ROAD DESIGN STANDARDS

JANUARY 1978
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<td>Guardrail Construction (5 Sheets)</td>
<td>DCE-18</td>
<td>Standard Endwall for Triple 125&quot; x 8&quot; CMP Arch</td>
<td>GTO-01-1</td>
<td>Turnout Details</td>
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<tr>
<td>BMP-01-1</td>
<td>Median Barrier Details (3 Sheets)</td>
<td>DCE-19</td>
<td>Standard Endwall for Triple 154&quot; x 100&quot; CMP Arch</td>
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<td>Merrited End Section (5 Sheets)</td>
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<td>BSM-01</td>
<td>Back of Sidewalk Drainage Details</td>
<td>DSE-01-1</td>
<td>Sand-Cement Endwalls for Pipe Culverts</td>
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<td>BC-01</td>
<td>Concrete Spillway at Bridge Ends</td>
<td>DSE-02-1</td>
<td>Sand-Cement Endwalls for Pipe Culverts</td>
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<tr>
<td>DEX-01</td>
<td>Pipe Culvert Extension for 2&quot; x 2&quot; Box Culvert</td>
<td>DSE-03</td>
<td>Sand-Cement Endwall for 72&quot; CM Pipe</td>
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<td>DEX-02</td>
<td>Pipe Culvert Extension for 3&quot; x 2&quot; Box Culvert</td>
<td>DSE-04</td>
<td>Sand-Cement Endwall for 90&quot; CM Pipe</td>
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<td>DSE-05</td>
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<td>GOM-01-2</td>
<td>Drainage Details for Median Openings</td>
<td>DSE-06</td>
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<td>DKS-01</td>
<td>Ditch Pavement and Sealing</td>
<td>DSE-07</td>
<td>Sand-Cement Endwall for 106&quot; x 75&quot; CMP Arch</td>
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<td>Ditch Culvert - Types 5 and 6</td>
<td>DSE-08</td>
<td>Sand-Cement Endwall for 123&quot; x 81&quot; CMP Arch</td>
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<td>Concrete Endwalls</td>
<td>GCG-01</td>
<td>Cattle Guard</td>
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<td>DCE-02</td>
<td>Standard Endwalls for Pipe Culverts</td>
<td>GEC-01</td>
<td>Erosion Control Devices, Temporary Slope Dams</td>
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<td>DCE-03</td>
<td>U-Endwalls for Pipe Culverts (3 Sheets)</td>
<td>GEC-02</td>
<td>Erosion Control Devices, Sediment Basins</td>
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<td>Flared End Section for Pipe Culverts</td>
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<td>DCE-05</td>
<td>U-Endwalls for 60&quot; and 66&quot; Pipe Culverts</td>
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<td>Erosion Control Devices, Silt Barrier</td>
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<td>DCE-06</td>
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<td>Erosion Control Devices, Railed Hay or Straw</td>
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<td>Erosion Control Details for Permanent Construction</td>
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<td>Embankment Utilization Details</td>
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<td>GMC-01</td>
<td>Details for Municipal Construction</td>
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<td>Standard Endwall for 84&quot; Concrete Pipe</td>
<td>GRC-01-1</td>
<td>Miscellaneous Roadway Construction Details (2 Sheets)</td>
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<td>DCE-12</td>
<td>Standard Endwall for 79&quot; x 49&quot; CMP Arch</td>
<td>GRR-01</td>
<td>Details of Railroad Crossings (6 Sheets)</td>
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<td>Standard Endwall for 76&quot; x 57&quot; CMP Arch</td>
<td>GRT-01</td>
<td>Standard Details for Ramp Terminals (4 Sheets)</td>
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<td>Standard Endwall for 106&quot; x 73&quot; CMP Arch</td>
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<td>Standard Abbreviations</td>
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<td>Standard Endwall for 123&quot; x 81&quot; CMP Arch</td>
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<td>Standard Symbols for Key Maps and Plan Sheets (3 Sheets)</td>
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- GENERAL NOTES -

1. The illustrated limits for guardrail installation are standard requirements, one panel equals 12.5 ft.

2. Installations shown are typical. The intent is that 62.5 ft of rail is available approaching earliest hazard.

3. No full stops shall be provided except at width increase (see detail J). Should the finish of the approach differ from the finish of the road, the maximum offset shall be provided for the length of the approach plus one panel of guardrail (roll).

4. Guardrail sections may be used every 50 ft of 125 ft or greater. For radii less than 125 ft, the rail must be manufactured to 50 ft length.

