handholes or pull boxes shall be allowed on the roadway surface.
- (b) No handhole, manhole or pull box shall be located within 10 feet of any turning radius.
- (c) All handholes, manholes, and pull boxes shall have the name of the utility company clearly marked on the lid. The information shall be inconspicuous and no larger than one-inch lettering.
- (d) Handholes, manholes, and pull boxes shall not display any advertising.
- (e) Unless approved by DTPW for better camouflage, or where necessary to permit installation of a small wireless facility, or for safety reasons, which determination DTPW may make through the permit review process without need for a variance application, handholes, manholes, and pull boxes shall not be placed in the right-of-way:
 - (1) within 75 feet of the center of the intersection of two streets;
or
 - (2) within 10 feet of any turn radius.

375.06 **Appurtenance installed with new pole:** Except as provided in this Manual for small wireless facilities, an appurtenance related to a new pole installed in a right-of-way for the sole purpose of locating a wired or wireless facility pursuant to sections 380.03 or 380.06 shall comply with the following:

- (a) No such appurtenance shall be placed in a right-of-way directly in front of a residence unless it is within 5 feet of the property corner and more than 15 feet from the front side edge of the structure.
- (b) Appurtenances in the right-of-way shall not interfere with any access points to a residential property and shall stay a minimum of 5 feet from driveways and existing gates.

375.07 **Appurtenance for Small Wireless Facility:**

- (a) Ground-mounted wireless equipment for a small wireless facility shall not be subject to the provisions of this Manual requiring

placement in a public utility easement (375.03(a)) or limiting the number of appurtenances that may be grouped together (375.03(c)).

- (b) To qualify for this exemption: the equipment shall be no more than 28 cubic feet in volume, excluding electric meters, concealment elements, telecommunications demarcation boxes, grounding equipment, power transfer switches, cutoff switches, and vertical cable runs for the connection of power and other services, and excluding the ground-based enclosure itself; and the antenna and other components of the small wireless facility must otherwise comply with the size limitations set forth in § 337.401(7)(b)10., Fla. Stat.
- (c) Pursuant to § 337.401(7)(o), (p), and (q), these provisions relating to small wireless facilities shall not apply in the following:
 - (1) A retirement community that:
 - (i) Is deed restricted as housing for older persons as defined in § 760.29(4)(b), Fla. Stat.;
 - (ii) Has more than 5,000 residents; and
 - (iii) Has underground utilities for electric transmission or distribution.
 - (2) Within a municipality that:
 - (i) Is located on a coastal barrier island as defined in § 161.053(1)(b)3, Fla. Stat.;
 - (ii) Has a land area of less than 5 square miles;
 - (iii) Has fewer than 10,000 residents; and
 - (iv) Has, before July 1, 2017, received referendum approval to issue debt to finance municipal-wide undergrounding of its utilities for electric transmission or distribution.
 - (3) In a location subject to covenants, conditions, restrictions, articles of incorporation, and bylaws of a homeowners' association; it is provided, however, that the provisions relating to small wireless facilities shall apply to the installation, placement, maintenance, or replacement of micro wireless facilities on any existing and duly authorized aerial communications facilities.

Section 380

Utility Poles

- 380.01** **Intent and Applicability:** It is the intent of this section to address all utility pole installations in the public rights of way, and to prohibit towers, masts, and other wireless support structures or vertical installations that have a lattice, A-Frame, H-Frame, or other open, web-type structure.
- 380.02** **General Standards for Utility Poles:** Utility poles installed in the right-of-way shall conform to the following standards. Unless specifically indicated, these standards shall apply to utilities poles used to support a small wireless facility.
- (a) Utility poles shall be enclosed, with no lattice, A-Frame, web, or other type of open construction.
 - (b) Utility poles shall be installed so as to not obstruct, damage, destroy, or interfere in any way with the functioning of any drain or drainage system. No pole shall be installed within the drain field of a drainage system.
 - (c) Utility poles shall comply with the "Minimum Width of Clear Zone" standards set forth in the Florida Green Book, as may be amended from time to time.
 - (d) Any utility pole greater than 18 inches in width shall comply with Stopping Sight Distance and Sight Triangle requirements as defined in the Florida Green Book and FDOT Index 546, as may be amended from time to time.
 - (e) Utility poles shall be installed and located so as to cause minimum interference with the rights, safety, and access of property owners who join on any road.
 - (d) Utility poles shall at all times be kept and maintained in a safe, adequate, and substantial condition and in good order and repair.
 - (e) Utility poles should be placed at the right-of-way line whenever possible or in horizontal line with the nearest existing poles.
 - (f) Utility poles for locating wireless facilities shall not be permitted where the pole would interfere with other at-grade or aerial facilities within 50 feet of the location where it is proposed for installation.

