This document was promulgated at an annual cost of $18.67 per copy to provide standards and criteria for the design, construction and maintenance of highway transportation facilities by governmental agencies, consultants, contractors and the citizens of the State of Florida.
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<td>Map for seeding zones and detail for sodding pattern added. Shoulder reworking limits and shoulder build-up limits better defined.</td>
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<td>201</td>
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<td>Detail for 'Temporary Drains For Subgrade And Base' added. Flow channel subheading deleted.</td>
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<td>General Note No. 1 revised and No. 5 added. 'Temporary Drains For Subgrade And Base' detail deleted.</td>
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<td>New sheets identifying change for thin wall and slab precasting (4-grate Type H option added).</td>
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<tr>
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<td>'Structural Review' notations modified.</td>
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<td>Bottom slab reinforcing steel realigned. Section BB labeled.</td>
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<td>Bottom slab reinforcing steel realigned.</td>
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<td>Spacing changed in bottom slab reinforcing steel. Wall steel realigned.</td>
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<td>Bottom slab reinforcing steel realigned.</td>
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<td>Bottom slab and wall reinforcing steel realigned.</td>
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<td>Case I identification added.</td>
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<td>New sheet (Top conversion on existing structures 'Cases II &amp; III'. Notes for Cases I, II &amp; III).</td>
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<td>Spacing dimensions added to bottom slab reinforcing steel; wall steel realigned in Inlet Type F. Spacing revised in bottom slab reinforcing steel; wall steel realigned in Inlet Type G.</td>
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<td>Headwall clearance dimension added.</td>
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<td>New sheet added (Tables for 5 1/2&quot; concrete slabs).</td>
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<td>Class I concrete notations added. Perforated steel plate added to 'Guard At Pipe Ends' detail.</td>
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<td>Railroad name change. 'Method For Setting Limits Of Variable Front Slopes At Drainage Structures' drawings improved.</td>
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<td>Pay item changed for 'Shallow Ditches' detail.</td>
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<td>Filter fabric envelope notations changed or added and weep hole notation added. General Notes Nos. 1 and 2 revised.</td>
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<td>Filter fabric envelope notation added to Type II underdrain. General Note No. 6 expanded.</td>
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<td>New sheet (Draincrete; underdrain).</td>
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<td>Replots with drawing improvements. Sketches 'A' and General Notes deleted.</td>
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<td>New sheet (Culvert skew; independent headwall and wingwall skew options; miscellaneous details; and, General Notes).</td>
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<td>Rural crossovers under 'Median Stabilizing Details' revised. Subheading under 'Removal of Plastic Material' details and 'Removal and Disposal of Plastic Materials' expanded.</td>
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<td>'Design Superelevation Rates' table expanded and General Notes Nos. 1 and 2 deleted.</td>
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<td>Notation under superelevation table revised.</td>
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<td>All weak mixes deleted. All multiple listings of Type S-III deleted. Pavement thicker than 6&quot; deleted. General Notes No. 4 added.</td>
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<td>Embedment details and Note No. 2 for 'Concrete Steps' detail revised.</td>
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<td>Z-length added to 'Detail A'. Mainline-ramp pavement thickness transition detail added. 'Single-lane ramps' designation added to sheet.</td>
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<td>Ramp-mainline pavement thickness transition detail added. General Notes Nos. 1, 2 and 3 revised. 'Single-lane Ramps' designation added to sheet.</td>
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<td>New sheet (Two-lane ramps).</td>
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<td>Acceleration and deceleration lane designations added. Shoulder transitions added to ramps. 'Expressway Ramp Terminals' designation added to sheet.</td>
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<td>Notations updated to 1984 AASHTO (Green). Detail grouped under identifying subheadings.</td>
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<td>Note No. 3 revised. Typographical corrections made to sections for Types H &amp; G-Mod.</td>
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<td>Notation added to 'Shoulder Gutter' and dimension added to 'Concrete Bumper Guard'.</td>
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<td>Keyways in lieu of dowels added to separators Types I and IV, Options II.</td>
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<td>Comprehensive revisions for ramp locations.</td>
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<td>New sheets (Allowable and prohibited ramp locations).</td>
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<td>Redrawn. 'Concrete-Asphalt Shoulder Joints' detail added.</td>
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<td>Wires added to 'Florida Steel Corporation' dowel assembly.</td>
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<td>ΔNotation added to 'Plan'.</td>
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<td>Method for determining 'Length of Advancement' (Figure 1) revised. General Notes Nos. 13, 14 and 15 added.</td>
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<td>Typographical correction.</td>
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<td>References to General Note updated.</td>
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<td>Transverse barrier added between median wingposts on dual bridges.</td>
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<tr>
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<td>Transverse barriers added between median wingposts on dual bridges. Note for median deck closure added.</td>
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<td>Existing bridge anchorage details deleted. Steel back-up plate for 'Special End Shoe' bolts added.</td>
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<td>Light pole foundation deepened.</td>
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<td>Drawing proportion improved.</td>
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<td>Data related to length of barrier, length of need, and, runout length either deleted or revised.</td>
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<td>Method for determining 'Length Of Advancements' revised.</td>
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<td>'Wall Ties And Anchorage' notation revised.</td>
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<td>General Notes Nos. 5 thru 14 either renumbered, revised or added (due to redefinition of combinations of optional materials).</td>
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<tr>
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<td>General Notes Nos. 5 thru 11 either renumbered, revised or added (due to redefinition of combinations of optional materials). Notation added to 'Barb Wire Attachment' detail.</td>
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- I01 Trash Retainer And Sediment Basins
- I02 Raised Hug Or Straw Barriers And Silt Fences (3 Sheets)
- I03 Turbidity Barriers
- I04 Erosion Control For Permanent Construction
- I05 Shoulder Sodding And Reworking Of Existing Facilities

### DRAINAGE

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- 201 Supplementary Details For Manholes And Inlets (5 Sheets)
- 205 Cover Height (4 Sheets)
- 209 Curb Inlet And Gutter Inlet Selection Guide
- 210 Curb Inlet Tops - Types 1, 2, 3, And 4
- 211 Curb Inlet Tops - Types 5 And 6 (2 Sheets)
- 212 Curb Inlet - Type 7
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- 255 Straight Concrete Endwall - Single 64° Concrete Pipe
- 258 Straight Sand-Cement Endwalls
- 260 U-Type Concrete Endwalls With Grates -15" To 30" Pipe
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**UNITS OF MEASURE**

**STANDARD ABBREVIATIONS**
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<td>Vehicle Detector (Loop)</td>
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<td>Walk - Don't Walk</td>
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<tr>
<td>Flash</td>
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<td>Signal Face Number</td>
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<td>Item Number</td>
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<td>Programmed Signal Head</td>
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State of Florida Department of Transportation Road Design

Standard Symbols

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<td>Stop Bar</td>
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<td>Traffic Flow Arrow</td>
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Approved By: [Signature]

Date: 7/7/93

Source: [Signature]

Scale: 1:200

Drawn By: [Signature]

F.E.W.S. Approved: 7/7/93
CHART I
RECOMMENDED SPACING FOR TYPE I AND TYPE II HAY BALE BARRIERS, TYPE III AND TYPE IV SILT FENCES AND PAVED DITCH HAY BALE BARRIERS

FLOW RATES (CFS)

- Very Light: < 5
- Light: > 5 ≤ 10
- Moderate: > 10 ≤ 15
- Heavy: > 15 ≤ 25
- Very Heavy: > 25 ≤ 40

LEGEND

SOILS

- Cohesive
- Non-Cohesive
- Fine Loam
- Fine Sand
- Clay Loam
- Clayey Loam
- Sands
- Gravels
- Sandy Loam
- Silt Loam

NOTE: Spacings shown in this chart are based on generalized conditions and should be adjusted based on actual site performance or hydraulic computations.

Spacing (in Feet)

50 100 150 200 250 300 350 400

Stage (in Feet)

1 2 3 4 5 6 7

STATE OF HAWAII DEPARTMENT OF TRANSPORTATION
HIGHWAY DESIGN

BALED HAY OR STRAW BARRIERS
AND SILT FENCES

PREPARED BY: K.T. LEIK
CHECKED BY: D. DOHERTY
APPROVED BY: R. CAVALLI

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SILT FENCE APPLICATIONS

Do not display in a manner that silt fences will act as a drain across permanent paving surfaces. Silts fences are to be used at critical locations and turbulence barriers used in permanent bodies of water.

Type III or Type IV Silt Fences

Note: Silt fences are to be installed in accordance with Chart 2, Sheet 1 of 3 and must extend to the drain structures Sheet 3 of 3.
FLOATING TURBIDITY BARRIERS

STAKED TURBIDITY BARRIER

LEGEND
- Pile Launching
- Side Wall Or Flood Area
- Mooring Buoys/anchor
- Anchor
- Barrier Movement Due To Current Action

- Shore Line
- Limits Of Current
- Limits Of Flood
- Structure Alignment
- Current
- Type Of Support

TURBIDITY BARRIER APPLICATIONS

Note: Turbidity barriers are to be used in all permanent bodies of water regardless of water depth.

1. Turbidity barriers are to be used in all permanent bodies of water regardless of water depth.
2. Number and spacing of barriers depend on current velocities.
3. Deployment and maintenance of barriers may vary depending on construction operations.
4. Operating costs may vary depending on conditions and needs at the site.
5. Turbidity barriers may be used for floating or stacked types or any combination of these types that are suitable for the conditions.

Type I Floating Turbidity Barrier uses anchors as shown, however, if conditions warrant, Type II Floating Turbidity Barrier may be used. For additional information see Standard Specifications.

TURBIDITY BARRIERS

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION
Highway Design

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**EYE BOLT AND CHAIN REQUIREMENTS**

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**EYE BOLT AND CHAIN FOR LOCKING GRATES TO INLETS**

- Jam Nut Or Spot Weld With Single Nut & Washer For Standard Structures.
- Jam Nut With Slugs Nut & Washer For Alternate 4 Structures.

**SUMP BOTTOM**

- Note: Sump bottom is specific to all manholes and inlet types. Cost for sump bottom is included in the contract unit price for inlet or manhole.

**LADDER BARS FOR STRUCTURES OVER 10' IN DEPTH**

- Standard Bar: 4" O.D. Plain Bar or Approved Alternate.
- Optional Bar Types: 4" O.D. Plain Bar or Approved Alternate.

**CHANNELIZATION**

- Channelized required for all drainage structures with two or more pipes.

**ALTERNATE LOCATION OF PIPE IN STRUCTURE WHEN PREFABRICATED FLOOR SLAB IS USED**

- Smooth flow channels composed of concrete or brick and mortar shall be constructed in the bottoms of all structures to a depth equal to half the diameter of the largest pipe.
### Rigid Pavement

**Minimum Cover**
- Concrete: All Round & Elliptical: 6".
- Corrugated Steel: 15" - 24" Round: 12".
- Corrugated Aluminum: 15" - 24" Round: 12".
- Corrugated Polyethylene: 15" - 24" Round: 12".

### Flexible Pavement

**Minimum Cover**
- Concrete: All Round & Elliptical: 6".
- Corrugated Steel: 15" - 24" Round: 12".
- Corrugated Aluminum: 15" - 24" Round: 12".
- Corrugated Polyethylene: 15" - 24" Round: 12".

### Unpaved W/O Select Bedding

**Minimum Cover**
- Concrete: All Round & Elliptical: 15".
- Corrugated Steel: 15" - 24" Round: 24".
- Corrugated Aluminum: 15" - 24" Round: 24".
- Corrugated Polyethylene: 15" - 24" Round: 24".

### Unpaved With Select Bedding

**Minimum Cover**
- Concrete: All Round & Elliptical: 15".
- Corrugated Steel: 15" - 24" Round: 18".
- Corrugated Aluminum: 15" - 24" Round: 18".
- Corrugated Polyethylene: 15" - 24" Round: 18".

### General Notes
1. The tabulated values are recommended minimum dimensions to withstand anticipated highway traffic loads. Additional cover may be required to support construction equipment loads or highway traffic loads before pavement is completed.
2. Less than the tabulated cover may be used provided suitable methods are detailed in the plans. These features may include but are not limited to extra strength plate, select bedding, select backfill, encasement and etc.
3. Values shown in parentheses are for 3" x 1" corrugations which must be specified to utilize the lesser cover.
4. Commercial and noncommercial refers to typical vehicular utilization of unpaved roads and drives where cutting and cover displacement may occur.

**Minimum Cover for Concrete, Steel, Aluminum and Polyethylene Pipe**

**Cover Height**
- Corrugated Steel: 18".
- Corrugated Aluminum: 24".
- Corrugated Polyethylene: 18".
### ROUND PIPE INSTALLATIONS

<table>
<thead>
<tr>
<th>Equiv. Dia. (In.)</th>
<th>Area (Sq. Ft.)</th>
<th>Wall Thickness (In.)</th>
<th>Class III, IV, V</th>
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#### ELLIPTICAL PIPE INSTALLATIONS

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### MAXIMUM COVER FOR REINFORCED CONCRETE PIPE ROUND AND ELLIPTICAL

#### STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION ROAD DESIGN

#### COVER HEIGHT

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*Notes:*
- All dimensions are in feet.
- Covers for reinforced concrete pipes are calculated based on the pipe diameter and the depth of embedment.
- The table above provides cover heights for various pipe diameters and embedment depths.
## ROUND PIPE - 2 1/4 x 1/4 CORRUGATION

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**Sheet 1 of 4**

## ROUND PIPE - 3 x 1 CORRUGATION

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**Sheet 1 of 4**

## ROUND PIPE - 5 x 1 CORRUGATION

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**Sheet 1 of 4**

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## PIPE ARCH - 2 1/2 x 1/2 CORRUGATION

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<th>Maximum Corner Pressure Lbs/Sq.ft</th>
<th>Maximum Height Of Cover (ft)</th>
<th>Min. Height Of Cover (ft)</th>
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**Sheet 1 of 4**

## PIPE ARCH - 3 x 1 and 5 x 1 CORRUGATION

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**Sheet 1 of 4**

---

### Maximum Cover for Corrugated Steel Pipe Round and Pipe Arch

**Cover Height**

- **NA** - Not Available
- **LA** - Limited Availability
- **NS** - Not Suitable (For Highway H-20 Loadings)

---

**State of Florida Department of Transportation**

**Engineer:**

- **Fiscal Year:** 2018
- **Phone:** (904) 387-3040
- **Fax:** (904) 387-3053
- **District No. 5:**
- **Contractor:**
- **Project No.:**
- **Fiscal Year:** 2018
- **Approver:**

![Image](205.png)
### ROUND PIPE - 2\(\frac{3}{4}\)" CORRUGATION

<table>
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<tr>
<th>D (in)</th>
<th>Area (Sq.Ft.)</th>
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### ROUND PIPE - 3" 1" CORRUGATION

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### PIPE ARCH - 2\(\frac{3}{4}\) 2\(\frac{1}{2}\) CORRUGATION

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### PIPE ARCH - 3" 1" CORRUGATION

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### CORRUGATED ALUMINUM ALLOY ROUND PIPE AND PIPE ARCH

**Cover Height**
### Application and Selection Guide to Curb Inlets and Gutter Inlets

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<th>INLET TYPE</th>
<th>TYPE CURB / GUTTER</th>
<th>GRADE CONSIDERATION</th>
<th>HYDRAULIC INTAKE (CFS)</th>
<th>BICYCLE SAFE PEDESTRIAN SAFE</th>
<th>UTILITY LOCATION FROM CURB</th>
<th>MAXIMUM PIPE SIZE WITH STANDARD BOTTOMS</th>
<th>COMMENTS</th>
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<td>30&quot;</td>
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<td>30&quot;</td>
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<td>E &amp; F</td>
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<td>F</td>
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1. Hydraulic intake values do not represent hydraulic capacity but are shown to compare inlets based on a 0.2% longitudinal slope, 0.2% cross slope and a 90% efficiency factor. For other conditions, the values shown should be adjusted for bypass flow or debris blockage. Seg inlets intake value is based on flushing the pier side lane or shoulder, where spread rather than hydraulic intake may dictate inlet selection or spacing. Full design data and additional information is available in "A Study of Stormwater Inlet Capacities" by U.S.E.

2. Curb inlets and transitions should be located outside pedestrian cross walk areas, preferably upgrade from these locations.

3. Double-threshold inlets are usually not warranted unless bypass flow in excess of 50 feet distance or 0.5 cfs.

4. Median Barrier Inlet types 1, 2, 3, 4, 8 & 9 can be made bicycle and pedestrian safe by specifying the required grate.

5. Pipe sizes are circular, Class III 30 Wall, concrete pipe. Elliptical pipe and corrugated pipe are to be checked for fit in accordance with Index No. 209. All pipe sizes should be reviewed using 2% K x 5% corrugation up to 30" and 3% x 1" corrugation for larger sizes.

---

**Curb Inlet and Gutter Inlet Selection Guide**
GENERAL NOTES

1. This inlet is used in Traffic Separators Types I and II that are located in medians constructed with Curbs. Types A, B, and E. Use of this inlet in through traffic side of the separator is not permitted in medians with Curbs Types A and B. Locate inlet outside of pedestrian cross traffic.