5. For specifications of materials refer to standard specifications.

6. Design load of rail equals 80,000 pounds in tension.

7. In addition to use of conventional road signs, guardrail will be required every 100 ft blocks exceed 1/4 mile. In addition to the standard length of the guardrail section, the segment of the guardrail section of the guardrail section shall be provided with the additional panel of the guardrail section to be completed by the ultimate design.

8. Undressed timber will be permitted for 6.5 x 4.5 nominal treated timber section. The guardrail section of the guardrail section shall be provided with the additional panel of the guardrail section to be completed by the ultimate design.

9. Where guardrail is constructed for steel guardrail no anchor shall be provided. Blocks or terminal ends will be provided.

10. Where necessary to enlarge or add additional holes to guardrail, the blocks will be done by drilling or flame-cutting.
ADJACENT TO UNPAVED SHOULDER

ADJACENT TO SHOULDER PAVEMENT

UNDER DOUBLE FACE RAIL

ADJACENT TO SHOULDER GUTTER

DETAIL OF GUARDRAIL PAVEMENT

NOTE: Where shoulder pavement and/or shoulder gutter is present adjacent to a standard rail and the guardrail pavement single extend said to the shoulder pavement or gutter in front of the rail.

DETAIL P

STANDARD FLANGE

ONE-PIECE ANCHOR PLATE (ALTERNATE)

NOTE: This back-up plate is placed between two end plates at intermediate posts (non-slippery panels).

PRELIMINARY DESIGN

GuARDRAIL CONSTRUCTION

NOTE: The payment for the items of Guardrail Amendment Type E shall include assessment and attachment of, dull end, Set-In Plates, End, Flange, Flange Screws, Anchor Blocks, Plates and the necessary hardware.

ELEVATION

END ANCHORAGE TYPE II

DETAI N

PLAN

6" X 6" STEEL POST

NOTE: Type "I" Steel Post may be used with Double Face Guardrail.

Type "I" Steel Rail placed both of slope break point in slopes shall be 18" long unless otherwise noted. See note e, sheet 2.
NOTE:
All sections to be capped in direction of traffic.
TERMINATION OF BARRIER WALL AT APPROACH TO WIDE MEDIAN SECTION

CONCRETE MEDIAN BARRIER TERMINAL
(To be used only at a Temporary Barrier Terminals or where located 30' from edge of approach lane. See Detail A.)

CONCRETE MEDIAN BARRIER TERMINAL
NARROW MEDIAN DESIGN SPEED 45 MPH OR LESS

GENERAL NOTES:
1. Cost of installation of all conduits and utility accessories, reinforcing steel and reflective barrier markers shall be included in the contract unit price for Concrete Barrier Wall.
2. Terminal Barrier Notes for Design Speeds greater than 45 mph:
   a. Terminated in a wide median section outside recovery area of the approach traffic. See Detail A, Lt
   b. Terminated from a shielded location.
   c. Terminal protection by the use of an impact attenuation system.
   d. Terminated in conjunction with a suitably designed transition to another type median barrier that can be introduced more safely.
3. Expansion joints in wall required only at bridge ends and/or at locations where wall is an integral part of existing or proposed concrete wall to match an existing or proposed expansion joint.
4. Expansion joints in conduits shall be required only at the expansion joints in the wall.
5. In the barrier is installed adjacent to the road the top 12" of the subgrade shall be compacted to at least 100% of the density as defined in the AASHTO T-99 specifications.
6. Cost-in-place barrier wall normally will be a continuous pour without transverse contraction joints.
7. Cost-in-place sections with a length < 40' shall be joined to adjacent sections by doweling. See Detail T-6 on sheet 2 of 3.
8. Precast construction is allowed on a alternate to cast-in-place construction.
   a. Section lengths will not be ≥ 20' in length.
   b. Bedding of the precast sections shall be facilitated by the use of sand-cement grout or equal method to assure uniform bearing.
   c. Reinforcement may be required for handling stresses.
   d. See detail T-6 on sheet 2 of 3 for transverse joint details.
MEDIAN BARRIER INLET TYPE 1 AND 2

- Symmetrical about E for Mounting of M.B. Type 2 Inlet
- Warp Shoulder Pavement
- Face of Wall
- See detail at section for mounting

MEDIAN BARRIER WALL
- Non-Symmetrical about E for Super-elevated (S)
- Refer to Wall Section for
- Refer to Wall Section for dimensions
- See section for mounting

NOTES:
- Cut and reed steel
- Out of way where necessary
- Construction joints

- For detailed dimensions, see wall section

- 5-4 Bars (5' Centers) within limits of inlet
- Vertical Face Varies
- Vertical Face Varies
- Standard Section
- Shoulder Pavement

GENERAL NOTES:
1. For standard barrier and dimensions, see sheet 1.
2. For flow control device, see index No. 250-93.
3. For details of access doors at roadside, see index No. 930.01.
4. For details of inlets, see index No. 930.02.
5. For standard barrier with decreased light, see index No. 250-92.
6. Minimum area for opening steel sheet to be determined.