- (g) Design standards for wireless facilities. Utility poles installed for locating wireless facilities shall minimize the visual impact of above-ground facilities and shall blend into the surrounding environment and aesthetics. For example, poles may be designed to look like light poles, banner poles, or other elements already in the surrounding public rights-of-way.
 - (1) All equipment associated with a wireless facility shall be a flat, non-reflective color that is similar to the associated pole.
 - (2) A new utility pole used to support a small wireless facility must be of substantially similar design, material, and color as the predominant utility pole type within 500 feet of the proposed location of the new utility pole within the same ROW.

380.03

Installation of new utility pole for the sole purpose of locating wireless facilities. Except for utility poles used to support a small wireless facility or as otherwise provided herein, wireless facilities shall be installed on existing utility poles.

- (a) New utility pole installation: In areas where no other utility pole is available for collocating wireless facilities, a new utility pole may be installed in accordance with the criteria set forth herein.
- (b) Denial of collocation for wireless facilities, other than small wireless facilities:
 - (1) No utility pole for the purpose of mounting a wireless facility shall be allowed if any other utility pole is available within a radius of 200 feet of the proposed installation; it is provided, however, that, because § 337.401(3)(a), Fla. Stat. prohibits a request for “an inventory of communications facilities, maps, [or] locations of such facilities,” this survey of available utility poles need not include utility poles for communications facilities.
 - (2) No new utility pole for the purpose of locating a wireless facility will be allowed within 500 feet of an existing utility pole that was installed for the purpose of locating a wireless facility.
 - (3) The applicant shall submit the following information to DTPW:
 - (i) an inventory of all existing utility poles, including street light poles, located within the above-referenced radius; and either
 - (ii) formal documentation from the utility company that is denying the collocation detailing the reasons for each location within the above-referenced radius; or
 - (iii) an affidavit from the applicant, in a form acceptable to DTPW, that the applicant has requested collocation from the utility company responsible for the existing

utility pole and has not received a response within 14 days.

- (4) Based on this documentation, DTPW shall determine whether other utility poles are available for collocation within the relevant area.

- (c) Permitted Rights-of-ways: Except for utility poles used to support a small wireless facility, new utility poles for the purpose of installing wireless facilities shall only be permitted in rights-of-way as follows:

- (1) Section Line, Half-Section Line, arterial, and collector roadways: in any zoning district.
- (2) Rights-of-ways 70 feet or greater in width: only within the following Approved Zoning Districts:

BU-1	Neighborhood Business District
BU-1A	Limited Business District
BU-2	Special Business District
BU-3	Liberal Business District
IU-1	Industrial, Light Manufacturing District
IU-2	Industrial, Heavy Manufacturing District
IU-3	Industrial, Unlimited Manufacturing District
IU-C	Industrial District, Conditional
AU	Agricultural District
GP	Government Property
OPD	Office Park District
OTHER	Any other mixed-use or non-residential zoning district or property that is developed with a non-residential use, regardless of zoning district, as determined by the RER Director or designee.

- (d) Maximum height of antennae or other equipment installed on a pole shall comply with section 385.

- (e) A new pole installed in a right-of-way for the sole purpose of locating a wireless facility pursuant to section 380.03 shall comply with the following:

- (1) No such utility pole shall be placed in a right-of-way directly in front of a residence unless it is within 5 feet of the property corner and more than 15 feet from the front side edge of the structure.
- (2) Utility poles in the right-of-way shall not interfere with any access points to a residential property and shall stay a minimum of 5 feet from driveways and existing gates.