2. Reinforcing 4-6 bars @ 12 centers unless otherwise noted. Cut or bend bars out of way of pipe when necessary. Bars to clear pipe by 1/2". 

3. Recommended maximum pipe sizes are 24" longitudinal and 30" transverse. For larger pipe, inlets with bottoms Type J, Art. B, Index No. 200 are recommended.

4. For supplementary details see Index No. 201.
## APPLICATION AND SELECTION GUIDE FOR DITCH BOTTOM AND MEDIAN INLETS

<table>
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<tr>
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<th>TYPE</th>
<th>LOCATION</th>
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<th>SAFETY</th>
<th>DEBRIS TOLERANCE</th>
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</table>

### GENERAL NOTES

1. All inlets must be selected to satisfy hydraulic suitability, with proper consideration given to safety and economics.
2. CZ denotes clear zone, formerly CMA denoting clear recovery area.
3. Determine G grades should be specified when in salt water environment.
4. Inlets C, D, and E capacity and debris tolerance may be increased by the addition of a slot. Slotted inlets located within roadway clear zone and in areas accessible to pedestrians shall have transverse slots. Transverse slots are not adaptable to Type H.
5. Special ditch blocks require plan details.
6. Pin size limitations are based on circular Class III, B Well, Concrete Pipe. Elliptical pipe and corrugated pipe are to be checked for fit in accordance with Index No. 202. Metal pipe sizes should be reviewed using 2\(\frac{1}{4}\) x 1\(\frac{1}{4}\) corrugation up through 30" and 3\(\frac{1}{2}\) x 1\(\frac{1}{2}\) corrugation for larger sizes.
7. The figures shown for capacity are approximate, and are intended as a guide to assist in describing relative performance:
   - (a) Inlets with grades only are considered to be 50% blocked with 3' of ponding.
   - (b) Standard 6' slots and transverse slots are calculated assuming a 25% blockage and 3' of ponding above the grade.
8. The capacity values assume inlet control. The designer must verify the outfall conditions and design assumptions before accepting the capacity values shown; outlet constraints are likely to control with minimum pipe sizes.
### APPLICATION AND SELECTION GUIDE FOR PIPE END TREATMENTS

<table>
<thead>
<tr>
<th>INDEX NO.</th>
<th>DESCRIPTION</th>
<th>APPLICATION</th>
<th>INLET END</th>
<th>OUTLET END</th>
<th>SAFETY</th>
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<tr>
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1. All end treatments must be selected to satisfy hydraulic suitabilities with proper consideration given to safety and economics.
2. CZ denotes clear zone, formerly CRA denoting clear recovery area.
3. Grades should not be placed on outlet ends unless positive debris protection is provided at inlet end.
4. Additional notes concerning application restrictions may be shown on individual indexes.
5. Economic ratings are based on statewide average costs.
6. End treatments with a Kp of 0 or greater should be used only in areas of low design velocities and negligible debris.
7. Pipe sizes are concrete, Class III B Wall, concrete pipe. Elbow pipe and corrugated pipe are to be checked for fit in accordance with index No. 201; metal pipe sizes should be reviewed using 2 1/2 x 1/2" corrugation up to 30" and 3 x 1/2" corrugation for larger sizes.
ENDWALL DIMENSIONS (EXCLUSIVE OF MULTIPLE PIPE SPACING)

ENWWALL POSITIONS FOR SINGLE AND MULTIPLE PIPE AND SPACING FOR MULTIPLE PIPE
### Round Concrete and Corrugated Metal Pipe

<table>
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<tr>
<th>Opening Area (SF)</th>
<th>Dimensions</th>
<th>Class I Concrete (CY)</th>
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<th>Single</th>
<th>Double</th>
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### Corrugated Metal Pipe Arch

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### Concrete Elliptical Pipe

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<td>YZ</td>
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<td></td>
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</tbody>
</table>

### Note:
- Use the guidelines of General Note No. 7 for selecting tuber quantities.
**GENERAL NOTES**

1. Design Specifications: AASHTO, 1977
2. Rebar: Epoxy coated, Grade 60 or 80.
3. Concrete: Class 2.
4. Chamfer: All chamfered edges and corners to be chamfered 1/8" unless otherwise shown.
5. Soaking shall be in accordance with AASHTO C61 and paid for under the contract unit price for Soaking CY.
6. Embedment to be paid for under the contract unit price for Class II Concrete Endwalls CY and Rebar/Soaking Steel (Fondexy) L.O.

**STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION**

**ROAD DESIGN**

**STRAIGHT CONCRETE ENDWALLS**

SINGLE AND DOUBLE 66" CONCRETE PIPE

**Bill of Reinforcing Steel**

<table>
<thead>
<tr>
<th>MARK</th>
<th>SIZE</th>
<th>LENGTH</th>
<th>LOCATION</th>
<th>BENDS</th>
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<td>E</td>
<td>12</td>
<td>80'</td>
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</table>
GENERAL NOTES
2. Reinforcing Steel: Grade 40 or 60
3. Concrete: Class B
4. Chamfer: All exposed edges and corners to be chamfered 45° unless otherwise shown.
5. Sizing shall be in accordance with Index No. 281 and paid for under the contract unit price for Sizing SY.
6. Endwall to be paid for under the contract unit price for Class II Concrete (Endwalls) CT and Reinforcing Steel (Roadway) LS.

STATE OF FLORIDA
DEPARTMENT OF TRANSPORTATION
P300-915

STRAIGHT CONCRETE ENDMILLS
SINGLE AND DOUBLE 72° CONCRETE PIPE
Note: For concrete and corrugated metal pipes. Concrete pipe shown.

**TABLE OF DIMENSIONS**

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**Straight Sand-Cement Endwalls**

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION
ROAD DESIGN

DESIGNER: [Signature] DATE: [Date]
APPROVED BY: [Signature] DATE: [Date]

H.P.W.A. Approved: 2/8/98
MOUNTING FOR STEEL GRATE

TABLE OF DIMENSIONS AND QUANTITIES FOR ONE GRATE

<table>
<thead>
<tr>
<th>Grade</th>
<th>Slope</th>
<th>Baffle Size</th>
<th>Baffle</th>
<th>Baffle Panel Width</th>
<th>Baffle Panel 1</th>
<th>Baffle Panel 2</th>
<th>Baffle Panel 3</th>
<th>Baffle Panel 4</th>
<th>Baffle Panel 5</th>
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<td>8'</td>
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STEEL GRATE

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION
P.O. BOX 949
Tallahassee, FL 32302

U-TYPE CONCRETE ENDWALLS
BAFFLES AND GRATE OPTIONAL

15' TO 30' PIPE
**GENERAL NOTES**

1. Flared and sections shall conform to the requirements of ASTM C-76 with the exception that dimensions and reinforcement shall be as prescribed in the tables below. Concentrated reinforcement may consist of either one cage or two cages of equal. Compressive strength of concrete shall be 4000 psi. Stress drawings for flared and sections having dimensions other then above must be submitted for approval to the Engineer of Drainage.

2. Connections between the flared and section and the pipe culvert may be of any of the following types unless otherwise shown on the plans.
   a. Joints meeting the requirements of Section 942-1.5 of the Standard Specifications.
   b. Joints sealed with preformed plastic gaskets. The gaskets shall meet the requirements of Section 942-2 of the Standard Specifications and the minimum scores for gaskets shall be as that specified for equivalent sizes of elliptical pipe.
   c. Reinforced concrete jackets, as detailed on these drawings.

**DESIGN NOTES**

1. Flared end sections are intended for use outside the clear zone on median drain and cross drain installations, except that flared and sections for pipe sizes 12" and 15" are permitted within the clear zone. When the slope intersection permits, these flared end sections may be located with the culvert opening as close as 8" beyond the outside edge of the shoulder.

2. Reinforced concrete jackets shall be used at all locations where significant loads are designed to flow through the holes or highly eroded soils may cause displacement. These locations are to be shown on the plans.

3. The walls shall be used whenever the anticipated velocity of discharge and soil type are such that erosion action would occur. The walls are not required where ditch pavement is provided, except when discharging would occur if the ditch pavement should fail.

4. The walls shall be constructed as shown on the plans or as locations designated by the Engineer. The walls are to be cast in-place with Class I Concrete and paid for under the contract unit price for Class I Concrete (Miscellaneous).

5. Flared End Section to be paid for under the contract unit price for Flared End Section (Concrete), each. Sodding shall be in accordance with Index No. 280, and paid for under the contract unit price for Sodding, BY.
### Dimensions and Quantities

| D | X | A | B | C | E | F | G | N | Single Pipe | Double Pipe | Triple Pipe | Quadruple Pipe | See General Note No. 3. See Sheet 5 Of 6 For 51⁄2" Slab Quantities |
|---|---|---|---|---|---|---|---|---|-----------|-------------|-------------|-----------------|------------------------------------------------|---|
| 2:1 Slope | | | | | | | | | | | | | |---|
| 4:1 Slope | | | | | | | | | | | | |---|

Δ 6.00"  Δ 6.25" Dimensions permitted to allow use of 6' standard pipe lengths.
Δ 8.00"  Δ 8.25" Dimensions permitted to allow use of 8' standard pipe lengths.
Δ 10.00" Concrete slab shall be deepened to form bridge across crown of pipe. See section below.

---

**Concrete Slab, 3" Or 51⁄2" Thick, Reinforced With WWF Or W-4 Or W-4-W-4**

**TOP VIEW - SINGLE PIPE**

**TOP VIEW - MULTIPLE PIPE**

---

**CROSS DRAIN MITERED END SECTION**

**SINGLE AND MULTIPLE ROUND CONCRETE PIPE**

**SECTION**

Pipe To Be Included Under Unit Price For Mitered End Section 1

---

**NOTE:** See Sheet 6 For Details And Notes.
### Dimensions and Quantities

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### Cross Drain Mitered End Section

**Top View - Single Pipe**

Concrete Slab, 3" Or 5/8" Thick, Encased With WWP 64° - W-44W-4

**Top View - Multiple Pipe**

Concrete Slab, 3" Or 5/8" Thick, Encased With WWP 64° - W-44W-4

**NOTE:** See Sheet 6 For Details And Notes.
DIMENSIONS AND QUANTITIES

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2:1 Slope

Concrete Slab, 3" Or 5 1/2" Thick, Reinforced With Welded Wire Fabric

TOP VIEW - SINGLE PIPE

Concrete Slab, 3" Or 5 1/2" Thick, Reinforced With Welded Wire Fabric

TOP VIEW - MULTIPLE PIPE

NOTE: See Sheet 6 for details and notes.

SECTION

CROSS DRAIN MITERED END SECTION
SINGLE AND MULTIPLE CORRUGATED METAL PIPE ARCH

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION
A AASHO

1974 AASHO

See General Note No. 3.
See Sheet 5 Of 6 For 5 1/2" Slab Quantities
### Quantities for 5 1/2" Thick Concrete Slabs (Cy)

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**State of Pleasea Department of Transportation**

**Cross Drain Mitered End Section**

**Page: 272**
GENERAL NOTES

1. Mitered and sections shall be paid for as mitered end section, each, based on each independent pipe end.

2. The cost of all pipes, flanges, reinforcing, connectors, anchors, concrete, watertight pit, jackets, and coupling bands shall be included in the contract unit price for mitered end section, each. Soldering not included.

3. The reinforced concrete slab shall be constructed for all sizes of cross drain pipe and cost in place with Class I concrete. Slabs shall be at least 2 1/2" thick unless 3" thickness called for in plans.

4. Concrete pipe used in the assembly of mitered and sections shall be selective lengths to avoid excessive connections.

5. Corrugated metal pipe gasketed that is damaged during bevelling and perforating for mitered and section shall be repaired.

6. That portion of corrugated metal pipe in direct contact with the concrete slab shall be bituminous coated prior to placing the concrete.

7. Unless otherwise designated in the plans, concrete pipe mitered and sections may be used with any type of cross drain pipe; corrugated steel pipe mitered and sections may be used with any type of cross drain pipe except aluminum pipe; and, corrugated aluminum mitered and sections may be used with any type of cross drain pipe except steel pipe. When bituminous coated metal pipe is specified for cross drain pipe, mitered and sections shall be constructed with like pipe or concrete pipe.

8. When the mitered and conector pipe is dissimilar to the cross drain pipe, a concrete jacket shall be constructed in accordance with Standard Index 260.

9. When existing multiple cross drain pipes are spaced other than the dimensions shown in the detail, or have non-parallelogram, or have non-uniform sections, the mitered and sections will be constructed at separate or separate as single pipe mitered and sections or collectively as multiple pipes and sections as directed by the Engineer; however, mitered and sections will be paid for each, based on each independent pipe end.

10. Mitered and sections for pipe sizes 15", 18" and 24" round or equivalent pipe arch or elliptical pipe are permitted within the clear zone.

11. Slope and ditch transitions shall be used when the normal roadway slope must be flattened to piece and section outside clear zone.

SLOPE AND DITCH TRANSITIONS

CONCRETE PIPE CONNECTOR

ANCHOR DETAIL

Anchors required for CMP only.

Anchor, washer and nuts to be galvanized steel.

Bend anchors where required to center in concrete slab. Damaged surfaces to be repaired after bending. Anchors are to be spaced a distance equal to four (4) corruptions. Place the anchors in the outside crest of corruption.

Flat washer to be placed on inside wall of pipe.
DIMENSIONS & QUANTITIES

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<th>D</th>
<th>X</th>
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<th>B</th>
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- 1.00" Dimensions permitted to draw size of 6" standard pipe length.
- 1.00" Dimensions permitted to draw size of 12" standard pipe length.
- Concrete slab shall be deepened to form bridge plumes around pipes. See section below.

TOP VIEW - SINGLE PIPE

Concrete Slab, 3" Thick, Reinforced With WWF6x6-W14xW/4

Note: See Sheet 5 for details and 6 for notes.

SIDE DRAIN
MITERED END SECTION
SINGLE AND MULTIPLE ROUND CONCRETE PIPE

SECTION

STATE OF FLORIDA
DEPARTMENT OF TRANSPORTATION
ENGINEERING DIVISION

To C Pipe for Pipes 18" And Smaller, 2.1 For Pipes 24" And Larger.
DIMENSIONS B QUANTITIES

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</table>

TOP VIEW - SINGLE PIPE

Concrete Slab, 3" Thick, Reinforced With WWPCG-W-14 x W/4

Note:
See Sheet 5 for details and Sheet 6 for notes.

TOP VIEW - MULTIPLE PIPE

Concrete Slab, 3" Thick, Reinforced With WWPCG-W-14 x W/4

SIDE DRAIN MITERED END SECTION
SINGLE AND MULTIPLE ELLIPTICAL CONCRETE PIPE

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION
ROAD DESIGN

No Pipe Joint Permitted
Unless Approved By The Engineer

PED For As Pipe Diam.

F (Pipe To Be Included Under Unit Price For Mitered End Section)

\( \text{A} \) Slope:
To Major Axis For Pipes 24" x 36" And Smaller.
2:1 For Pipes 25" x 40" And Larger.
GENERAL NOTES

1. Mitered and sections shall be paid as mitered end section, each, based on each independent pipe end.
2. The cost of all pipe(s), grates, fasteners, reinforcing, connectors, anchors, concrete, sediments, jackets and coupling bands shall be included in the contract unit price for mitered end section, each. Sodding not included.
3. The reinforced concrete slab shall be constructed for all sizes of side drain pipe and cost in place with Class I concrete.
4. Round pipe size 30" or greater, pipe arch size 36" x 24" or greater, and elliptical pipe 18" x 50" or greater shall be grouted unless specified in the plans. Smaller sizes of pipe shall be grouted only when called for in plans. The lower grates on trailing downstream ends on divided highways shall be omitted.
5. Grates are to be fabricated from steel ASTM A 53, Grade B, pipe. The lower grates on all traffic approach ends shall be Schedule 80 and all remaining grates shall be Schedule 40. Grates subject to salt water or highly corrosive environment may be fabricated from galvanized pipe, with base metal exposed during fabrication repainted as specified in Section 562. Standard Specifications. All grates fabricated from black pipe and hot-dipped galvanized after fabrication in accordance with ASTM A 123. Grates subject to salt water or highly corrosive environment shall be hot-dipped galvanized after fabrication in accordance with ASTM A 123.
6. Concrete pipe used in the assembly of mitered and sections shall be of selective lengths to avoid excessive connections.
7. Corrugated metal pipe galvanizing that is damaged during bending and perforating for mitered and section shall be repaired.
8. That portion of corrugated metal pipe in direct contact with the concrete slab shall be bimetallic coated prior to placing of the concrete.
9. Unless otherwise designated in the plans, concrete pipe mitered and sections may be used with any type of side drain pipe, corrugated steel pipe milred and sections may be used with any type of side drain pipe except aluminum pipe, and corrugated aluminum mitered and sections may be used with any type of side drain pipe except steel pipe. When bimetallic coated metal pipe is specified for side drain pipe, mitered and sections shall be constructed with steel pipe or concrete pipe. When the mitered and section pipe is dissimilar to the side drain pipe, a concrete jacket shall be constructed in accordance with Index No. 280.
10. Corrugated polyethylene pipe (PEP) for side drain application of 15" 18" or 24" diameter shall utilize either corrugated metal or concrete mitered ends sections. When used in conjunction with corrugated metal mitered and sections, connection shall be by either a formed metal band specifically designed to join PEP pipe and metal pipe or other contact approved by the Engineer of Drainage. When used in conjunction with a concrete mitered and section, connection shall be by concrete jacket constructed in accordance with Index No. 280.
11. When existing multiple side drain pipes are spaced other than the dimensions shown in this detail, or have non-parallel axes, or have non-uniform sections, the mitered and sections will be constructed either separately as simple pipe mitered and sections or collectively as multiple pipe and sections as directed by the Engineer; however, mitered and sections will be paid for each, based on each independent pipe end.
12. In addition to the requirements of Section 430-4, side drain culverts shall comply with the bedding and backfill requirements shown on Index No. 280.
13. Ditch transitions shall be used on all grades in excess of 3% as directed by the Engineer.
14. The project engineer shall contact the District Drainage Engineer for possible alternate treatment prior to constructing side drain mitered and sections when a minimum spacing of 50 will not result between the toe points of the mitered and sections.