"SPECIAL" M.B. INLET FOR DEPRESSED MEDIAN'S (SHOWN GRATE SUPPORT)
Note: Set reflector plates on right hand curb at bridge ends as shown. Plates to be furnished by O.C.T. and installed by the contractor. Cost of installing plates to be included in the contract unit price for concrete ditch pavement (3" thick).

SECTION A-A

Note: Spillway to terminate as directed by the engineer.

SECTION B-B

SECTION C-C

Profile of curb to match curb at end of bridge.

Dowels E @ 18" cts. 5/8" g.

Depress Approach Slab

Dowels to be included in the contract unit price for concrete ditch pavement (3" thick).

PLAN

SECTION ALONG O. D. OF DRAIN

Estimated Quantities:

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<th>ITEM</th>
<th>UNIT</th>
<th>QUANTITY</th>
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*Quantity shown above includes pavement for 10 ft. *Length of Slope*
For each additional foot of slope length add 0.349 sq. yds.
Table of Dimensions and Quantities:

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<td>5.6</td>
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<tr>
<td>30° to 45°</td>
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<td>8.0</td>
</tr>
<tr>
<td>45° to 50°</td>
<td>6.2</td>
<td>8.2</td>
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Note: Reinforcing steel to be included in Contract Unit Price for Concrete.

Details for L-Type Endwalls:

Note: Reinforcing Steel to be included in Contract Unit Price for Concrete.

Details for Straight Type Endwalls:

Note: Reinforcing Steel to be included in Contract Unit Price for Concrete.
Note: Collar may be formed by any feasible method approved by the Engineer.

Details for Straight Type Endwalls

Table of Dimensions and Quantities

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<th>Skew (°)</th>
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<td>0° to 30°</td>
<td>8'-0&quot;</td>
<td>6.5 Cu. Yd.</td>
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<tr>
<td>30° to 45°</td>
<td>9'-0&quot;</td>
<td>7.5 Cu. Yd.</td>
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<tr>
<td>45° to 50°</td>
<td>9'-6&quot;</td>
<td>7.5 Cu. Yd.</td>
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1. Reinforced steel to be included in Contract Unit Price for Concrete.
2. As an alternate to the endwalls shown the contractor may construct endwalls in accordance with Index No. DCE-02.
3. For sodding around endwall see detail on Index No. GRC-01.

Details for L-Type Endwalls

Table of Dimensions and Quantities

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<td>8'-0&quot;</td>
<td>5.0 Cu. Yd.</td>
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<tr>
<td>30° to 45°</td>
<td>9'-0&quot;</td>
<td>6.1 Cu. Yd.</td>
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Note: Reinforcing steel to be included in Contract Unit Price for Concrete.

STATE OF FLORIDA, DEPARTMENT OF TRANSPORTATION

CONCRETE PIPE CULVERT EXTENSION FOR 3-L" X 2-D" BOX CULVERT

ENGINEER'S DRAWING

Revised by: E.H. Hart

1 of 1 DEX-02
DETAIL OF EXTRA BASE CONSTRUCTION FOR THE PROTECTION OF CULVERTS WITH LESS THAN MINIMUM COVER

PLAN

SECTION B-B

SECTION A-A

SECTION B-B

SECTION C-C

DETAIL OF CONC. SPILLWAY AT END OF SHOULDER GUTTER

NOTE:
1. Spillway to be used for shoulder gutter
2. If spillway extends into median or roadside, the design should be modified as necessary

ENDWALLS PARALLEL TO C ROADWAY

SECTION A-A

SECTION B-B

CONNECTION DETAILS, R.C. BOX CULVERT EXTENSIONS

PLAN

MISCELLANEOUS DRAINAGE DETAILS

Florida Department of Transportation
Roadway Plan Section

FLARED ENDWALL

NOTE:
1. Cast of Steel Grating to be included in cast of Box Culvert
2. As shown in detail view

Detail of Conc. Spillway at End of Shoulder Gutter

(TO BE USED WHERE INLETS, PLATES & ENDWALLS ARE MANDATORY)

DETAIL SHOWING OPENING IN TOP OF BOX CULVERT FOR DRAINING MEDIAN DITCH

NOTE:
1. Cast of Steel Grating to be included in cast of Box Culvert
2. As shown in detail view
Provide a minimum of 0.20% grade on gutter, slightly warping the surface of the median pavement if necessary, within limits of the median curb or curb and gutter. Construct a drainage flume or flumes at the point of change of grade. See details.