- (f) The following shall not be allowed on utility poles or associated equipment permitted pursuant to this subsection:
 - (1) Advertising;
 - (2) Signs, except for traffic signs deemed necessary by the Director and signs required by applicable law; and
 - (3) Signals, lights, or illumination, unless required by applicable law.
- (g) If the applicant and DTPW mutually agree to a new utility pole being designed to accommodate the installation of additional equipment to enhance public safety or provide other public benefit, including installation of high-definition cameras or traffic sensors, then, notwithstanding any other provision of this Manual to the contrary, the Director or designee may grant variances of the provisions of this Manual to allow installation of such additional equipment for the public, including approving an increase in pole height.

380.04 **Utility poles for the sole purpose of leasing to future providers:** Except as provided in this Manual for small wireless facilities, no utility pole for the sole purpose of mounting a wireless facility shall be allowed in the public rights-of-way unless the application identifies the wireless services provider who will be installing a wireless facility on the utility pole.

380.05 **Collocation:** Notwithstanding any other provision of this Manual to the contrary, DTPW may grant variances of the provisions of Sections 375, 380, or 385 to allow collocation of additional wireless facilities on an existing utility pole, including approving an increase in pole height or allowing the existing pole to be relocated.

380.06 **Wired communications facilities:** Wired communications facilities shall generally be installed underground or collocated on existing utility poles. Utility poles for the purpose of installing wired communication facilities may only be installed in the public right-of-way under the same terms as utility poles for wireless facilities, except that:

- (a) Existing utility poles may be replaced because of damage or to harden the facilities; and
- (b) New utility poles may be added between existing utility poles for safety purposes, or to provide for collocation of other communication facilities such as wireless facilities, in accordance with this Manual.

380.07 Equipment to be installed inside utility poles:

- (a) Except on wooden or concrete poles that cannot accommodate such installations, all conduits, cables, wires, and lines shall be installed inside of the utility pole.
- (b) For collocations on existing utility poles, where the law or the pole owner do not permit installation inside the pole, DTPW shall permit surface mounting of conduits, cables, wires, and lines, subject to reasonable conditions.

380.08 New Utility Pole for Small Wireless Facility: Pursuant to § 337.401(7)(d) and (j), Fla. Stat., installation of a new utility pole for the sole purpose of supporting a small wireless facility shall be exempt from sections 380.03, 380.04, and 380.05 of this section but shall be subject to the following:

- (a) *Height limitation.* Pursuant to § 337.401(7)(d)5., Fla. Stat., unless the Director determines that a greater height is appropriate, the height for a new utility pole for installation of a small wireless facility is limited to the tallest existing utility pole as of July 1, 2017, located in the same right-of-way, other than a utility pole for which a waiver has previously been granted, measured from grade in place within 500 feet of the proposed location of the small wireless facility. If there is no utility pole within 500 feet, the height of the utility pole shall be limited to 50 feet. These height limitations shall apply to a replacement pole for a small wireless facility but shall not apply to installation of a pole-mounted small wireless facility on an existing pole, which shall be governed by section 385.
- (b) Pursuant to § 337.401(7)(j), Fla. Stat., an applicant may apply to install a new utility pole for the sole purpose of mounting a small wireless facility without identifying the wireless services provider at the time of application, provided that the application includes an attestation that, within 9 months of the application being approved, a small wireless facility will be mounted on the utility pole or structure and will be used by a wireless services provider to provide service.
- (c) Pursuant to § 337.401(7)(o), (p), and (q), the exemptions and other provisions relating to small wireless facilities shall not apply in the following:
 - (1) A retirement community that:
 - (i) Is deed restricted as housing for older persons as defined in § 760.29(4)(b), Fla. Stat.;
 - (ii) Has more than 5,000 residents; and
 - (iii) Has underground utilities for electric transmission or distribution.