DESIGN NOTES

1. In critical hydraulic locations, grates shall not be used until potential debris transport has been evaluated by the drainage engineer and appropriate adjustments made. Ditch grades in excess of 5% or pipe with less than 15' of cover and grades in excess of 1% will require such evaluation General Note 4.
2. The design engineer shall determine highly corrosive locations and specify in the plans when the grates shall be hot-dipped galvanized after fabrication (General Note 5).
3. The design engineer shall determine and designate in the plans which alternate types of mitered and section will not be permitted. The restriction shall be based on corrosive or structural requirements.
**GENERAL NOTE**

1. Details for concrete and round corrugated metal pipe, concrete pipe shown.
2. Sod slopes 2' each side and top and ditch 4' beyond toe.
3. These mitered end sections are intended for side drain installations by FDOT Maintenance forces and for side drain installations constructed under FDOT Maintenance permit.

---

**ESTIMATED QUANTITIES & DIMENSIONS**

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<th>Pipe Size</th>
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**PICTORIAL VIEW**

Concrete Slope Pavement 6" Thick, 2' Wide Sides and Toe.

Sand-Cement Slope Pavement 2' Wide, 2 Bags Deep, Sides and Top.
Provide approximately a minimum of 0.20% grade on gutter, slightly warping the surface of the median pavement if necessary, within limits of the median curbs or curbs and gutter. Construct a drainage flume or flumes at the point or points of low grade. See details.

GRADE TO DRAIN AS SHOWN IN THE PLANS OR AS ADJUSTED BY THE ENGINEER DURING CONSTRUCTION

MEDIAN WIDTH AS INDICATED IN DETAIL PLANS

SLOPE TO APPROX. MATCH THAT OF ADJACENT PARTS. (BRAKEOVER 0.02 MIN., 0.05 MAX.)

CROWN LINE (EXIST. PART) OR LANE LINE OF SUPERELEVATED PART (EXIST. PART. OR NEW 4-LANE PART.)

PROVIDE SMOOTH SECTION MATCHING EXISTING GRADE

SECTION A-A

SECTION B-B

CROWN DITCH OR DRAIN MIN. SLOPE 0.02/11

CONTRACT AS SHOWN

FLUME DETAIL

GENERAL NOTES

1. These details are to apply to projects which provide for the conversion of 2-lane sections to 4-lane divided highway sections and for super-elevated portions of new 4-lane divided highways. Layout above is illustrative only. Cost of flumes to be included in the contract price for Curb or Curb and Gutter. Sed to be paid for under the contract unit price for Sedding, BY.

2. Flumes to be located in low point of needs and at other points as designated on the plans. The locations may be adjusted by the Engineer during construction.
Note: Set reflector plates on right hand curb at bridge ends as shown. Plates to be furnished by O.D. and installed by the contractor. Cost of installing plates to be included in the contract unit price for concrete ditch pavement (3" thick).

SECTION AA

Note: Spillway to terminate as directed by the engineer.

SECTION BB

TOE OF SLOPE

SECTION CC

Profile of curb to match curb of end of bridge.

DEPRESS APPROACH SLAB

3'-5"  3'-5"

B R I D G E  A P P R O A C H  S L A B

PLAN

CONCRETE SPILLWAYS
BRIDGE END SPILLWAY

ESTIMATED QUANTITIES

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*Quantity shown above includes pavement for 10 ft. "Length of Slope".
For each additional foot of slope length add 0.346 sq. yds.
DETAIL OF CONC. SPILLWAY AT END OF SHOULDER GUTTER

(TO BE USED WHERE INLETS, PIPES & EMBANKMENTS ARE IMPractical)

NOTES:

1. Spillway to be placed for an shoulder gutter.
2. If spillway enters into a channel or channel edge, the steps should be modified as necessary.
**DESIGN NOTES**

1. The type of underdrain should be selected to meet design water removal rate and soil condition. Care is exercised to overcome use of these typical sections, and special designs may be required to satisfy special conditions.

2. Type I underdrain is intended for minimum water removal conditions.

3. Type II underdrain is intended for moderate water removal conditions.

4. Type III underdrain is intended for maximum water removal conditions.

5. Type IV underdrain is intended for minimum water removal conditions.

6. Type V underdrain is intended for use in detention basins and other locations which require a filtration system. Type Vc underdrain includes a filter fabric envelope which is not appropriate for Type IV underdrain. The filter fabric envelope is required around underdrain Types I, II, IIa, and Vb. When required, fabric shall be specified in the plans. Fabrics to be paid for separately.

**GENERAL NOTES**

1. The underdrain pipe shall be either 4' smooth or 5' corrugated tubing unless otherwise shown in the plans.

2. Fine aggregate shall be quartz sand matching the requirements of Section 902-4 of the Standard Specifications.

3. Course aggregate shall be gravel or stone matching the requirements of Section 901-2 or 901-3 respectively. The graduation shall meet Section 601-6, Grad. 4, 6, 7, 8, or 9 as selected in the plans.

4. Underdrain Type I, II, IIa, and Vc shall be in accordance with Section 440 and Underdrain Type IV (Copperhead) in accordance with Section 441.

5. Filter fabric meeting Section 885 shall be a subsurface drainage type.

6. When corrugated polyethylene tubing with slits or 5007 publications is used in conjunction with fine aggregate, a filter fabric shall be required.

7. For standard location details, see index 800. Special locations require location details in the plans.

8. The utmost care is to be used. Underdrain, filter, and aggregate shall include the following components for each underdrain type as follows:

   - Type I: Pipe, filter, and aggregate
   - Type II: Pipe, aggregate, and filter fabric envelope
   - Type IIa: Pipe, aggregate, and interface filter fabric envelope
   - Type IV: 48" Pipe, aggregate, and filter fabric envelope

   Underdrain Type Vc shall be paid for under the contract unit price Corrugated Polyethylene Tubing (Copperhead, C-F) and shall include the cost for handling, each (200), and aggregate.

   Concrete filter fabric envelopes, when specified for underdrains Types I, II, and V, shall be paid for separately under the contract unit price for Precast Filter Fabric (Type Vc.)

   All filter fabric joints shall overlap a minimum of one (1) foot.

**STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION ROAD DESIGN**

**UNDERDRAIN**

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</table>

*State: FL, ID: 286*
SAFETY MODIFICATION FOR
INLETS IN BOX CULVERTS
TYPICAL RETURN PROFILES
INCLUDING DETAIL SHOWING LOCATION OF INLETS ON RETURN

NOTE:

1. On normal intersections, profiles need not be included in the plans as the above typical adequately present the desired configuration.

2. For major intersections, where extreme grades are involved or where it is deemed necessary to include profiles in order to present adequate design data, return profiles may be included in the plans.

3. Profile grades should be established that will allow extra to be carried outside the return whenever practicable. Inlets should be located to avoid contact with pedestrian movement. Special consideration should be given to present curtiling where in curb cut influence is involved. Where on state to refers to Notes No. 144.

4. Grades of 0.2% or greater should be maintained on any profiles outside the curb lines.

CURB RETURN PROFILES
STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION
Highways Division

C.M. Approved: 7/7/76
(1 of 1) 303
SIDEWALK RAMPS

MEDIAN CROSS RAMP

FOR ADDITIONAL LOCATION INFORMATION SEE SHEET 3 & 4 OF 4
Ramps for Linear Pedestrian Traffic

For Transverse Pedestrian Traffic see Sheets 1, 3 & 4 of 4

State of Florida Department of Transportation

Curb Cut Ramps Physically Handicapped
DESIGNER'S NOTES

1. For curb ramps on or in back of sidewalk, the configuration shall be determined by the elevated sidewalk projection line for 2' offset.
2. For full height curb, projection line for 1' shall be determined by curb cut ramp configuration to suit other side, and there shall be developed independently of the other side where curb cut ramps are not permitted.

Ramp Not Permitted Within These Limits.

SIDEWALKS WITHOUT UTILITY STRIP

LOCATIONS WHERE CURB CUT RAMPS NOT PERMITTED

15° R
20° R
25° R
30° R
35° R
40° R
45° R
60°
**CONCRETE - CONCRETE JOINTS**

**Tape Bond Breaker**

- For New Projects: Preformed Elastomeric Compression Seal
- For New and Rehabilitation Projects: Backer Rod Bond Breaker

**Backer Rod Bond Breaker**

- Joint Dimensions (Inches):
  - Joint Width
  - Sealant Bead Thickness
  - Backer Rod Diameter
  - Minimum Backer Rod Depth
  - Backer Rod Placement Depth

**Concrete - Asphalt Shoulder Joints**

**Joint Seal Dimensions**
**DETAIL SHOWING RIGID SHOULDER PAVEMENT**

NOTE: Rigid shoulder pavement shall be concrete or embankment as called for in the plans.

**DETAIL SHOWING SHEET METAL STRIP**

NOTE: Immediately prior to placing the seal, the area shall be thoroughly cleaned of all foreign material. Immediately after the seal is placed, sheet metal strip shall be beaten against the pavement edge.

The sheet metal strip shall be a minimum of 16 gauge steel, 12 wide and shall be galvanized G-180 in accordance with ASTM A-526, Coating Designation G-90.

**GENERAL NOTES**

1. The quantity of expansion joint to be calculated to be the direct of the centerline of the roadway pavement.

2. Expansion joints shall be cast of Class I concrete, except for bridge or bridge approach joints. The type of expansion joint used shall be determined by the engineer of record.

3. Joint sealant shall be used to seal the expansion joint. The type of joint sealant shall be determined by the engineer of record.

4. The width of asphalt strip shall be determined by the engineer of record.

**SECTION A A THROUGH EXPANSION JOINT**

**COMPRESSION SEAL DETAIL**

NOTE: All contacting surfaces between the compression seal and concrete shall be thoroughly coated with a lubricating adhesive.

**SECTION THRU SEALS**

Either of the three Seals shown may be used.
GENERAL NOTES

1. The illustrated applications for guardrail are standard requirements. Length of advancement shall be established by Figure 1 for all installations incorporating the Standard Flare Detail P; however length of advancement shall not be less than 62.5 feet or other approach lengths shown by detail on this index.

2. One panel equals 12.5 feet. Post spacings shall be 6'-3" except that a reduced spacing of 3'-1" shall be used for transitions to interchange or rigid structures such as bridges (See Detail LI).

3. At hazards where the face of guardrail is offset from the hazard less than the desirable 4 foot minimum, a 2 foot minimum offset may be used with reduced post spacing extending over the length of the hazard plus one panel of approach rail. For an offset less than 2 feet, a special detail should be submitted to the State Design Engineer, Roadways for approval.

4. In addition to use of conventional roadside hazards, guardrail will be required where hill slopes exceed 3:1, except that where hill heights are less than 6 feet guardrail may be omitted (regardless of hill slope) unless in the opinion of the Engineer its use is deemed necessary due to other roadside features.

5. Stragger rail sections may be used for all radii of 125 feet or greater. For radii less than 125 feet the rail must be fabricated to fit.

6. Corrugated sheet steel beams, and shoes, and sections and back-up plates shall conform to the current requirements of ASTM A 366, Grade A (10 ga.), Type 2 (end) coating. Aluminum guardrail elements will be fabricated to fit the contours of the roadway.

7. Permeable post and offset block combinations are tabulated on sheet 10 of 13.

8. Where necessary to enlarge or add holes to galvanized guardrail, the work will be done by drilling or reaming. Damaged galvanized guardrail will be monitored in accordance with Sections 562 and 971 of the Standard Specifications. No burning of holes will be permitted.

9. Guardrail reflectors shall be the same colors as the pavement striping edge lines.

10. Crash cushions may be required in lieu of or in conjunction with guardrail at locations where space does not permit development of sufficient guardrail length, offset or closeness to termini or terminals. On high-speed facilities (50 mph or greater) crash cushions shall be constructed of Type B end and chases isolated in the median within the clear zone.

11. Median guardrail for bridges located on divided roadways shall be constructed the same as outer roadway guardrail under the following conditions:

(a) Medians of uniform width that are occupied by other transportation and joint use facilities.

(b) Medians of uniform or variable widths with vertical alignments not suited to normal median guardrail installations.

(c) Medians of bifurcated roadways.

12. Any guardrail with existing concrete piers that is being reset under a construction contract shall be reset using wood or steel parts.

13. All guardrail panels, end sections, and special end shoes shall be lapped in the direction of traffic.

14. Guardrail mounting height of 1'-9" to center of W beam and 1'-6" to lower post bolt in pipe beam is critical and shall be attained in all cases.

15. Guardrail connections to existing bridges shall be in accordance with this index and Index No. 401.

Design Length Of Advancement, Ft. (X)
Speed (mph) 50 - 70 45 Or Less
13(D-1/2) 16(D-1/2)

Note: For minimum length of advancement see General Note No. 1.

LENTH OF ADVANCEMENT

Figure 1

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION

GUARDRAIL

Fig. 400

[Diagram of guardrail installation with equations and variables]

Equation Variables:

D = Distance in feet from near edge of the near approach travel lane to back of hazard or clear zone width whichever is lesser. For left side hazards and clear zones on two-way undivided facilities D is measured from the inside edge of the near approach travel lane.

a = Distance in feet from the near edge of the near approach travel lane to the face of guardrail at the No 2 breakaway post. For left side hazards and clear zones on two-way undivided facilities a is measured from the inside edge of the near approach travel lane. See Standard Flare - Detail P for additional information.

For minimum length of advancement see General Note No. 1.

[Diagram showing guardrail installation with equations and variables]
MEDIANs 30° OR LESS WITH 10' BRIDGE SHOULDERS

MEDIANs 30° OR LESS WITH 6' BRIDGE SHOULDERS

NOTE: The guardrail configurations shown apply only to parallel or near parallel bridges with open medians 30° or less in width. When medians 30° or less in width are closed by continuous decking between the bridge travel ways, traffic separation shall be obtained by appropriate treatments such as, but not limited to, raised separators, curbs, guardrails, concrete barrier walls and special barriers.
GUARDRAIL AND SHOULDER GUTTER TRANSITIONS AT BRIDGE APPROACHES - DETAIL J

GUARDRAIL ATTACHMENT AT HANDRAIL BARRIER - DETAIL N
NOTES: (STEEL POST)

1. Either anchor bolts or concrete wedge anchors may be used. Anchor bolts are to be installed as detailed. Wedge anchors are to be installed in accordance with the manufacturer’s recommendations, allowing 3000 psi compressive strength for concrete. Wedge anchors shall be four (4) wedge anchors per secuored post, installed in a staggered pattern, one post in the center area per secuored post. The maximum post approach shall be 10,000 lbs. Each (4) wedge anchors shall be driven into the concrete with a minimum of 12-inches of embedment, Type 3, 700 ksi, in accordance with ASTM A-164. The coated bolts, nuts, and washers shall be completely immersed in a water solution containing 0.5% sodium chloride (3.5% per 100 gms.).

2. Anchor bolts and washers are to be drilled. Enclosed reinforcing steel shall be drilled through holes shall be thoroughly cleaned before setting bolts or wedge anchors and poured when setting bolts. Bolts shall be set in epoxy mortar.

3. Posts are to be plumbed with adjusting nuts when bolts are used and plumbed with a centering post when wedge anchors are used. All base plates to be grouted with neat finish.

4. Steel post and plate assembly to be galvanized. Any damaged galvanized areas to be repaired in accordance with Section 542 of the Standard Specifications.