- (2) Within a municipality that:
 - (iv) Is located on a coastal barrier island as defined in § 161.053(1)(b)3, Fla. Stat.;
 - (v) Has a land area of less than 5 square miles;
 - (vi) Has fewer than 10,000 residents; and
 - (vii) Has, before July 1, 2017, received referendum approval to issue debt to finance municipal-wide undergrounding of its utilities for electric transmission or distribution.
 - (3) In a location subject to covenants, conditions, restrictions, articles of incorporation, and bylaws of a homeowners' association; it is provided, however, that the provisions relating to small wireless facilities shall apply to the installation, placement, maintenance, or replacement of micro wireless facilities on any existing and duly authorized aerial communications facilities.
- (d) Pursuant to § 337.401(7)(d)3.i and (7)(i), Fla. Stat., and notwithstanding any other provisions of this Manual to the contrary, the following shall apply in an area where the County, at least 90 days prior to the submission of an application for a small wireless facility, has required all public utility lines in the rights-of-way to be placed underground:
- (1) Small wireless facilities shall be collocated on a structure that is allowed to remain above ground and is reasonably available. The above-ground structure may be replaced to accommodate the collocation of the small wireless facility.
 - (2) A new utility pole for a small wireless facility may only be installed where the provider demonstrates that no other structure in the area is reasonably available for collocation or the provider is not reasonably able to provide wireless service from any structure that is reasonably available for collocation.
 - (i) To demonstrate that collocation is not reasonably available, the applicant shall submit the following information to DTPW:
 - a. an inventory of all utility poles identified by the County as authorized to remain above ground, if any, , including street light poles, located within the area; and either
 - b. formal documentation from the utility company that is denying the collocation detailing the reasons for each location within the above-referenced radius; or
 - c. an affidavit from the applicant, in a form acceptable to DTPW, that the applicant has requested collocation from the utility company

responsible for the existing utility pole and has not received a decision within 14 days.

- (ii) To demonstrate that the provider is not reasonably able to provide wireless service, the applicant shall submit to DTPW supporting materials addressing the technical information and additional criteria set forth in section 370.17(a) and (b).

Section 385

Antennas & Small Wireless Facility Appurtenances Attached to a Pole

385.01 **Intent and Applicability:** It is the intent of this section to address all antennas and other wireless facilities, including small and micro wireless facilities, that are mounted on a utility pole.

385.02 **Maximum height restrictions:**

- (a) Except as provided in this section for small wireless facilities, the top of the uppermost antenna array shall not exceed the following heights based on the referenced right-of-way.
 - (i) Section-line roadways and arterials: The top of the uppermost antenna array shall not exceed 75 feet in height as measured from grade.
 - (ii) Half-section-line roadways, collectors, and other roadways: The top of the uppermost antenna array shall not exceed 55 feet in height as measured from grade.
- (b) Small wireless facility: Notwithstanding any other provisions of this Manual to the contrary, the maximum height of a small wireless facility shall be 10 feet above the utility pole or structure upon which the small wireless facility is to be installed and shall not be based on the height of the pole as measured from grade. The height of a new pole installed for the purpose of locating a small wireless facility shall be governed by section 380.08.

385.03 **Antenna Arrays:** Antenna arrays shall comply with the following:

- (a) Cylinder-type arrays:
 - (1) No more than four cylinder-type antenna arrays shall be allowed on each utility pole.
 - (2) Antennas shall be limited to two levels of concealed antenna arrays, up to a maximum of 10 feet per array, with a cumulative height for both array levels of no more than 20 feet.
 - (3) Antennas shall be concealed in a cylinder to provide screening and shall match in color the existing surface of the utility pole. The screen shall not exceed 1.5 times the diameter at the top of the utility pole on which the antenna is mounted.

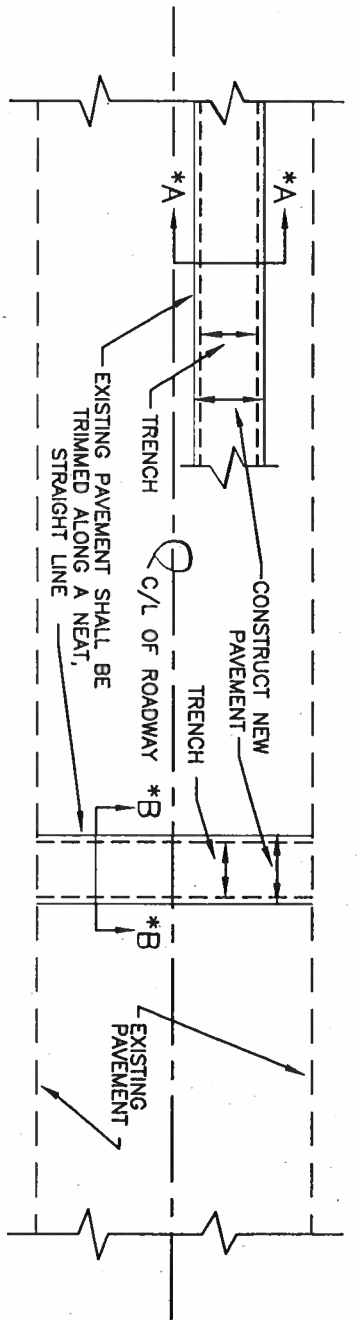
- (b) Omni-directional whip antennas:
 - (1) No more than three omni-directional whip antennas shall be co-located on a utility pole.
 - (2) Each whip antenna shall be mounted no higher than 5 feet below the top of the pole and shall not extend more than 24 inches away from the pole.
 - (3) Whip antennas mounted in the Communications Space of a utility pole shall not extend more than 48 inches from the pole.
- (c) Square-panel-type antennas:
 - (1) No more than three square-panel-type antennas shall be co-located on a utility pole.
 - (2) Square-panel-type antennas shall not exceed 6 square feet in area and 8 inches in depth and shall not extend more than 24 inches away from the pole.
 - (3) Square-panel-type antennas mounted in the Communications Space of a utility pole shall not extend more than 48 inches from the pole.
- (d) Antenna associated with small wireless facility: Notwithstanding any other provisions in this section, antenna arrays associated with small wireless facilities as defined in this Manual may be installed on any utility pole and shall not be subject to the requirements of (a), (b), or (c) above. Each antenna associated with a small wireless facility shall be located inside an enclosure of no more than 6 cubic feet in volume, or in the case of antennas that have exposed elements, each antenna and all of its exposed elements could fit within an enclosure of no more than 6 cubic feet in volume.
- (e) Each type of antenna authorized pursuant to this section may be mounted on a single utility pole in combination with any other authorized type of antenna.
- (f) Limitations:
 - (1) Antennas for amateur radio stations and satellite dish antennas shall be prohibited in the public rights-of-way.
 - (2) No other antennas, transponders, repeaters, dishes, grid type dishes or any other type of antenna transmitting or receiving device shall be allowed in the public rights-of-way unless approved by the County Engineer or designee.

385.04**Small wireless facility appurtenance attached to pole**

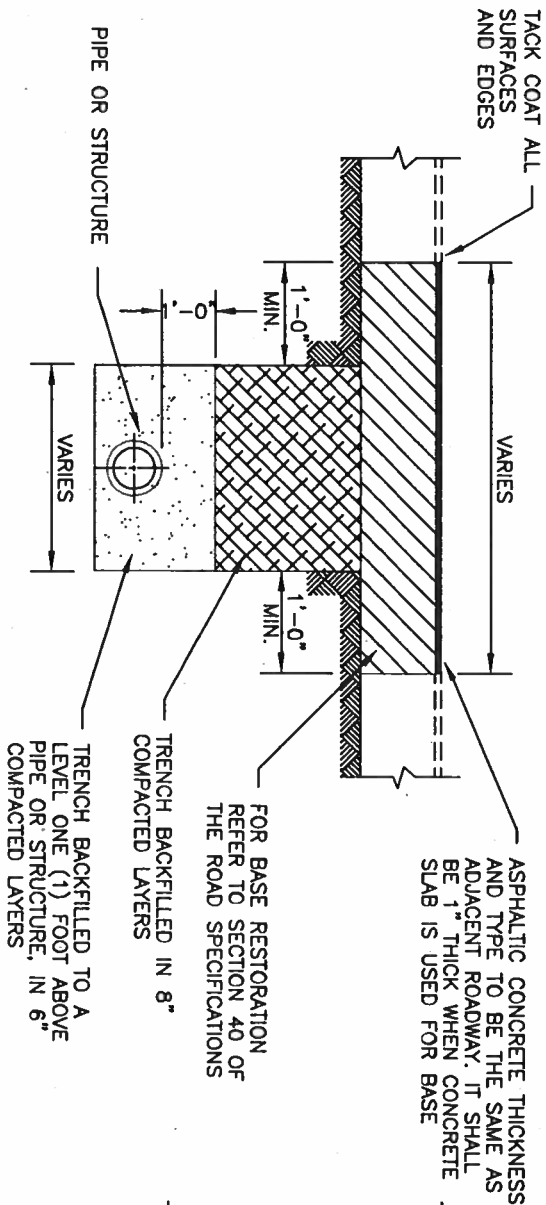
- (a) Other equipment associated with a small wireless facility may be attached to a utility pole, provided that the equipment is no more than 28 cubic feet in volume ("SWF Pole Attachment"). The following shall not be included in the calculation of attachment volume: antennas, which are governed by Section 385.03; electric meters; concealment elements; telecommunications demarcation boxes; grounding equipment; power transfer switches; cutoff switches; vertical cable runs for the connection of power and other services; and utility poles or other wireless support structures.
- (b) SWF Pole Attachments shall be marked with the name of the utility company. The information shall be inconspicuous and no larger than one-inch lettering.
- (c) Design standards.
 - (1) SWF Pole Attachments shall have graffiti-resistant paint or finishes.
 - (2) SWF Pole Attachments shall not display any advertising.
 - (3) SWF Pole Attachments shall be a flat, non-reflective color that is similar to the associated pole.