FOR CONSTRUCTION OF GUARDRAIL WHERE CULVERT, PIER FOOTING OR OTHER STRUCTURE PRECURSES NORMAL POST INSTALLATION

SPECIAL STEEL GUARDRAIL POSTS

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION

GUARDRAIL

<table>
<thead>
<tr>
<th>Post Type</th>
<th>Notes</th>
</tr>
</thead>
</table>
| Steel Post | For Timber Surfaces And Nominal Dimension Tolerances See Permissible Post And Rail Clearances (Sheet 10) of (3).
| Steel Post | For Timber Surfaces And Nominal Dimension Tolerances See Permissible Post And Rail Clearances (Sheet 10) of (3).
| Timber Post | Steel Post | For Timber Surfaces And Nominal Dimension Tolerances See Permissible Post And Rail Clearances (Sheet 10) of (3).
| Timber Post | Steel Post | For Timber Surfaces And Nominal Dimension Tolerances See Permissible Post And Rail Clearances (Sheet 10) of (3).

STANDARD TIMBER AND STEEL GUARDRAIL POST
Only single special post shown (normal location for special post).
Max variation in location of special post.
Max variation in location of special post on one of two special posts.

**NUMBER OF SPECIAL POSTS**
- Single Offset Block: Max. 7
- Double Offset Block: Max. 9
- Blocks of Estimate for Payment 1

**CURB INLET TYPE 1**

Max variation in location of special post.
Max variation in location of special post on one of two special posts.

**NUMBER OF SPECIAL POSTS**
- Single Offset Block: Max. 7
- Double Offset Block: Max. 9
- Blocks of Estimate for Payment 1

**CURB INLET TYPE 2**

Max variation in location of special post.
Max variation in location of special post on one of two special posts.

**NUMBER OF SPECIAL POSTS**
- Single Offset Block: Max. 7
- Double Offset Block: Max. 9
- Blocks of Estimate for Payment 1

**CURB INLET TYPE 3**

Max variation in location of special post.
Max variation in location of special post on one of two special posts.

**NUMBER OF SPECIAL POSTS**
- Single Offset Block: Max. 7
- Double Offset Block: Max. 9
- Blocks of Estimate for Payment 1

**CURB INLET TYPE 4**

Max variation in location of special post.
Max variation in location of special post on one of two special posts.

**NUMBER OF SPECIAL POSTS**
- Single Offset Block: Max. 7
- Double Offset Block: Max. 9
- Blocks of Estimate for Payment 1

**CURB INLET TYPE 5**

Max variation in location of special post.
Max variation in location of special post on one of two special posts.

**NUMBER OF SPECIAL POSTS**
- Single Offset Block: Max. 7
- Double Offset Block: Max. 9
- Blocks of Estimate for Payment 1

**CURB INLET TYPE 6**

Max variation in location of special post.
Max variation in location of special post on one of two special posts.

**NUMBER OF SPECIAL POSTS**
- Single Offset Block: Max. 7
- Double Offset Block: Max. 9
- Blocks of Estimate for Payment 1

**LEGEND**
- Variations shown for the locations of special posts mounted in insets are determined from standard post spacing 8' 0" (7) measurements of standard posts from inset (4' 0"), use of single special post mounting brackets, and concrete surface edge distance (8" for standard and 3") for restoration standards.
- The number of posts and their locations may vary by reducing post spacing and adjusting the length of rail panels.
- Encased guardrail posts shall conform in section to standard standard and steel posts, and be paid for under the contract, and price for special guardrail post, each.
- Special post shall be furnished and placed as required by condition at the time of construction.

**SPECIAL POST LOCATIONS ON CURB INLETS**

5 Variations shown for the locations of special posts mounted in insets are determined from standard post spacing 8' 0" (7) measurements of standard posts from inset (4' 0"), use of single special post mounting brackets, and concrete surface edge distance (8" for standard and 3") for restoration standards.

**PLAN (SQUARE OPTION)**
- 15" for steel post or 17" for timber post.
- Foam wrap and foam for wood block out same as for square option above.

**PLAN (ROUND OPTION)**
- 15" for steel post or 17" for timber post.
- Foam wrap and foam for wood block out same as for square option above.
### GENERAL NOTES

1. Whether an existing bridge handrail is to remain in place, be retrofitted or be replaced, it is determined that must be made independent of any information contained on this index.

   Only after it has been established that an existing bridge handrail is to remain in place is this index to be used to analyze guardrail in bridge connections.

2. The schemes on this index are not to be used for new bridge construction, bridge widening, bridge barrier wall or handrail replacement, or, for existing bridges that have way points for guardrail connection that conform with configurations shown in current Roadway Design Standards and Bridge Design Standards.

3. The schemes on this index are divided into two general categories, representing curbed and uncurved roadway approaches. A scheme selection guide is provided under "Design Notes" for curbed and uncurbed roadway approaches. Approach slides with curbs or wing walls with radial safety curbs will be treated as curbed roadway approaches.

4. Existing bridge features shown in these schemes are example configurations only. The principle key to scheme selection is bridge curb or sidewalk width. Location control is keeled to bridge face of curbs, except for certain trailing conditions.

5. Details that are repetitive on the schemes and features that are detailed on Index No. 400 have been purposely detailed to produce clarity and simplification in the schemes, and to emphasize proper location and positioning of the anchoring and connecting guardrail.

6. All schemes are right side or right hand details for traffic flow right to left. Left side applications are opposite hand.

7. For undivided two-way bridges 'trailing end' as used in this index, is in relation to the direction of travel of near lane traffic, but it is always considered as an approach for opposing lane traffic.

8. All connections of guardrail spigots and shoes to concrete anchorages posts, piers and walls shall have a \( \frac{1}{4} \) x \( 1\frac{1}{2} \) x \( 1\frac{1}{2} \) galvanized steel back-up plate for gang tightening of nuts on \( \frac{1}{4} \) diameter galvanized anchor bolts. Special shoe anchor bolts shall have a nominal length equal to the thickness of the concrete anchorage plus \( \frac{1}{4} \) in.

When thru bolts would generate existing bridge rails, \( \frac{1}{4} \) diameter bolt clamps and chemical anchor bolts meeting the manufacturers recommendation may be substituted as approved by the Engineer.

9. All concrete surfaces shall have Class 5 finish unless otherwise stated in the plans.

10. The guardrail and anchorage schemes on this index do not include cost for payment of guardrail. See index No. 400 Detail N for limit of guardrail measurement.

Each individual anchorage described in these schemes shall be paid for as a bridge and anchorage detail under the contract unit price for Bridge Anchorage Assembly. Each. The unit price shall be full compensation for the following:

- Each concrete anchor post, panel or transition wall including reinforcing steel, existing rail or post removal, socket filling, bond breaker, post bedding, driving, driving, grouting, expansion, backfill, special and shoe and accessories items.

- Each guardrail steel terminal post, including flared and section, anchorage and accessory items (optional use not included).

- Each guardrail and anchorage details to existing bridge and post or way post, including back-up plate and accessories items.

Continuous concrete safety barrier (Schemes 1 & 18) shall be paid for as a roadway item under the contract unit price for Guardrail Barrier (Horse) / Vertical (L), and Special Guardrail Post, Each. The unit price for guardrail shall include the cost for all accessories prescribed on Index No. 400 and the unit price for special post shall include the cost for all accessories and anchorage prescribed in Index 400 and in Scheme 16 at this state.

### DESIGN NOTES

1. The details in this index are intended to be used for existing bridges that have end and approach side configurations constructed under former Department Standards, and, are not intended to preclude special design details more suited to bridges with unusual handrail or guardrail configurations, or, when there is conflict with drainage structures or other features that can be adjusted.

2. The schemes provide the designer with a convenient method of providing standardized information on the plans. In the selection and assignment of schemes the designer must predetermine existing bridge handrails, curb, sidewalk and approach side conditions, particularly the location of embankment crest. Special attention must be directed to the presence or absence of curbed approaches on each independent corner of the bridges.

3. Each corner of the bridge that requires a guardrail connection should be labeled independently by scheme number, and, where continuous barrier is required across a bridge the scheme number should be labeled independently on the underside of the bridge. When continuous guardrail is called for, bridge and anchorage assemblies will be omitted, but when continuous concrete safety barrier is called for, one or more bridge and anchorage assemblies will be labeled on the plans.

4. The scheme selection guide below is to be used as a quick reference for determining anchoring and continuous barriers that are applicable to specific conditions for existing bridges. When applicable, special details are to be used in lieu of scheme or to supplement or complement the scheme details. In selecting schemes the width of curb, safety curb and sidewalk is the distance from face of curb to nearest face of rail, post or parapet.

### SCHEME SELECTION GUIDE (NUMBERS)

<table>
<thead>
<tr>
<th>WITH ROADWAY CURVES APPROACHING BRIDGES</th>
<th>WITHOUT ROADWAY CURVES APPROACHING BRIDGES</th>
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<tr>
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<tr>
<td><strong>ONE-WAY BRIDGES</strong></td>
<td><strong>APPROACH END</strong></td>
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<td>Narrow Curb</td>
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<tr>
<td>Wide Safety Curb</td>
<td>( 1\frac{3}{8}, 12, 13, 14, 15, 16, 17 )</td>
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<tr>
<td>Sidewalks</td>
<td>( 1\frac{1}{8}, 1\frac{1}{16} )</td>
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*For W.A. Anschutz*

### STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION

**GUARDRAIL ANCHORAGE AND CONTINUOUS BARRIER FOR EXISTING BRIDGES**

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<thead>
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<tr>
<td>18</td>
<td>Vertical</td>
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</table>
BRIDGES WITH APPROACHING ROADWAY CURB

APPLICATIONS

CAST IN PLACE PANELS

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION

GUARDRAIL ANCHORAGE AND CONTINUOUS BARRIER FOR EXISTING BRIDGES
CURVILINEAR GUARDRAIL
BRIDGES WITH APPROACHING ROADWAY CURB
TRANSITIONS AT BRIDGES FOR BARRIER WALL ON RETAINING WALL

REINFORCED CONCRETE BARRIER WALL (RETAINING)

REINFORCED CONCRETE BARRIER WALL (SHOULDER)

RIGID BARRIER WALL

NOTE: All longitudinal reinforcement is 4 bars.
Minimum segment length for this wall is 20 feet.
Not to be used for other projects.
For Concrete Barrier Wall (Highway) - Referencing ICC.

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION PROJECT NO.

CONCRETE BARRIER WALL

Sheet A-2

410
TWO-WAY TRAFFIC (UNDIVIDED)

Bridge End Hazard

NOTE:
X = Length of advancement in feet for rear and approach approach lanes. See Sheet 8 of 8.
For locations without utility strips see Sheet 5 of 8.
Transition, sidewalk and sectional details see Sheet 6 of 8.
The 2.5' offsets to toe of barrier wall cannot be reduced to accommodate hazards; however, hazards located in the area of the row can be accommodated by the detail on Sheet 8 of 8.

HAZARD 4' OR LESS FROM FACE OF CURB

CURB AND GUTTER WITH UTILITY STRIP

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION ROAD SERIES
CONCRETE BARRIER WALL
TWO-WAY TRAFFIC (UNDIVIDED)

ONE-WAY TRAFFIC

BRIDGE END HAZARD

TWO-WAY TRAFFIC (UNDIVIDED)

ONE-WAY TRAFFIC

HAZARD 4' OR LESS FROM FACE OF CURB

CURB AND GUTTER WITHOUT UTILITY STRIP

NOTE:
X = Length of advancement in feet for rear and opening approach lines. See Sheet 8 of 8.
For locations with utility strips see Sheet 4 of 8.
For inspection, setback and sectional details see Sheet 6, 7, 8 of 8.
The 2.5 offsets to be of barrier wall cannot be reduced to accommodate hazards; the offset of the wall can be accommodated by the detail on Sheet 8 of 8.
CONCRETE BARRIER WALL

TRANSITION SEGMENTS FOR 'CONCRETE BARRIER WALL (RIGID) (CURB & GUTTER)'

Plan with utility strip
Two-way traffic (opposing lane approach)

Plan without utility strip

Plan with utility strip
One-way traffic (trailing end)
SIDEWALK DRAINAGE SLOT FOR BARRIER WALL (RIGID) (CURB & GUTTER)

NOTE:
- Transition Segments Shall Be Drilled Into The End Of The Barrier Wall In The Following Manner:
  - Four 1/2" diameter holes 6" deep on 6" centers shall be drilled into the end of the barrier and No. 6 bars 15" long set in epoxy mortar. The ends of the dowels extending into the transition segment shall be wrapped with one layer of 15 lb. paper felt with the ends crimped.
- When Construction Joints Are Utilized For Transition Segment Construction The Stem Shall Be Devoted To The Four No. 6 Bars. The Following Are Five No. 4 bars 15" long shall be embedded 7" into the footing. The dowels shall be spaced 15" on centers with the first dowel located 5/8" from the barrier wall. Dowels may be placed within or adjacent to the keyway.

CONCRETE BARRIER WALL

ONE-WAY AND TWO-WAY TRAFFIC (NEAR LANE APPROACH)

TRANSITION SEGMENT FOR 'CONCRETE BARRIER WALL (RIGID) (CURB & GUTTER)'

RIGHT SIDE SHOWN, LEFT SIDE OPPOSITE HAND
GENERAL NOTES

1. Gate components shall meet the material requirement specified on Index No. 452.
2. Steel gate frame shall be fabricated prior to galvanizing, except that truss rods and truss rod plates may be fabricated following frame galvanizing provided surfaces damaged during welding are galvanized in accordance with Section 24 of AASHTO M36.
3. All fabric shall be knuckled top & bottom supports.
4. Cost of all gate components shall be included in the contract unit price for Sliding Fence Gate (Cantilever). Each.
5. The Contractor may substitute any equivalent cantilever slide gate approved by the Engineer.
SUPERELEVATION TRANSITION L₁ (VARIES 100' MIN.)

STRAIGHT LINE TRANSITION OUTSIDE EDGE OF PAVEMENT

0.8L₁ TANGENT

0.2L₁ CURVE

OUTSIDE PART EDGE OUTER ROADWAY

OUTSIDE PART EDGE OUTER ROADWAY

D₀₁

-profile grade

CROWN POINT BOTH ROADWAYS

SUPERELEVATION TRANSITION L₂ (VARIES 100' MIN.)

STRAIGHT LINE TRANSITION OUTSIDE EDGE OF PAVEMENT

0.8L₂ TANGENT

0.2L₂ CURVE

OUTSIDE PART EDGE INNER ROADWAY

OUTSIDE PART EDGE INNER ROADWAY

D₀₂

-profile grade

CROWN POINT BOTH ROADWAYS

B = L₁ + S(D₀₁ - D₀₂)

C = L₁ + S(D₀₁ - D₀₂)

D = L₁ + S(D₀₁ - D₀₂)

E = L₁ + S(D₀₁ - D₀₂)

F = L₁ + S(D₀₁ - D₀₂)

S = SLOPE RATIO

SECTION A-A

NORMAL CROWNED SECTION

SECTION B-B

SUPERELEVATION SECTION LT & RT.

SECTION C-C

SUPERELEVATION SECTION LT.

PLANE INCLINED SECTION RT.

SECTION D-D

PLANE INCLINED SECTION LT.

SUPERELEVATION TRANSITION LT.

SECTION E-E

SUPERELEVATION TRANSITION RT.

FULL SUPERELEVATION LT & RT.

SECTION F-F

FULL SUPERELEVATION LT & RT.

5-LANE PAVEMENT WITH ONE LANE SLOPED TO MEDIAN
GENERAL NOTES FOR SUPERELEVATION

1. MAXIMUM RATE OF SUPERELEVATION ON MUNICIPAL CONSTRUCTION SHALL BE 0.05 FT/FT.

2. SUPERELEVATION SHALL BE OBTAINED BY ROLLING THE PLANE SUCCESSFULLY ABOUT THE SWEEP POINTS OF THE CURVE UNTIL THE PLANE HAS A SLOPE EQUAL TO THAT REQUIRED BY THE CHART, SHOWN ON POSITION THRUST IN THE CURVE紀錄.

3. MINIMUM SUPERELEVATION SHOWN ON THE CHART IS THE LOWEST SLOPE THAT WILL BE REQUIRED ON THE MUTCD ROAD.

4. SUPERELEVATION IS ATTAINED BY ROLLING A PLANE SUCCESSFULLY ABOUT THE SWEEP POINTS OF THE CURVE UNTIL THE PLANE HAS A SLOPE EQUAL TO THAT REQUIRED BY THE ELEVATION.

5. WHEN POSITIVE SUPERELEVATION IS REQUIRED, THE SLOPE OF THE SITTER ON THE HIGH SIDE SHALL BE A CONTINUATION OF THE SLOPE OF THE SURFACE ELEVATION.

6. IN CONSTRUCTION, THICK VERTICAL CURVES SHALL BE PLACED AT ALL ELEVATION PROFILE BREAKS WITHIN THE LIMITS OF THE SUPERELEVATION TRANSITION.

7. MINIMUM SITTER SLOPES WITHIN THE LIMITS OF THE SUPERELEVATION TRANSITION SHALL BE 0.01 FT.

8. THE VARIABLE SUPERELEVATION TRANSITION LENGTH "L" SHALL HAVE A MINIMUM VALUE OF 30 FT FOR DESIGN SPEEDS OF 30 FT/HR AND 75 FT FOR DESIGN SPEEDS OF 40 FT/HR OR GREATER.