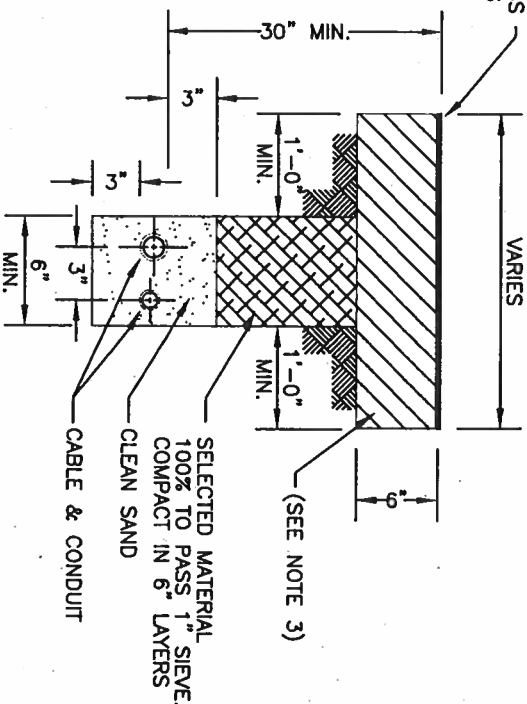
Directors Approval



PLAN



SECTION A-A & B-B



DIRECT BURIAL

CABLE OR CONDUIT

- NOTES:**
- 1.- PAVEMENT RESTORATION FOR LONGITUDINAL CUTS SHALL INCLUDE FULL LANE WIDTH RESURFACING FOR EACH LANE WITHIN WHICH THE CUT EXTENDS.
 - 2.- IN SOME CASES IT WILL BE NECESSARY TO OVERLAY MORE THAN ONE (1) LANE WITH ASPHALTIC CONCRETE TO SATISFY PAVEMENT SLOPE.
 - 3.- SAND-CEMENT MIX.

PVMT. RESTORATION		SEC 40
UTILITY PLACEMENT	G-21	SEC 133
ASPHALTIC CONCRETE		SEC 51
BASE COURSE		
ITEM	CROSS REF.	SPEC. REF.

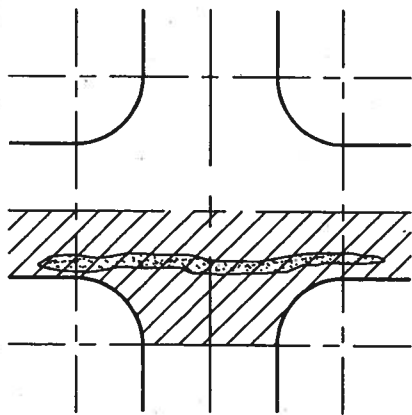
METROPOLITAN
DADE COUNTY
PUBLIC WORKS
DEPARTMENT

APPROVED
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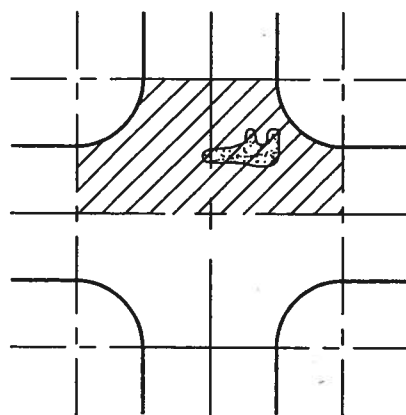
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6/4/86

STANDARD ROAD DETAIL
PAVEMENT RESTORATION FOR
TRENCHES CUT IN PUBLIC
RIGHTS-OF-WAY

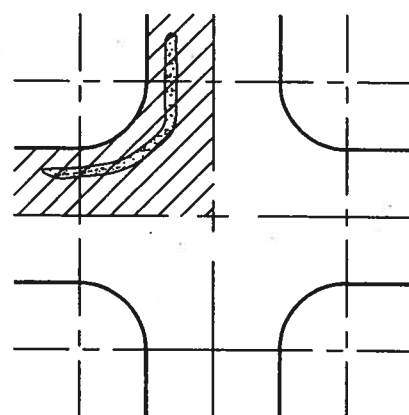
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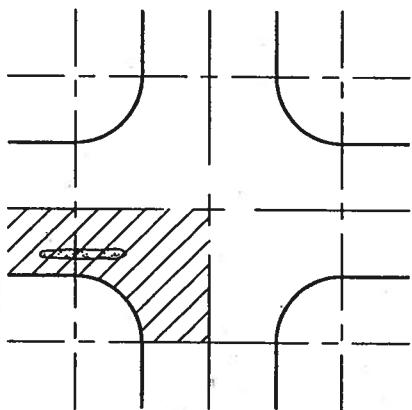
CASE 1



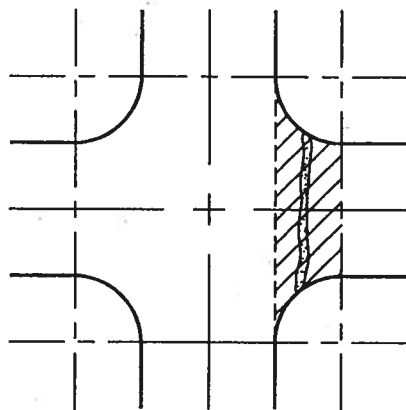
CASE 2



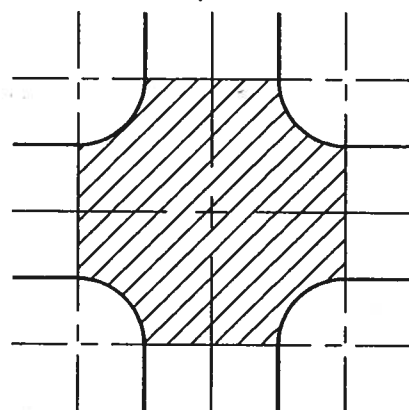
CASE 3



CASE 4



CASE 5



SIGNALIZED INTERSECTIONS

NOTES:

- 1.—PLEASE NOTE THAT FOR CASES 1–5 NOTED ABOVE, FULL INTERSECTION OVERLAY WILL BE REQUIRED FOR ALL SIGNALIZED INTERSECTIONS WITHOUT EXCEPTIONS.
- 2.—RESTORE ALL PAVEMENT MARKINGS AS PER DADE COUNTY PUBLIC WORKS STANDARD.
- 3.—ANY VARIATION OF THE LIMITS OF PAVEMENT OVERLAYS SHOWN ABOVE, MUST BE APPROVED PRIOR TO REPLACEMENT BY DADE COUNTY PUBLIC WORKS DEPARTMENT
- 4.—ANY DAMAGE ENTERING AN ADJACENT INTERSECTION QUADRANT WILL REQUIRE THE REPAIR OF SAID QUADRANT

LEGEND:

- RIGHT OF WAY LINE
- ▨ LIMITS OF PAVEMENT.

SEC. 133					SPEC. REF.
ASPHALTIC CONCRETE					CROSS REF.
					ITEM

MIAMI-DADE
COUNTY
PUBLIC WORKS
DEPARTMENT

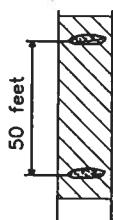
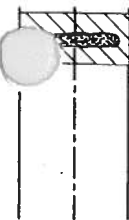
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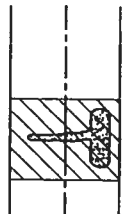
STANDARD ROAD DETAIL
PAVEMENT RESTORATION
FOR
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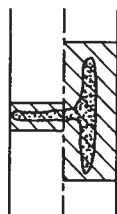
SHEET 2 OF 3