9. MINERAL SECTIONS HAVING LANE ARRANGEMENTS DIFFERENT FROM THOSE SHOWN, BUT COMPOSED OF SECTIONS OF PLANE, SHALL BE SUPERELEVATED IN A SIMILAR MANNER.

10. FOR CURVES IN RURAL AREAS SEE INDEX NO. 510.

PARABOLIC SECTION

VALUES DETERMINED FROM THE CHARTS ARE ALSO APPLICABLE TO A PARABOLIC CROWN SECTION. WHEN THIS TYPE OF SECTION IS USED, SUPERELEVATION IS ATTAINED BY ROLLING A PLANE SUCCESSFULLY ABOUT THE ANGULAR POINTS OF THE PARABOLIC CROWN.

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION
MUNICIPAL CONSTRUCTION
# Layer Thickness for Asphaltic Concrete Structural Courses

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<thead>
<tr>
<th>COURSE THICKNESS ( Inches )</th>
<th>LAYER THICKNESS ( Inches )</th>
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<tr>
<td>3</td>
<td>1/2</td>
</tr>
<tr>
<td>4</td>
<td>1/2</td>
</tr>
<tr>
<td>5</td>
<td>1/2</td>
</tr>
<tr>
<td>6</td>
<td>1/3</td>
</tr>
</tbody>
</table>

**GENERAL NOTES**

1. If combinations other than those shown in the table are used, the thickness must be consistent with the following thickness ranges and the details must be given on the Typical Section Sheet:

<table>
<thead>
<tr>
<th>Type S-1</th>
<th>S-2</th>
<th>S-1</th>
<th>S-1</th>
<th>S-1</th>
</tr>
</thead>
<tbody>
<tr>
<td>1/2</td>
<td>1/2</td>
<td>1/2</td>
<td>1/2</td>
<td>1/2</td>
</tr>
</tbody>
</table>

2. When quantities are bid as tonnage items, equivalent tonnage layer thickness will be constructed (i.e., 10000 square yard inch).

3. When construction includes paving of adjacent 1/2" shoulders, the layer thicknesses for the shoulder shall be the same as the upper roadway pavement layer(s) in order to facilitate paving. This may limit combinations available. (See Note 1.)

4. The designer should consider staged construction for course thicknesses greater than 4".
# Optional Base Groups and Structural Numbers

## Table of Base Groups and Structural Ranges

<table>
<thead>
<tr>
<th>Base Group and Structural Range</th>
<th>(18)</th>
<th>(19)</th>
<th>(20)</th>
<th>(21)</th>
<th>(22)</th>
<th>(23)</th>
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</thead>
<tbody>
<tr>
<td>1.00 - 1.25</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
</tr>
<tr>
<td>1.25 - 1.50</td>
<td>7</td>
<td>8</td>
<td>9</td>
<td>10</td>
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<tr>
<td>1.50 - 1.75</td>
<td>13</td>
<td>14</td>
<td>15</td>
<td>16</td>
<td>17</td>
<td>18</td>
</tr>
<tr>
<td>1.75 - 2.00</td>
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<td>20</td>
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<tr>
<td>2.00 - 2.25</td>
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<td>26</td>
<td>27</td>
<td>28</td>
<td>29</td>
<td>30</td>
</tr>
</tbody>
</table>

**Legend:**
- Base Group: Identifies the base group type.
- Structural Range: Indicates the range of structural numbers.

## Notes:
- **Type:**
  - 1: Consists of ABC Type 2 with structural number of 25.
  - 2: For widening only.
  - 3: Based on minimum practical thickness.
  - 4: Generally restricted to slender base construction.

### Base Group Types
- **ABC Type 2:** Base group type used for widening projects.
- **Structural Number:** Numeric value indicating the structural capacity.

### Structural Range
- **Min:** Minimum structural number.
- **Max:** Maximum structural number.

**Year:** 1994

---

### References
- State of Florida Department of Transportation Manual Design
- Volume 4: Structural Design

---

**State:** Florida

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**Footer:**
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- Document Number: 514
- Date: 01/19

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**Footer:**
- Page 1 of 1
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- Date: 01/19
### TURNOUT PAVEMENT STRUCTURE

**Minimum Requirements**

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<thead>
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<th>Course</th>
<th>Material</th>
<th>Minimum Thickness</th>
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<td>Asphaltic Concrete</td>
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<tr>
<td>Base</td>
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<tr>
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<td><em>Soil Cement (Need Mix)</em></td>
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</tbody>
</table>

**Notes:**
1. Turnouts are to be constructed or resurfaced at locations as directed by the Engineer.
2. Turnout construction is required to be at an approved location.
3. Connections outside the 5' limit are to be constructed as directed by the Engineer.
4. Contract unit price, Turnout Construction, to include excavation and base.
5. Payment for structural course to be included in roadway resurfacing pay item.
6. Payment for feathering friction course to be included in the unit price for Asphalt Concrete Friction Course placed on the roadway. Feathering area will not be included in measured quantities. Feathering toll required for FC-2 friction course.
7. For low volume two-lane facilities without a friction course the structural course is replaced by a surface course.

### General Notes

**SECTION A-A**

**SECTION A-A WITH WIDENING**

**TURNOUT CONSTRUCTION**

- Widening
  - Friction Course
  - Structural Course
  - Leveling Course
  - Feathered FC

**Existing Base & Surface**

**SECTION A-A WITH WIDENING**

**TURNOUT CONSTRUCTION**

- Widening
  - Friction Course
  - Structural Course
  - Leveling Course
  - Feathered FC

**Existing Base & Surface**

**GENERAL NOTES**

1. Turnouts are to be constructed or resurfaced at locations as directed by the Engineer.
2. Turnout construction is required to be at an approved location.
3. Connections outside the 5' limit are to be constructed as directed by the Engineer.
4. Contract unit price, Turnout Construction, to include excavation and base.
5. Payment for structural course to be included in roadway resurfacing pay item.
6. Payment for feathering friction course to be included in the unit price for Asphalt Concrete Friction Course placed on the roadway. Feathering area will not be included in measured quantities. Feathering toll required for FC-2 friction course.
7. For low volume two-lane facilities without a friction course the structural course is replaced by a surface course.
DETAIl C
TWO THRU LANES

FLEXIBLE PAVEMENT THICKNESS TRANSITION

GENERAL NOTES
1. The notes applying to PCC Pavement are not applicable to Flexible Pavement.

2. (a) PCC Pavement Projects:
   Where shoulder pavement adjacent to shoulder gutter is less than 6' wide, it shall be identified in the adjacent roadway pavement beginning with the transition joint nearest the point of 6' width.

(b) Flexible Pavement Projects:
   Where shoulder pavement used in conjunction with shoulder gutter is less than 6' uniform width, it shall be identified in the adjacent roadway pavement.

3. Exit and Entrance terminals as detailed shall not be used for ramps for which a speed of 50 M.P.H. or greater cannot be maintained. For such ramps, parallel demarcation and acceleration lanes shall be used in pairs of lengths set according to AASHTO.

DETAIl D
WITH ADDED LANE

ENTRANCE TERMINALS -SINGLE-LANE RAMPS

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION PAVEMENT DESIGN
RAMP TERMINALS

[Diagram of pavement details with annotations and specifications]
ACCELERATION LANE WITH SHOULDER GUTTER

DECELERATION LANE WITH SHOULDER GUTTER

SHOULDER TREATMENT
AT SPEED CHANGE LANES AT EXPRESSWAY RAMP TERMINALS

DECELERATION LANE WITHOUT SHOULDER GUTTER

ACCELERATION LANE WITHOUT SHOULDER GUTTER

EXPRESSWAY RAMP TERMINALS
SECTION A-A

TYPE A
REINFORCED CONCRETE

PLAN

Symmetrical about 6'-0"

One row of 12" & 18" piers (in center of lane)

No. 4 Bars @ 6" Ctrs Top and Bottom

Shoulder Width 6'-0"

Shoulder Width 4'-0"

4'-0" Bases

Const. Joint

1/4" Wets. 31/2" Shoulder

Slope to Match Pavt. 1/2

Slope to Match Shoulder

SECTION X-X

TYPE B
TREATED TIMBER

NOTE
TRACTOR CROSSING TO BE CONSTRUCTED TO MATCH G GATEMENT CROSS SLOPE.

THE NUMBER OF PIERS REQUIRED WILL VARY WITH THE OVERALL WIDTH, A MINIMUM NUMBER OF PIER WILL BE USED SO THAT THE OVERALL WIDTH OF THE TRACTOR CROSSING WILL BE A MINIMUM OF ONE FOOT GREATER THAN THE PAVEMENT WIDTH. THE TRACTOR CROSSING WILL BE CENTERED ON THE PAVEMENT CENTERLINE.

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION P & E ISSUE

TRACTOR CROSSINGS

[Diagram showing plan and section with notes and specifications]
GENERAL NOTES

1. The purpose of shrubs in areas back of guardrail is to eliminate hand movements in those areas.
2. Shrubs are to be spaced approximately 6 ft. back from guardrail posts and hazards. Narrow plant areas due to loss of space one row of shrubs, as street through the Engineer.
3. Shrubs are to be planted approximately 3 ft. center to center with 3 ft. spacing.
4. Shrubs are to be placed in sets of two rows to create a curtain pattern at the center of the road.
5. Shrubs shall be specified in the plant by Landscape Master Master Plan with list numbers.
6. Only one variety of shrub shall be planted within any given contiguous area and no shrub variety is to be repeated within a distance of one mile.
7. All guardrail spacing in conjunction with shrub planting and specification shall be in accordance with Section 359 of the Standard Specifications.
GENERAL NOTES
1. The furnishing and installing of concrete crossovers together with any
   equipment, pavements, guardrail, improved access, and track alignment shall
   be furnished and installed by the Railroad Company without cost to the Contractor or
   the Department.
2. All concrete bases, rubber pads for top of ties and wood filler blocks shall
   be furnished and installed by the Railroad Company.
3. Concrete crossovers shall be located on 20" centers by the Railroad Company.
4. Rubber pads shall be installed on concrete ties in field using contact cement.
5. Filter blocks shall be pressure treated pine or clear heart redwood and shall
   be shaped prior to treatment.
6. Class I concrete is to be used in construction by contractor of George Approach Slabs and for
   laying skewed crossings (Cost of Skewed) to be included in Cost of Class I Concrete.
FRAME DETAILS

SECTION A-B

1. This drawing is based on using 13\% rail on a tangent section and decking fabricated in sections to fit the corresponding sections of the supporting frame. The depth of the Z bars and channels may be varied to fit other rail sections.
2. The framework units are attached to ties by 3/8\" x 3/4\" log screws, and to new work, by 5/8\" anchor bolts. Double coil spring washers are used with log screws to compensate for vertical motion.
3. The decking is attached to the framework with 5/8\" bolts. The head of the bolt is to be spot welded to the underside of the channel flange.
4. Flashing and outside filter timbers are to be flashed to assure close fit prior to treatment.
5. Ties to be clad and spaced 18\" C to C.
6. Crossing of any angle can be equipped with units of either 45\°, 67\°30\" or 90\°.
7. Decking may be as shown or equal (Submit shop drawings for approval by the Engineer).
GENERAL NOTES

1. The crossings shown on this sheet are NOT to be used for multiple track crossings within zones for an existing or scheduled future vehicular stop. Zone lengths are charted above.

2. Crossings on this sheet may be used for single track crossings within the zones in the chart unless engineering or safety considerations dictate otherwise.

3. Details shown are for straight track installations. Materials are also available for curved track installations.

4. For additional details, materials required and installation procedures refer to the manufacturer's specifications.

EXPERIMENTAL - Requires Prior Approval

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION
ROAD DESIGN

RAILROAD CROSSINGS
TYPE P & R

CROSSING TYPE "R" (RUBBER)

CROSSING TYPE "P" (POLYETHYLENE)
GENERAL NOTES

1. The reinforced concrete slabs are manufactured in 12'-0" sections, 3" in depth to fit all rail sections 5 1/4" in height or heavier. Slabs are interchangeable and reusetable.

2. Center slabs are one piece construction allowing for 2 1/2" flange opening. 80 lb. rail is used to encase, armor and reinforce slabs and is held to gage with 3 tie rods per slab.

3. Slabs are installed by a "flotation" process, supported on non-shrinkable, non-metallic grout positioned on the ties. Slabs can be placed on wood ties, concrete ties, steel ties, bridge decks or any other type of track support. No re-spacing of ties is necessary.

4. Slabs are secured to "running rails" with specially designed hardware. Insulation is to be provided for crossings in signal territory.

5. Curved slabs are fabricated to fit curved track to 22 degrees (262.04' radius). Special slabs are available for Diamond Crossings, Turnouts, Multiple Tracks, Bridge Decks and Rapid Transit Systems.

6. For additional details, materials required and installation procedures refer to the manufacturer's specifications.
PHASE I
1. Maintain two-lane two-way traffic over existing pavement. Construct new roadway within the proposed 4-lane limits, excluding the friction course. Sign as shown if roadway construction area falls within 15 feet of existing pavement edge. When the construction area falls more than 15 feet from the existing pavement edge, traffic shall be controlled in accordance with Cases 1, 2, or 3 of the MTCSP.
2. Construct shoulder pavement to provide two-lane two-way traffic over shoulder and existing pavement during Phase III roadway construction. Lanes to be not less than 10 feet in width. Signing as shown to be in place prior to shoulder pavement construction.

PHASE II
1. Remove existing pavement marking, in areas of detour and re-mark as shown, install warning devices and re-sign as shown. Traffic to be controlled in accordance with Case 2 of the MTCSP. Lanes to be not less than 10' in width.
2. Route through traffic to temporary and existing pavement.
3. Construct transitions, excluding friction course.

LEGEND
- Phase I
- Phase II
- MTCSP Manual On Traffic Control And Safe Practices
- Denotes Direction Of Traffic And Open Not Reflect Pavement Marking

CONVERTING TWO LANES TO FOUR LANES DIVIDED STANDARD TRAFFIC CONTROL PLAN RURAL FACILITY
GENERAL MAINTENANCE OF TRAFFIC NOTES

1. All signing, pavement marking, barriers and warning lights necessary for maintenance of traffic shall conform to the MTCS.

2. Lane widths for maintenance of two-way traffic shall be at least 10 feet, and lane widths of the existing facility, but lanes shall not be less than 10 feet wide. When lane reductions are necessary, a minimum lane width of 10 feet shall be maintained and traffic conducted in one lane as needed to maintain lane width.

3. Pulsed pavement markers shall be placed along the center of the pavement under traffic at 20-foot centers in the transition area where alignment shift is 10 feet or greater.

4. Pulsing signs and pavement markings that conflict with construction signing and marking shall be eliminated or removed.

5. Pulsed speed on the existing facility shall be decreased at the rate of 10 mph per 500 feet (minimum distance) until deceleration speed is reached.

6. Additional barricades, signing, lighting or other traffic controls as required by the MTCS shall be provided as conditions warrant at each phase.

7. Pulsed speed at the construction site shall exceed one mile per hour, as directed by the Engineer.

8. Provisions approved by the Engineer shall be made for the removal of stone in the roadway during construction.

9. Decelerating shall meet the requirements of Chart 1 of the MTCS.

LEGEND

- Phase I
- Phase II
- MTCS
- Manual on Traffic Control
- Sign and Barriers
- Denotes Direction of Traffic and Does Not Reflect Pavement Marking

PHASE III

1. Repave through traffic as shown in Phase II. Signing to be as shown in Phase II.

2. Construct friction course over pavement constructed in Phase I and II.

CONVERTING TWO LANES TO FOUR LANES DIVIDED STANDARD TRAFFIC CONTROL PLAN RURAL FACILITY

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION

MILES

CONTRACTOR

IMPROVEMENT

DATE

REVISION

REQUEST

DATE

SHEET

DATE

DRAWN BY

APPROVED BY

P.O. APPROVED

SHEET No.

DRAWN

SPEC.

SHEET No.

DRAWN

SHEET No.

PAINT

SHEET No.

REV.

SHEET No.

REV.

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SHEET No.
PHASE III

1. Sign and mark Phase II pavement in accordance with the Phase III diagram.
2. Reroute through traffic to Phase III pavement.
3. Construct friction course over Phase I pavement. Side street traffic to be maintained. Through and cross traffic to be controlled in accordance with Cases XX and XXX of the MTCSHP. When work extends through an intersection, temporarily reroute cross traffic to other cross streets. When rerouting is not possible, provide one lane access (minimum) for two-lane two-way cross streets and one lane access (minimum) each direction for four-lane two-way cross streets.

GENERAL MAINTENANCE OF TRAFFIC NOTES

1. All agencies, pavement markings, barricades and warning lights necessary for maintenance of traffic shall conform to the MTCSHP.
2. Routed pavement markings shall be placed along the center of pavement spot to traffic at 20' centerline in the transition area where alignment shift is 10 feet or greater.
3. For divided facility, identify through traffic signing on show chosen shall be placed on the curbed and median of both roadways for each phase.
4. Existing signs and pavement markings that conflict with construction signages and markings shall be obliterated or removed.
5. At signalized intersections, signals shall be directed or repositioned as required to the center of repositioned lanes.
6. Provisions approved by the Engineer shall be made for the removal of steam pipes from the roadway(s) during construction.
7. Additional barricades, signing, lighting or other traffic controls as required by the MTCSHP shall be provided as conditions warrant in each phase.
## DESIGN CRITERIA RELATED TO HIGHWAY SAFETY

### FLORIDA DEPARTMENT OF TRANSPORTATION

**January 1986**

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<thead>
<tr>
<th>TYPE OF FACILITY</th>
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### EMBANKMENT SLOPE

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### CLEAR WIDTHS FOR BRIDGES

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### CLEAR ZONE

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### LIGHT POLES

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### UTILITY POLES, FIRE MIRRORS, ETC.

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### RAILROAD CROSSING DEVICES

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### MEDIAN WIDTHS

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### TREES

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<tbody>
<tr>
<td>4 feet</td>
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</tbody>
</table>

Design speed to be established using realistic anticipated operating speed. (Assume 55 mph limits to be non-existent.)

Prefrontal cross sections are shown on pages 25, 26, 27 of the AASHO Guide for Selecting, Locating, and Designing Traffic Barriers.

Consideration should be given to maintaining greater than the above specified clearances and/or flare areas so that feasible and practical.

6. No projects where the existing or newly planned trees are in the median or at the edge of the roadway will be approved. In all locations where median development such as buildings, etc. provide less clearance, bridge piers can be placed to provide clearance less than 10.'

Values shown above shall be used on all new project construction and re-construction projects to the extent that economic and environmental considerations and R/W limitations will allow. For definitions of new construction and reconstruction see "Manual of Uniform Minimum Standards for Design, Construction, and Maintenance for Steel and Highway Bridges."
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## TRAFFIC DESIGN STANDARDS

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<td>17328</td>
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<td>OVERHEAD SIGN STRUCTURES, DETAILS OF SIGN FACES &amp; TRUSS CONNECTION</td>
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<td>FOOTINGS FOR OVERHEAD SIGN TRUSSES, TYPE A, B OR C TRUSS (SHEET 10F 2)</td>
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<td>TYPE &quot;C&quot; SINGLE COLUMN GROUND SIGNS (SIGN PROFILE &amp; IDENTIFICATION NUMBERS)</td>
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<td>TYPICAL SECTIONS FOR SINGLE COLUMN SIGN PLACEMENT</td>
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<td>a) Added Dimension for concrete pole depth.</td>
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<td>b) Added note on mounting height requirements for concrete and metal poles.</td>
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<td>c) Modified foundation note and ground rod note on metal detail.</td>
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<td>d) Added note for backfill of concrete pole.</td>
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<td>Changed Ground Rod Length from 10 ft. to 20 ft.</td>
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<td>Changed Fuse Type and size in switch box.</td>
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<td>Revised conduit and added pull box.</td>
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<tr>
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<td>Changed Traffic Operations Numbers to Traffic Plans Numbers and revised double yellow line.</td>
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GROUND ROSS SHALL HAVE A RESISTANCE TO GROUND NOT TO EXCEED 25 OHMS, WHERE THE RESISTANCE IS NOT AS LOW AS 25 OHMS, TWO OR MORE GROUND ROSS CONNECTED IN PARALLEL SHALL BE USED. CONTRACTOR SHALL HAVE NECESSARY TEST EQUIPMENT CURRENT CALIBRATION CERTIFICATE REQUIRED AT FINAL INSPECTION TO INSURE ACCURACY OF GROUNDING SYSTEM.

TOTAL GROUNDING SYSTEM NOT TO EXCEED 25 OHMS.

THE CONTRACTOR SHALL BE RESPONSIBLE FOR CONTACTING ALL UTILITY COMPANIES PRIOR TO ANY UNDERGROUND WORK. THE UTILITY COMPANY WILL LOCATE AND IDENTIFY THEIR UTILITIES.

CONTRACTOR SHALL DETERMINE THE SERVICE REQUIRED DATE FOR THE POWER COMPANY TRANSFORMER INSTALLATION AT THE PRE-CONSTRUCTION CONFERENCE.

THE POWER COMPANY RESERVES THE RIGHT TO INSTALL THE REELS, EARTHING DECK AND HAZARDIZER ON POWER COMPANY PROPERTY FOR THEIR USE OR FOR AUTHORIZATION FOR AN ALTERNATE PROCEDURE.

ANY DAMAGED PORTIONS OF GALVANIZED STEEL POLES AND BRACKET ARMS SHALL BE REPAIRED IN ACCORDANCE WITH SECTION 562 OF THE STANDARD SPECIFICATIONS.

POLES, BRACKET ARMS AND FRANGIBLE DEVICES SHALL BE DESIGNED IN ACCORDANCE WITH THE DESIGN CRITERIA AS INDICATED IN THE PLANS AND USING THE APPLICABLE EQUATIONS FOUND IN "STANDARD SPECIFICATIONS FOR STRUCTURAL SUPPORTS FOR HIGHWAY SIGNS, LUMINARIES AND TRAFFIC SIGNALS" PUBLISHED BY A S T T DATES SETS.

THE LUMINARIE MANUFACTURER SHALL PLACE A PERMANENT TAG ON THE LUMINARIE PROVIDING SPECIFICATIONS ON THE FOLLOWING: MANUFACTURER, SERIAL NUMBER, MODEL, LUMINARIE LOCATION, LAMP SETTING POSITION, LUMINARIES, LAMP DISTRIBUTION WITH THIS LAMPS IN THE POSITION SPECIFIED, INPUT VOLTAGE AND POWER FACTOR, LUMINARIE PHOTOMETRIC SUBMITTAL, REQUIRED.

BEFORE FINAL ACCEPTANCE, CONTRACTOR SHALL PROVIDE 2 SETS OF FULL SIZE AS-BUILT PLANS TO THE MAINTAINING AGENCY.

CONDUIT ROUTING SHALL BE POLE TO POLE, MAINTAINING POLE DETACHMENT DISTANCE FROM EDGE OF PAVEMENT, ANY CABLE ROUTING IN LOCATIONS WHERE EXCAVATIONS OR DREDGED SHALL BE 2 DEEPEST "O" IN FRONT OF THE STANDARD SLOPES POSITION.

POLE POSTIONS AND CONDUIT ROUTING MAY BE ADJUSTED AS JUDGED BY THE MAINTAINING AGENCY, THE CONTRACTOR AND THE DESIGNER, POST-CONFLICT WITH UNDERGROUND LIGHTING CIRCUITS.

WHERE SCARFING IS CONSTRUCTED, THE POLES SHALL BE PLACED A MINIMUM OF 4 BELIND OF SURFACE.

POLE FOUNDATION INSTALLATIONS SHALL BE BACKFILLED TO THE TOP OF THE FOUNDATION IN LOAM 1:0:1 (ONE THIRD CLAY TO TWO THIRDS SOIL) CONDITION APPROXIMATLY EQUAL, THEN THE ADJACENT SLOP THE FILL SHALL CONFORM TO EXISTING GRADE AND BE FULLY COVERED.

THE WIRES AT THE POLE HANDBALE AND FULL BOXES SHALL BE COPED UP IN THE POLE AND FULL BOXES WITH DIFFERENT LENGTH TO COMPLETELY REMOVE CONNECTORS TO THE OUTSIDE OF HANDBALE AND FULL BOXES TO MAKE CONNECTORS ACCESSIBLE FOR DIAMOND FUSES AND TROUBLE SHOOTING THE SYSTEM.

NEUTRAL WIRES TO HAVE WHITE INSULATION, DO NOT USE WHITE OR GREEN INSULATED WIRES FOR UNDERGROUND CONDUCTORS.

UNLESS OTHERWISE SPECIFIED, ALL CABLE SHALL BE SINGLE CONDUCTOR, 50 PERCENT CONDUCTIVITY STRANDED COPPER, WITH THE INSULATION.

ALL SPACES SHALL BE MADE IN FULL BOXES OR THE POLE BASE, NO SPACES ARE TO USE THE FULL BOXES OR POLE BASE. ALL EXPOSED WIRING SHALL BE IN FULL BOXES OR POLE BASE, FURNISHED WITH FULL BOXES ON THE CONTRACT PLANS AND TO BE INSTALLED PRIOR TO DEPARTMENT APPROVAL OF THE SUBMITTAL DATA.

POLES MOUNTED ON SURFACE WALL OR BEING SHIELDED ARE EXEMPT FROM THE ABOVE PRECAUTIONS.

STRUCTURAL SUPPORTS FOR HIGHWAY SIGNS, LUMINARIES AND TRAFFIC SIGNALS PUBLISHED BY A S T T DATES SETS.

ALL MATERIALS, UNLESS OTHERWISE SPECIFIED, SHALL BE UNCHALLENGED LUMINARIES AND BRACKET ARMS LABORATORY APPROVED.

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SIGN LIGHTING INSTALLATION

The roadway lighting contractor shall provide a means for sign service entry into a pole top or a pull base installed in lighting circuit methods for lighting circuit for convenience by Sign Contractor. The sign contractor shall furnish and install luminaires, fused safety switches, conduct, connectors, and all other electrical equipment necessary for connection to roadway lighting circuit as provided by roadway lighting contractor. Compression type connectors properly tacked and wire-wrapped shall be used. See roadway lighting plans for sign service locations.

When roadway lighting circuits are not available in the responsibility of the sign contractor to furnish Service Power Equipment. Unspecified in index (FM:0:1:0:0:0:0:0) and one other equipment necessary for operation of the lighted sign.

PLACEMENT OF SIGN LIGHTS

1. Luminaries shall be mounted so that the lamp centers are 4-1/4" in front of front of the sign face.
2. Luminaries shall be mounted so that the back of the fixture is placed 2-1/4" below the bottom edge of the sign face.
3. Luminaries are manufactured to be installed at a height of 8' for 4"x8" x 10" aluminum sign structure.
4. Photographic Data: For The Mercury Vapor Luminaire Proposed for Sign Lighting shall be submitted for approval to the Lighting Engineer, Florida Department of Transportation.

Use 1/4" Liquid Tight Flexible Conduit from Junction Box to Ballast and from Junction Box to Top in Luminaire Bracket. Conduit must be of sufficient length to allow rotation of Luminaire Bracket 90° in either direction.

System to be made with Acceptable Shaped Thin Pressure Mounted & Waterproofed.

FLORIDA DEPARTMENT OF TRANSPORTATION

EXTENSION, LOCATION FOR SIGNS

(INTERNAL PHASED FOR SIGNS)

DATE
REVISIONS
INITIAL DATES

06-19

8-9

17505

08-08

08-08

08-08

STATE DESIGN ENGINEER: RPCH

PROJECT ENGINEER: RPCH

CHECKED BY: RPCH

Drawings No. 10.01

INDEX No. 17505

10'-0" or LESS
30'-0" to 50'-0"
50'-0" to 60'-0"
60'-0" to 100'-0"
<table>
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**NOTE:**
- All dimensions are in inches.
- All tolerances are +-.0625.

**MEMORANDUM TO FILE:**
- All dimensions and tolerances are in accordance with the Specifications for Highway Bridges and Structures.
- All details shown on the drawings are for guidance only and do not constitute contractual documents.

**PLAN:**
- Dimensions A and B are as shown.

**SECTION A-A:**
- Details are as shown.

**OVERHEAD TRUSS DETAILS:**
- All trusses are of the A, B, or C type.
- Details are as shown.

**OVERHEAD TYPE A, B, AND C TRUSSES:**
- State of Flushing Department of Transportation Structures
- Draft Date: 12/31/2021
- Scale: 1/2" = 1'-0"
- Designed by: F. Ball, AIA
- Approved by: J. J. Smith

---

**NOTES:**
1. All dimensions shown are in feet and inches.
2. All tolerances are ±.0625.
3. All details shown are for guidance only.
4. All trusses are of the A, B, or C type.
5. All details are as shown and do not constitute contractual documents.

---

**OVERHEAD TYPE A, B, AND C TRUSSES:**
- State of Flushing Department of Transportation Structures
- Draft Date: 12/31/2021
- Scale: 1/2" = 1'-0"
- Designed by: F. Ball, AIA
- Approved by: J. J. Smith
### Design Notes

**Materials:** Aluminum alloy, steel, and wood.

- **Aluminum:** All signs are made of aluminum alloy (5052-H321) with a thickness of 0.125" (3.2 mm).
- **Steel:** All gusset plates and bolts are made of steel (A36) with a thickness of 0.125" (3.2 mm).
- **Wood:** All sign support posts are made of pressure-treated wood (Grade A) with a thickness of 4" (102 mm).

**Concrete:** The sign support posts are embedded in concrete (C30/37) with a minimum cover of 4" (102 mm).

**Aluminum Bolts:** The aluminum bolts are used for attaching steel gusset plates and posts.

**Concrete:** All concrete is mixed according to the ASTM C109 specifications.

**General:** All signs must be installed according to the specifications provided in this document.

### Signs and Sign Brackets

**Types:** There are different types of signs and sign brackets available, each with specific dimensions and materials.

**Design:** Signs are designed to be durable and resistant to weather conditions.

**Installation:** All signs must be installed using proper hardware and techniques as specified in the installation manual.

### Sign Clearances

- **Height:** Signs must be installed at least 6" (152 mm) above the ground level.
- **Width:** Signs must be installed within 12" (305 mm) of the edge of the road.

**Clearance:** All signs must be installed with proper clearances to ensure visibility and safety.

### Typical Section

- **Frame:** The frame is made of steel (A36) with a thickness of 0.125" (3.2 mm).
- **Gusset Plates:** The gusset plates are made of steel (A36) with a thickness of 0.125" (3.2 mm).
- **Bolts:** All bolts are made of stainless steel with a grade of 304.

**Sign Post:** The sign post is made of pressure-treated wood (Grade A) with a thickness of 4" (102 mm).

### Sign Brackets

**Types:** There are different types of sign brackets available, each with specific dimensions and materials.

**Design:** Sign brackets are designed to securely hold signs in place.

**Installation:** All sign brackets must be installed using proper hardware and techniques as specified in the installation manual.

### Sign Drawing Notes

- **Material:** When using wood, the sign brackets must be made of pressure-treated wood (Grade A).
- **Design:** All design changes must be approved by the engineer.
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### Diagram

1. **Sign Panel Details**
   - Type Bracket
   - Type Bracket

2. **General Notes**
   - For sign identification numbers, see Column "Ident." in Table.
   - The measured column height is the distance between the sign panel and the ground. The height shown in the Table is the minimum height. The sign panel is to be mounted at least 10 ft above grade.
   - The sign will have a knee brace support on multiple columns. Type "K" knee brace supports.

3. **Column Details**
   - Columns in the Table are aluminum tube, diameter equal to outside diameter times wall thickness. Side 8" x 6" x 1/2" x 1/2" x 1/2". Take note of the following:
     - Take note of the following:
       - The column will be supported and reinforced with concrete footing and slab base.
   - 3.1: FOOTINGS: Footings are reinforced with the following:
     - The support column must be driven into the ground by its own weight at the depth indicated. The footing of the support column which is driven into the ground must be provided with a rebar cage as shown.

4. **Slip Base Notes**
   - Concrete (1) section 1 of 3.1, to be made with a cement content of not less than 11.5% cement by volume of concrete.
   - Steel bolts are to be Grade 50, A572, or equivalent. Stainless steel bolts are to be Grade 5.0, A307, or equivalent. The slip base bolts shall be the same size as the column and not larger than the column.
   - The slip base bolts shall be the same size as the column and not larger than the column.

5. **Column Details**
   - The slip base bolts shall be the same size as the column and not larger than the column.
   - The slip base bolts shall be the same size as the column and not larger than the column.

6. **Base Plate Details**
   - The slip base bolts shall be the same size as the column and not larger than the column.
   - The slip base bolts shall be the same size as the column and not larger than the column.

7. **Stud Details**
   - The slip base bolts shall be the same size as the column and not larger than the column.
   - The slip base bolts shall be the same size as the column and not larger than the column.

8. **Column Details**
   - The slip base bolts shall be the same size as the column and not larger than the column.
   - The slip base bolts shall be the same size as the column and not larger than the column.

9. **Base Plate Details**
   - The slip base bolts shall be the same size as the column and not larger than the column.
   - The slip base bolts shall be the same size as the column and not larger than the column.

10. **Stud Details**
    - The slip base bolts shall be the same size as the column and not larger than the column.
    - The slip base bolts shall be the same size as the column and not larger than the column.

11. **Column Details**
    - The slip base bolts shall be the same size as the column and not larger than the column.
    - The slip base bolts shall be the same size as the column and not larger than the column.

12. **Base Plate Details**
    - The slip base bolts shall be the same size as the column and not larger than the column.
    - The slip base bolts shall be the same size as the column and not larger than the column.