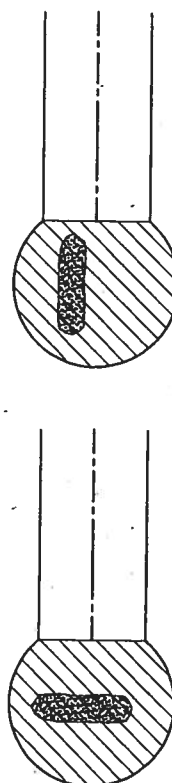
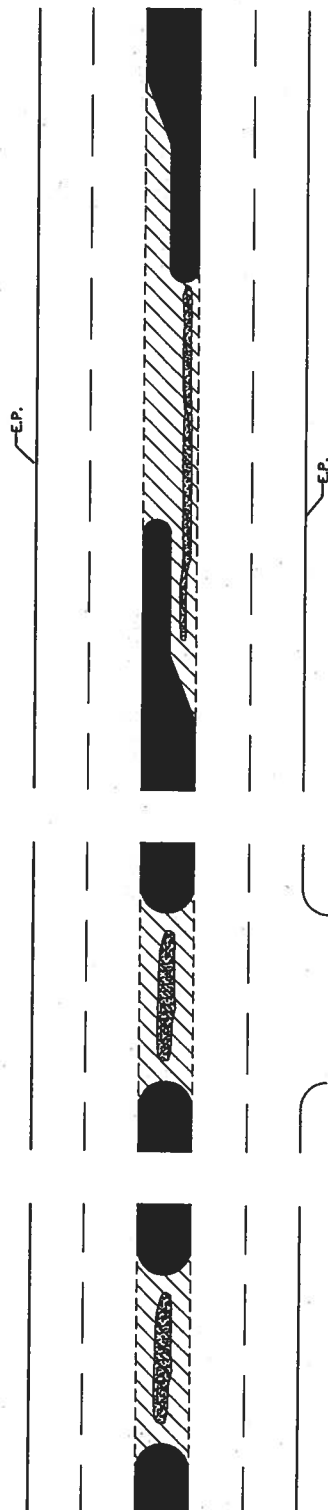
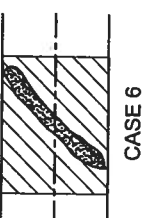
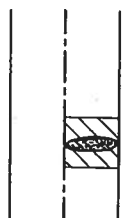
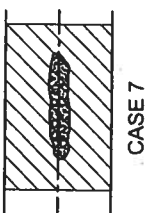
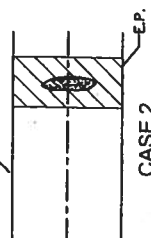
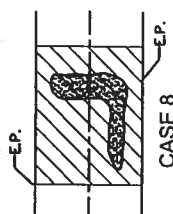
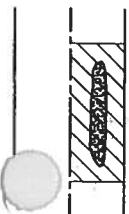
If $< 50'$



If $< 50'$ from CL
of perpendicular cut



If > 50' from CL
of perpendicular cut



NOTES:

1. ALL DAMAGED TRAFFIC LOOPS SHALL BE PROPERLY REPAIRED IN ACCORDANCE WITH CURRENT MIAMI-DADE COUNTY PUBLIC WORKS STANDARDS.
2. ALL PAVEMENT MARKING SHALL BE REPLACED IN ACCORDANCE WITH CURRENT MIAMI-DADE COUNTY PUBLIC WORKS STANDARDS.
3. ANY VARIATION TO THE LIMITS OF MILLING OR PAVEMENT OVERLAYS SHOWN ABOVE, MUST BE APPROVED PRIOR TO RESTORATION BY MIAMI-DADE COUNTY PUBLIC WORKS DEPARTMENT.
4. PAVEMENT CUTS WITHIN FIFTY (50) FEET OF EACH OTHER SHALL BE RESTORED UNDER THE SAME PATCH.

LEGEND:

RIGHT OF WAY LINE

LIMITS OF PAVEMENT.

ITEM	CROSS REF.	SPEC. REF.
ASPHALTIC CONCRETE		SEC. 133

MIAMI-DADE
COUNTY

PUBLIC WORKS
DEPARTMENT

APPROVED
5/20/2009

REVISÉD

STANDARD ROAD DETAIL PAVEMENT RESTORATION FOR TRENCH CUTS

R
21.1

SHEET 3 OF 3