13. **Stud Details**
    - The slip base bolts shall be the same size as the column and not larger than the column.
    - The slip base bolts shall be the same size as the column and not larger than the column.
<table>
<thead>
<tr>
<th>Column Size (Inches)</th>
<th>Plate Size</th>
<th>Plate Thickness</th>
<th>F</th>
<th>S</th>
<th>N</th>
<th>S</th>
<th>T</th>
<th>T</th>
<th>L</th>
<th>W</th>
<th>Dimension in Nominal Diameter</th>
</tr>
</thead>
<tbody>
<tr>
<td>4&quot;x8&quot;</td>
<td>6&quot;x8&quot;</td>
<td>1/8&quot;</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>4&quot;</td>
</tr>
<tr>
<td>6&quot;x10&quot;</td>
<td>8&quot;x10&quot;</td>
<td>1/8&quot;</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>6&quot;</td>
</tr>
<tr>
<td>8&quot;x12&quot;</td>
<td>10&quot;x12&quot;</td>
<td>1/8&quot;</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>8&quot;</td>
</tr>
<tr>
<td>10&quot;x14&quot;</td>
<td>12&quot;x14&quot;</td>
<td>1/8&quot;</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>10&quot;</td>
</tr>
<tr>
<td>12&quot;x16&quot;</td>
<td>14&quot;x16&quot;</td>
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<td>2</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>12&quot;</td>
</tr>
</tbody>
</table>

**NOTE:** Thickness of Sleeve shall match the size of Column inside diameter of the bearing plate provided by the shop drawings for each type of Column.

**SPECIFICATIONS**

**ERRODED TUBES:** The material used shall meet the requirements of the American Association of Welding and Structural Specification A5.1.

**WELDING ROOF:** The American Association of Welding and Structural Specification A5.1.

**TIRE MACHINES:** The American Association of Welding and Structural Specification A5.1.

**ALUMINUM BOLTS, NUTS, AND LOCKNUTS:** Aluminum alloy shall meet the requirements of the Participant's Association of Welding and Structural Specification A5.1.

**HOSTILITY:** The material used shall meet the requirements of the American Association of Welding and Structural Specification A5.1.

**SLIP-RESISTANCE:** All accessible areas shall be in accordance with the Standard Specifications for Highway Bridges, Subdivision C.

**ELEVATION:** The material used shall meet the requirements of the American Association of Welding and Structural Specification A5.1.

**NOTE:** The Column size shall be shown on the drawings for identification.

**STEEL BOLTS, NUTS & LOCKNUTS:** All Anchor bolts, Nuts and Locknuts shall meet the requirements of the American Association of Welding and Structural Specification A5.1.

**Figure 3:** Axial Load Calculations

**Table 1:** Material Properties
ELEVATION

Mounting of Exit Numbering Panels To Highway Signs

NOTE: EXIT NUMBERING PANELS shall be located to the right side for right exit and to the left for left exit.

SECTION A-A

GENERAL NOTES


SHEETS AND PLATES: Material shall meet the requirements of Aluminum Association Alloy 6061-T6 and ASTM Specification B-209. Sheets are to be degreased, cleaned, neutralized and treated with Alumin 2000, MIL-H-5.555, Standard D-1, or equivalent. The remaining parallel on sheet.

MATERIALS: All aluminum shall meet the requirements of the Aluminum Association Alloy 6061-T6 and shall meet the following ASTM Specifications for the following: Sheet and Plates B-209, Extruded Shapes B-225 and Extruded Structural Shapes B-290.

ALUMINUM BOLTS, NUTS & LOCKNUTS: Aluminum bolts shall meet the requirements of Aluminum Association Alloy 6064-T4 or 6065-T61; ASTM Spec. B-431; The bolts shall have an Anodic Coating of Type II 0.00020, Bead Blasted Surface, and be Aluminum Finish. The aluminum nuts shall meet the requirements of the Aluminum Association Alloy 6061-T6 or 6064-T4. The aluminum locknuts shall meet the requirement of Aluminum Association Alloy 6686-T6 or 6061-T6.

SIGN FACE: All Sign Face Covers shall be rounded. Sign Face Covers shall be rounded. For information on Sign Face Covers, MATERIAL STRESSES: All sign face stresses are in accordance with the Standard Specifications for Structural Supports for Highway Signs, Luminaire and Traffic Signals A.S.H.O. (1978), for all stresses shown in the plan.

FOR MOUNTING DETAILS REFER TO DRAWING NO. 1 OF I, INDEX 1037.
FOR FREEWAY USE

WEIGH STATION 1 MILE

ALL TRUCKS
ENTER WEIGH STATION

WEIGH STATION NEXT RIGHT

WEIGH STATION

NOTE:

FOR OTHER THAN FREEWAY USE

WEIGH STATION 1 MILE

ALL TRUCKS
ENTER WEIGH STATION

WEIGH STATION 1000 FT

NOTE:

ALL SIGNS TO HAVE GREEN REFLECTORIZED BACKGROUND WITH WHITE LEGEND AND BORDER EXCEPT SIGNS NO. FTP-4 & FTP-8, WHICH SHALL HAVE WHITE BACKGROUND WITH BLACK LEGEND AND BORDER ALL DIMENSIONS SHOWN ARE IN INCHES AND EIGHTHS
NOTE:
ALL SIGNS SHALL HAVE GREEN REFLECTORIZED BACKGROUND WITH WHITE LEGEND AND BORDER, EXCEPT SIGN FIT-49A, WHICH SHALL HAVE A WHITE BACKGROUND WITH BLACK LEGEND AND BORDER.

ALL DIMENSIONS SHOWN ARE IN INCHES AND ROUNDS.

ALL GUIDE SIGN CORNER RADIUS SHALL HAVE THE OUTSIDE CORNERS OF SIGN FACE CUT CONCENTRIC WITH BORDER. BORDER TO BE MOUNTED TANGENT TO AND WITH EDGE OF SIGN.
1. TRAFFIC CONTROL DEVICES FOR A SCHOOL CROSSWALK AT A SIGNALIZED INTERSECTION

2. TRAFFIC CONTROL DEVICES FOR A SCHOOL CROSSWALK AT A STOP CONTROLLED INTERSECTION
9. TRAFFIC CONTROL DEVICES AT SCHOOL ENTRANCES WHERE THERE ARE LITTLE OR NO WALKING STUDENTS

These signs are intended for use only at those few locations where the school entrance is not evident to the motorist, and must be approved in advance by the responsible traffic engineering authority.

10. TRAFFIC CONTROL DEVICES FOR A TYPICAL SCHOOL ZONE FRONTING THE SCHOOL PROPERTY

The school bus stop ahead sign is to be used in advance of locations where a school bus, when stopped to pick up or discharge passengers, is not visible for a distance of 500' in advance. It shall have a minimum size of 30" x 30" and is not intended for use on any road where the school bus stops to pick up or discharge passengers or where the terrain and roadway features limit the approach sight distance and where discharging is not possible without locating the sign in another location with adequate visibility.

LOCATION OF SCHOOL SPEED LIMIT SIGN WHERE A REDUCED SPEED LIMIT HAS BEEN APPROVED
FLASHER UNIT AND CABINET TO BE PLACED ON THE STRAIN POLE SUPPORTING OVERHEAD SIGN ASSEMBLY OR ON SERVICE POLE. THE FLASHER UNIT NOT TO OVERHANG PRIVATE PROPERTY OR SIDEWALK.

BULB REPLACEMENT SHALL BE FROM THE FRONT.

NOTE: FLASHING BEACON MAY BE PLACED WITHIN OR BELOW PANEL.

OPTIONAL LOCATION OF FLASHING BEACON.

5/16" ALUMINUM GROUND HEAD BOLTS WITH NUTS AND LOCKWASHERS. BOLTS SHALL BE SPACED 1/2" CENTERS MAX.

CABLE ENTRY DETAIL

LOCK NUT

DRILL 1/8" HOLE

1/8" FLEXIBLE CONSULT OR 10-32 ANGLE CONNECTOR

CABLE ENTRY DETAIL
SCHOOL SPEED LIMIT 
00 MPH 
WHEN FLASHING 
SCHOOL DAYS 
0:00 - 0:00 
0:00 - 0:00 
YELLOW BACKGROUND WITH 
BLACK LEGEND AND BORDER 
WHITE BACKGROUND WITH 
BLACK LEGEND AND BORDER 
24" x 36" 
24" x 36" 
NOTES: 
1. ALL SIGNS SHALL BE REFLECTORIZED. 
2. STANDARD SIZE SIGNS SHOULD BE USED WHENEVER POSSIBLE. MINIMUM SIZE MAY BE USED ONLY ON LOW VOLUME, LOW SPEED (LESS THAN 35 MPH) STREETS. SPECIAL SIZES SHOULD BE USED ON EXPRESSWAY FACILITIES WHERE SPECIAL EMPHASIS IS NEEDED. 
3. THE VALUE OF THE ACTUAL SCHOOL ZONE SPEED LIMIT SHALL BE DETERMINED BY THE DISTRICT TRAFFIC OPERATIONS ENGINEER IN COOPERATION WITH LOCAL SCHOOL SUPERINTENDENTS. IN NO CASE SHALL IT BE LESS THAN THE 15 MPH MIN. SET BY LAW. 

END SCHOOL ZONE 
4'0" x 4'0" 
1/2" BORDER - 3 1/8" RAD. 
BLACK ON WHITE 
OVERHEAD STANDARD 
FLASHING BEACON MAY BE PLACED WITHIN OR BELOW PANEL 

SCHOOL ZONE 
SCHOOL ENTRANCE 
00 MPH. 

END SCHOOL ZONE 
24" x 30" 
1 1/2" BORDER. 
BLACK ON WHITE 
NOTE: 
ALL SIGNS SHALL BE REFLECTORIZED.
**PARALLEL ACCELERATION AND DECELERATION LANE**

- **White Thermoplastic Arrow** with Colorless-Red Reflective Markers
- **White Paint Arrow** with Colorless-Red Reflective Markers

**WRONG WAY ARROWS**

**FLORIDA DEPARTMENT OF TRANSPORTATION**

**TRAFFIC DESIGN**

**INTERCHANGE MARKINGS**

<table>
<thead>
<tr>
<th>DATE</th>
<th>REVISIONS</th>
<th>INTERCHANGE MARKINGS</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
- **Types of Permanent Longitudinal Lines**
  - Solid white channelizing line
  - Broken white line
  - Broken yellow center line
  - Solid yellow line
  - Solid white line
  - Solid yellow edge line
  - Solid yellow line or lane line
  - Yellow edge line
  - Dotted line (turning guide line)
  - Two-lane passing prohibited (yellow)
  - Double solid yellow (or white)

- **NOTES**
  - For details on temporary lines, see manual on traffic controls and safe practices. Figure 2:6
  - Basic color: White
  - White lines separate flows in the same direction
  - Yellow lines separate flows in the opposite direction
  - Yellow dotted lines shall be omitted in special cases

- **Pavement Markings and Delineators for Median Cross-Over**
  - Traffic flow
  - White line
  - Yellow line
  - Edge line
  - Use amber delineators on sides facing cross-over, use galvanized steel posts
  - Use green delineators on sides away from cross-over
  - Generally, top of posts should be 48" above the edge of the pavement grade

- **Pavement Markings for Intersections with Major and Minor Roads**
  - Bus stop
  - ONLY lane
  - Merge

- **Pavement Arrow and Message Details**
  - Right turn arrow to be reverse
  - Yellow 6'-0" skip
  - Edge line in turn bay is optional as shown in plans

- **Florida Department of Transportation**
  - Traffic Series
  - Special Markings Areas
  - Revisions
  - Initials
  - Dates
  - Drawing No.
  - Index No.
TYPICAL CROSSWALK MARKINGS
FOR WHEELCHAIR RAMPS
REFER TO INDEX NO. 7708

FLORIDA DEPARTMENT OF TRANSPORTATION
TRAFFIC DESIGN
SPECIAL MARKING AREAS

REVOLUTIONS

INITIALS

DATER

DESCRIPTION

NOTED

SPECIAL

MARKING

REMARKS

REV.

SPECIAL

MARKING

REMARKS

INDEX NO.

DRAWING NO.

2 OF 8

17544
PAVEMENT MARKINGS FOR TRAFFIC CHANNELIZATION AT GORE
(TRAFFIC FLOWS IN SAME DIRECTION)

NOTE
RAISED PAVEMENT MARKERS SHALL BE SET IN THERMOPLASTIC AS SHOWN BELOW, OR SET TWO (2) INCHES INSIDE PAINTED LINE AS SHOWN IN DETAIL A.

PAVEMENT MARKING FOR TRAFFIC SEPARATION
(TRAFFIC FLOWS IN OPPOSITE DIRECTION)

FLORIDA DEPARTMENT OF TRANSPORTATION
TRAFFIC DESIGN
SPECIAL MARKING AREAS

REVISIONS

INITIAL DATES

DRAWING NO. 10 A/1
INDEX NO. 1146
GENERAL NOTES:

1. FOR TRAFFIC AND PEDESTRIAN SIGNAL INSTALLATION, SEE STANDARD INDEXES (272) THROUGH (280)

2. FOR HANDICAP CURB CUT, SEE ROADWAY DESIGN STANDARD INDEXES 304 SHEETS 1 OF 2 AND 2 OF 2

3. FOR PROPER MARKING AND SIGN INSTALLATION, SEE TRAFFIC DESIGN STANDARD INDEXES (1056) THROUGH (1256)

SPECIAL EMBHASIS CROSS WALK
MID-BLOCK - SIGNALIZED

SPECIAL EMBHASIS CROSS WALK
SIGNALIZED OR STOP SIGN CONTROLLED INTERSECTION

<table>
<thead>
<tr>
<th>APPROACH SPEED MPH</th>
<th>W11 SUGGESTED DISTANCE IN FEET</th>
</tr>
</thead>
<tbody>
<tr>
<td>25 TO 30</td>
<td>275</td>
</tr>
<tr>
<td>36 TO 45</td>
<td>350</td>
</tr>
<tr>
<td>46 TO 55</td>
<td>500</td>
</tr>
</tbody>
</table>

SPECIAL MARKINGS

REVISIONS

DATE

DRAWN

CHECKED

APPROVED

DRAWN

CHECKED

APPROVED

IMPLOMENTED

SIGNIFIED

DATE

APPROVED

SIGNIFIED

DATE

APPROVED

SIGNIFIED

DATE
STOP BAR PERPENDICULAR TO EDGE OF TRAVEL WAY

NOT LESS THAN 90°

W10-4
8° DIAMETER

When used on a bike lane (indicated by vehicle lane markings) the stop bars shall be placed 10 feet from markings for vehicles & W10-4 signs shall be used and placed for vehicles.

PAVEMENT MESSAGE DETAILS

ONLY LANE BIKE

4" UNL. BIKE LANE

4" UNL. BIKE LANE

WHITE

X

X

R

R

BICYCLE SPECIAL MARKING AREAS & DETAILS
NOTE
ROADWAY NOT DRAWN TO SCALE

NOTE
EITHER ONE BUT NOT BOTH OF SIGNS FTP-22A OR B SHOULD BE USED DEPENDING ON SPEED, ROADWAY
DEVELOPMENT & GEOMETRIC CONDITIONS.

FLORIDA DEPARTMENT OF TRANSPORTATION
TRAFFIC DESIGN
WELCOME CENTER SIGNING
FOR PRIMARY HIGHWAYS

REVISIONS

DATE: 6-75
INITIALS: W.B.
DESCRIPTION: CHANGED FTP-19 TO FTP-18
CHECKED BY: STATE DESIGN ENGINEER - HWY

INITIALS: W.B.
DESCRIPTION: CHANGED FTP-19 TO FTP-18
CHECKED BY: STATE DESIGN ENGINEER - HWY

Initials: W.B.
Description: Changed FTP-19 to FTP-18
NOTES
1. FOR LANE LINES SEPARATING ONE-WAY TRAFFIC, RAISED REFLECTIVE MARKERS SHALL BE MONO-DIRECTIONAL (COLORLESS).
2. FOR LANE LINES SEPARATING TWO TRAFFIC DIRECTIONS, RAISED REFLECTIVE MARKER SHALL BE BI-DIRECTIONAL (AMBER OR AMBER/GREEN), EXCEPT WHERE PASSING IS RESTRICTED IN ONE DIRECTION ONLY.
3. RAISED REFLECTIVE MARKERS SHALL BE PLACED 40 FT. ON ALL PROJECTS, HOWEVER ON SHARP CURVES LESS THAN 40 FT. MAY BE USED, IF SPECIFIED BY THE PLANS.
4. ALL MARKINGS SHALL BE APPLIED BEFORE RAISED MARKERS ARE INSTALLED.

PAINTED TRAFFIC LINES
COUNTY ROUTE MARKER DETAIL

(YELLO REFLECTORIZED LEGEND AND BORDER ON BLUE REFLECTORIZED BACKGROUND)

NOTES:
1. Signs for 1-4 digits are to be used on guide signs.
2. When used on a guide sign, shall be mounted on a 36" x 36" white reflective background.

FTP-29
COUNTY ROUTE MARKER DETAIL
(1-2 DIGIT MARKER)

(YELLO REFLECTORIZED LEGEND AND BORDER ON BLUE REFLECTORIZED BACKGROUND)

FTP-30
PEDESTRIANS
BICYCLES
MOTOR VEHICLES
LESS THAN 5 BHP
PROHIBITED
FLORIDA STATUTES

NOTES:
1. Color of the sign shall be black-white REFLECTORIZED BACKGROUND.
2. The text number shall be centered in the space provided on sign panel.
3. Color is reflective green background with reflective white legend and border.
4. Reduce size of numbers when 3 or more digits are used. Example 000.

EXIT PANEL
(GORE INSTALLATION)

FLORIDA DEPARTMENT OF TRANSPORTATION
TRAFFIC DESIGN SERIES
SPECIAL SIGN DETAILS

REVISIONS
**FLORIDA ROUTE MARKER FOR INDEPENDENT USE**

**NUMERAL SIZE**
- 1 or 2 Digits: 12" Series "C" - 24" x 24"
- 3 Digits: 8" Series "G" - 24" x 24"
- 4 Digits: 6" Series "G" - 24" x 30"
- More Than 4 Digits: 6" Series "G" - 24" x 30"

**Notes:**
1. Type 'G' arrow to be positioned as indicated on Signing Plans.
2. Green reflectorized background with White reflectorized legend and border.

**FLORIDA SHIELD FOR GUIDE SIGN USE**

**Notes:**
1. Florida shield shall have black opaque legend with white reflective background.

**FLORIDA'S TURNPIKE**

**DETAIL LAYOUT OF**

**FLORIDA TURNPIKE TRAILBLAZER**
COLOR
Black non-reflective legend and border, white reflective background

Optically spaced at vertical E.

SPEED LIMIT BREAKDOWN

<table>
<thead>
<tr>
<th>MPH</th>
<th>km/h</th>
</tr>
</thead>
<tbody>
<tr>
<td>20</td>
<td>30</td>
</tr>
<tr>
<td>25</td>
<td>40</td>
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<td>50</td>
<td>80</td>
</tr>
<tr>
<td>55</td>
<td>88</td>
</tr>
</tbody>
</table>

NOTE
in compliance with Senate Bill 306, all speed limit signs shall be installed with the metric speed limit signs mounted below, both sign panels shall be installed on the same support.

The 24" x 36" and 48" signs shall be installed with the corresponding size speed limit sign.

COLORS
Black non-reflective legend and border, red reflective circle and white reflective background.

Refer to standard index HBEQ for bracket TYPE I or TYPE II.

See table for footing type.

TABLE

COLMN SIZE 1/4" X 1/4" 1/8" X 1/8" 1/8" X 1/8" 1/8" X 1/8" 1/8" X 1/8" 3/16" X 3/16" 3/16" X 3/16" 3/16" X 3/16" 1/4" X 1/4" 1/8" X 1/8" 1/8" X 1/8" 1/8" X 1/8" 1/8" X 1/8" 3/16" X 3/16" 1/4" X 1/4"

HEIGHT (FT) GROUND TO BOTTOM OF SIGN
60 M.P.H. WIND ZONE

SPECIAL SPEED LIMIT SIGNS

FLORIDA DEPARTMENT OF TRANSPORTATION
TRAFFIC DESIGN

SPECIAL SIGN DETAILS

REVISIONS

DATE INITIAL DESCRIPTIONS REVISIONED BY
7-82 7-82

STATED ENGINEER-INTERN

QUALITY NUMBER
0

SUPERVISORY

HILL 7-82
Sign Locations Typical

1. WEIGH LIMIT
   RESTRICTION AHEAD
   FTP-41
   24" X 48"
   Block on Yellow

2. WEIGHT
   LIMIT
   FTP-42
   12" X 30"
   Block on White

3. WEIGHT
   LIMIT
   FTP-43
   24" X 30"
   Block on White

4. WEIGHT
   LIMIT
   FTP-42
   24" X 30"
   Block on White

Sign Details

NOTE:
1. SEE FHWA STANDARD HIGHWAY SIGNS BOOK DATED 1979 FOR SIGN DETAILS.
2. SIGN LOCATION NO. 3 MAY REQUIRE SOME FIELD ADJUSTMENT.

Bridge Weight Restrictions

[Diagram showing various signs and distances on a road layout]
GENERAL NOTES (SIGNALIZED & NON-SIGNALIZED)
1. FOR ENTRANCES TO A ONE-WAY STREET, THE DOWNSTREAM RESTRICTION MAY BE REDUCED TO 20 FEET.
2. PARKING SHALL NOT BE ALLOWED WITHIN 20 FEET OF A CROSSWALK.
3. ALL PARKING LANE MARKINGS SHALL BE 4" WHITE.
4. PARKING LANE LINES SHALL BE BROKEN AT DRIVEWAYS.
5. REFER TO CHAPTER 316, FLA. STATUTES, FOR LAWS GOVERNING PARKING SPACES.

MINIMUM PARKING RESTRICTION FOR
NON-SIGNALIZED INTERSECTIONS

MINIMUM PARKING RESTRICTION FOR
SIGNALIZED INTERSECTION

TYPICAL MARKINGS
FOR CROSSWALKS

PAVEMENT MARKING FOR WHEELCHAIR Ramps IN REST AREAS

Dimensions

NOTE:
CRITERIA FOR PAVEMENT MARKINGS ONLY, NOT WHEELCHAIR RAMP LOCATION. FOR RAMP CRITERIA SEE ROADWAY DESIGN INDEX NO. 304.
NOTES:
1. BRIDGES SHOULD BE MARKED AS NARROW BRIDGES UNDER THE FOLLOWING CONDITIONS:
   a. Width of bridge degrades to SHOULDER WIDTHS WHEN THE BRIDGE WIDTH EXCEEDS THE WIDTH OF THE APPROACH ROADWAY INCLUDING PAVED SHOULDERS.
   b. FOR APPROACH ROADWAYS WITHOUT PAVED SHOULDERS WHEN THE BRIDGE SHOULDER WIDTH IS LESS THAN 2'.
2. NO PASSING ZONE SHOULD BE EXTENDED 1500' IN ADVANCE OF NARROW BRIDGE.
3. THE FIRST MOUNTED DELINERATORS SHALL BE PLACED AT FINAL CURVING LIMIT ON EITHER SIDE 1500' ON BACKGROUND OR 100' ON CURVE 1500' IN ADVANCE OF A NARROW BRIDGE IF THE BRIDGE OR THE APPROACH IS ON A CURVE.
4. DELINERATORS ON BOTH SIDES OF ROADWAY SHALL FACE TRAFFIC APPROACHING BRIDGE.

INDEX NO. 1739
RURAL NARROW BRIDGE TREATMENT
TWO-WAY BRIDGES
**FIGURE A**
For use in areas not exposed to vehicular traffic and under driveways

- Not to be opened more than 25% of the time
- Area subject to vehicular or pedestrian
- Trench to be sawcut and removed to leave neat lines on both sides of the trench
- See Note 5 Figure C

**FIGURE B**
For use in installing conduit under existing asphalt pavement not adjacent to gutter when jackin is not feasible

- Trench not to be open more
- Width of trench plus 10" minimum necessary

**FIGURE C**
For use in installing conduit under existing asphalt pavement not adjacent to gutter when jacking is not feasible

- Jacked conduit must be used when jacking under existing pavement at 3 ft minimum depth
- Asphalt to be sawcut at the edges of the trench
- The removal and replacement of the additional pavement with 6" will not be required
- Width of trench shall be minimum necessary without disturbing the asphalt surface on either side

**FIGURE D**
For use installing conduit under a new roadway prior to installation of curbs, base and pavement

- Sidewalk patches to match existing joints
- Entire sidewalk slab must be replaced when specified in the plans
- Backfill and tamp with material from trench

**FIGURE E**
For use in installing conduit under sidewalk

- Sidewalk patches to match existing joints
- Entire sidewalk slab must be replaced when specified in the plans
- Backfill and tamp with material from trench
FIGURE A
CABLE DROP AND TERMINATION DETAIL
AERIAL INTERCONNECT FIGURE "A"

FIGURE B
CABLE DROP AND TERMINATION DETAIL
AERIAL INTERCONNECT MESSENER WIRE WITH CLAMPS

FIGURE C
CABLE DROP DETAIL
AERIAL INTERCONNECT MESSENER WIRE WITH CLAMPS

NOTES
1. THE MESSENER WIRE OF THE INTERCONNECT CABLES SHALL BE GROUNDED TO THE COPPER GROUND WIRE OF THE POLE OR TO THE EXTERIOR WIRE EXTENDING DOWN THE POLE.
2. WHEN UTILIZING THE EXTERIOR GROUND WIRE TO THE POLE, A LOCKING CABLE TIES OR LASHING WIRE SHALL BE USED TO PROTECT THE GROUND WIRE CONNECTING THE MESSENER WIRE TO THE GROUND BOX.
3. LOCKING CABLE TIES OR LASHING WIRE WHEN USED SHALL BE PLACED NO FURTHER THAN ONE (1) FOOT APART EXCEPT AT THE POINT OF CABLE DROP OR TERMINATIONS WHERE ONE (1) FOOT OF DISTANCE IS MAINTAINED AT THE POINT WHERE THE CABLES SEPARATE OR COMBINE.
4. IF ACCESSIBLE, THE INTERNAL GROUND WIRE OF THE SUPPORT POLE MAY BE USED TO GROUND THE MESSENER WIRE.
5. LASHING WIRE SHOULD NORMALY BE USED FOR DISTANCES OF 12 FEET OR GREATER.

FLORIDA DEPARTMENT OF TRANSPORTATION
TRAFFIC DIVISION
AERIAL INTERCONNECT

REVISIONS
INITIALS
DATE
DESCRIPTION

DRAFT
5-1-97
AERIAL INTERCONNECT WIRE

STATE DEPUTY ENGINEER

DRAWING NO.
TRUCK NO.
**DETAILS FOR SPlicing LOOP WIRE TO LEAD-IN WIRE**

**STEP 1**
- Lead-in wires
- DR slider
- Loop wires
- Lead-in 6 in.
- DR slider 2 in.
- Lead-in 24 in.

**STEP 2**
- Twist the bare conductors together
- Crimp the bare conductors together with an uninsulated butt connector

**STEP 3**
- Solder each splice using resin-core solder

**STEP 4**
- Wrap each splice with silicone tape
- Half lap starting at center of splice and proceeding to the right (left) past the end of the lead-in cable outside cover and past the lead-in wire to the specified pull box

**STEP 5**
- Slide outer heat shrinkable tubing over entire splice area

**ALTERNATIVE 1**
- Drill a hole through the curb at the point which the measured saw cut depth is determined, just prior to cutting the run inside edge of the curb
- Slide a section of loop conductors into the curb and lead-in wire to the specified pull box
- Drill a hole in the curb and lead-in wire to the specified pull box
- The conductors shall be spaced not more than 2 in. from the centerline of the roadway surface

**ALTERNATIVE 2**
- Drill a hole, 1 1/2 to 2 in. in diameter, in the curb
- Install a metal bushing on the inner edge of the curb
- Slide the conductors into the bushing

**FLORIDA DEPARTMENT OF TRANSPORTATION TRAFFIC ENGINEER**

**VEHICLE LOOP INSTALLATION DETAILS**

1. If the loop lead-in is 1 1/2 in. or less from the edge of the loop to the detector or controller cabinet, continue the twisted pair to the cabinet. If the loop lead-in is greater than 1 1/2 in., continue the twisted pair to the specified pull box, splice to shield and lead-in wire and continue to the detector or controller cabinet. This note does not apply to type 1.

2. The maximum saw cut depth shall be 8 in. on new roadway and 6 in. on existing roadway.

3. The minimum distance between the twisted pairs of loop lead-in wire is 6 in. from edge of curb or roadway to loop lead-in.

4. A nonmetallic hold-down material shall be used to secure loop wires and lead-in to the bottom of saw cuts. Hold-down material shall be placed at an average distance of approximately 1 foot intervals around loops and 2 foot intervals on lead-in.

5. A minimum cover of 1 1/2 ft of sealant material shall be provided in the saw cut between the uppermost loop wire or lead-in and the roadway wearing surface. The overdrill may be installed in the asphalt base prior to the placement of the final asphalt wearing surface, provided that the bottom of the loop wire is not greater than 2 in. below the final wearing surface.

6. The minimum distance between the twisted pairs of loop lead-in wire is 6 in. from edge of curb or roadway to loop lead-in.

**GENERAL NOTES**

- Other alternatives may be approved by the state traffic operations engineer.

**FLORIDA DEPARTMENT OF TRANSPORTATION TRAFFIC ENGINEER**

**VEHICLE LOOP INSTALLATION DETAILS**

**DATE**

**INITIALS**

**DESCRIPTION**

**DESIGNED BY**

**DRAWING NO.**

**INDEX NO.**

**REV.**

**CHECKED BY**

**APPROVED BY**

**DRAWING NO.**

**INDEX NO.**

**REV.**

**CHECKED BY**

**APPROVED BY**

**DRAWING NO.**

**INDEX NO.**

**REV.**

**CHECKED BY**

**APPROVED BY**
CONCRETE PAVEMENT EXPANSION JOINTS

NOTES:
1. The "number of turns" indicated at the specified point on the loop refers to the number of passes of loop wires which are placed in the saw cut in forming the complete loop.
2. Loop types or details not drawn to scale.
3. Loop types are centered in a single lane except Type E which is centered in two lanes.
4. The number of individual loops in the Type G loop may vary up to a maximum of four (4).

PLATE

10-

20-

40-

60-

80-

100-

120-

140-

160-

180-

200-

FLORIDA DEPARTMENT OF TRANSPORTATION
TRAFFIC ENGINEERS

VEHICLE LOOP INSTALLATION DETAILS

INITIALS	DATES

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STATE DESIGN ENGINEER- FROI

GANGING NO INDEX NO 2 of 2 17781
MEDIAN SIGNAL GATES FOR
MULTI LANE UNDIVIDED URBAN SECTIONS
(FOUR OR MORE DRIVING LANES IN ONE DIRECTION, 45 MPH OR LESS)
Typical Bridge Mounts

TYPE I

TO BE USED WHERE BRIDGE OPERATORS ARE FULL TIME OR ON DAILY BASIS

FIELD CONDITIONS MAY REQUIRE ADJUSTMENT OF THIS STANDING DISTANCE

SEQUENCE CHART

SIGNAL SWITCH
FLASHER BEACON
DRAWBRIDGE ARMED
(Gate shut)
STOP HERE ON RED
(Turn on arm)
TRAFFIC SIGNALS
(Flash 
Red)
ENTRANCE GATES
EXIT GATES

GATES
ENTRANCE GATES
EXIT GATES

ENTRANCE GATE
24" THERMOPRISTIC STOP BAR

NOTES:

1. A Bypass Switch shall be installed to override each Timing interval in case of a malfunction.

2. "STOP HERE ON RED" is omitted in Type I operation and "TRAFFIC SIGNALS" are omitted in Type II operation.

3. The time between beginning of flashing yellow on "Drawbridge Ahead" sign and the clearance of traffic signal to red, or beginning of flashing red, should not be less than the travel time of a passenger car, from the sign location to the stop line, traveling at the 85 percentile approach speed.

4. Beginning of operation of drawbridge gates shall not be less than 15 seconds after steady red or 20 seconds after flashing red (Actual time may be determined by the bridge tender).

5. Time of gate lowering and raising is dependent upon gate type.

6. Time of bridge opening is determined by the bridge tender.

7. Each gate shall be operated by a separate switch.

8. On each approach (Type II), all four red signals shall be on the same two circuit flasher, with the two top signals on one circuit, and the two bottom signals on the other circuit.

9. A drawbridge Ahead sign is required for both types of signal operation. However, a flashing beacon shall be added to the sign when physical conditions prevent a driver traveling at the 85 percentile approach speed from having a continuous view of at least one signal indication for approximately 10 sec.

10. Requirements re: Gate Installation Are Combined in Section 4E-13 through 4E-17 of the the Manual on Uniform Traffic Control Devices as revised by Official Ratings, Volume VII: Rating 67

FLORIDA DEPARTMENT OF TRANSPORTATION
TRAFFIC CONTROL DEVICES FOR DRAWBRIDGE SIGNALS

REVISIONS
INITIALS
DATE

APPROVED
STATE DESIGN ENGINEER

DRAWING NO.
INDEX NO.

17890
DRAWBIDGE SIGNAL

2 1/2" X 5 1/2"
2" BORDER, 4" RADIUS
6" SERIES "O" LETTERS

BLACK OPAQUE LEGEND AND BORDER ON REFLECTORIZED YELLOW BACKGROUND

TO BE USED WITH TYPE I OPERATION, AS SHOWN ON PREVIOUS SHEET

MONOTUBE SUPPORT MOUNTING

TYPICAL LAMP PLACEMENT

NOTE:
1. 24 VDC Flashing Red Lights Shall Be Mounted Above Gate Arm And Located As Shown In The Plan. The Distance From The Lowered Position On The Inside Of The Beam Lever Arm To The Lowered Position On The Inside Of The Beam Lever Arm Shall Be Equal To The Length Of The Gate Arm.
2. 25" Alternate Diagram For ReflectORIZED Red And White Stripes.

GATE & ARM DETAIL

REVISIONS

DATE INITIALS DESCRIPTION INITIALS DATES

DRAWING NO INDEX NO

3 3 17890