Drains

Construct ditch to drain to the proposed drainage system.

Location set by the Engineer during construction.

Prop. Peri

Drains

Prop. Median Flume, warp surface if necessary to drain to prop flumes.

Match existing grade

Pav widening for speed change and storage lane

Drains

Crown Line (Exist.)

Prop. Peri

Exis Peri

SECTION A-A

Provide smooth Section

Match existing grade

Prop. Peri

Median

Exist. Peri

Grade established in detail plans

SECTION B-B

(May drain from any point as established by the Engineer)

Min. Slope 0.05/ft

Construct ditch to drain

SECTION C-C

FLUME DETAIL

May be on tangent, curve, or as near. Details to be modified for location.

Necessary Rubble Gutter by State Forces.

7° for Median Curb 10' for C.B.G.

5° for Median Curb 6' for C.B.G.

GENERAL NOTES: These details are to apply to projects which provide for the conversion of 2-lane sections to 4-lane divided highway sections and for superimposed sections of new 4-lane divided highways. Location of low point or panels in gutters is to be set by the Engineer during construction and will establish locations of flumes. The number of flumes is to be maintained at a minimum. Plans for median openings to conform to detail plans, Layout above is illustrative only. Cost of flumes to be included in the contract price for Median Curb or Curb and Gutter.
GENERAL NOTES:
1. The finished grade and slope of the inlet tops are to conform with the finished cross slope and grade of the proposed sidewalk and/or driveway.
2. When pipes are to be constructed on a curve, tie to the pipe to determine the radius and, where necessary, modify the inlet details accordingly. Bend inlet where necessary.
3. All steel inlets shall have 1/4" minimum cover unless other wise shown, that inlets shall be driven cast-in-place or precast concrete.
4. The outer fibers shown for rectangular inlets (Type 5E) are necessary only when inlets are to be laid in an masonry wall which shadow cast or sunny when used as shown with rectangular inlet boxes.
5. See Details 5E-01 for supplemental details.
6. These inlet inlets were designed for use with curb & gutter and Type E curb. Locate outside of pedestrian cross traffic if possible.
7. For inlet batteries see index no. GSB-01.
8. Tank weld cover to frame in 4 pieces.
9. All steel used for frame and cover steel meet the requirements of ASTM A-57.
10. When Alternative "G" Cover is specified in plans, steel cover to be hot dip galvanized after completion. All exposed plates to be seal welded before galvanizing.

INLET THROAT TYPE 5
Inlet Throat Type 6
Symmetrical about F

SECTION "B-B"

SOLID STEEL COVER DETAIL

INLET TOP MODIFICATION FOR TYPE "E" CURB

TOP VIEW OF FRAME

DETAILS OF FRAME AND SOLID STEEL COVER

STATE PROJ. NO.

FLORIDA DEPARTMENT OF TRANSPORTATION

Steel Design Section

CURB INLET TYPES 5-8

REVISIONS

Inlet Types 5-8

REV 12-14-76

D-501-02-2

1 of 1
DETAILS OF TYPE 7 INLETS FOR MEDIAN WIDER THAN FOUR FEET

SECTION A-A

DETAILS OF TYPE 7 INLET FOR FOUR FEET WIDE MEDIAN

SECTION B-B

SECTION C-C

GENERAL NOTES


CONCRETE CURB FOR SHARP OF CONCRETE CURB SEE INDEX NO. PTC-07.
STEEL NO. 4 REINFORCING RAILS IN CENTER UNLESS OTHERWISE NOTED. (8) CLEARANCE TO INSIDE FACE.
FOR SUPPLEMENTARY DETAILS SEE INDEX NO. 27-02.
THIS INLET IS DESIGNED FOR USE WITH TYPE 8 & MEDIAN CURB OR TYPE 5 & 6 Trafic, Separation, Locate Outline OF Pedestrian Cross Traffic.

REINFORCING STEEL DIAGRAM

TOP SLAB OF INLET

CURB INLET-TYPE 7

CIVIL ENGINEER

DRAWING NO./INDEX NO. 1 OF 1 DC1-03

DESIGNED BY

CHECKED BY

PROJECT MANAGER

SUPERVISED BY

FLORIDA DEPARTMENT OF TRANSPORTATION

Road Design Section

RELATIONSHIP BETWEEN POLICIES AND SPECIFICATIONS

DRAWN BY

ENGINEER

INCHES
1. COST OF DITCH PAVING TO BE INCLUDED IN COST OF INLET.
2. REINFORCEMENT 4 BARS AT 12" CENTERS BOTH WAYS 2" CLEARANCE TO INSIDE FACE.
3. FOR SUPPLEMENTARY DETAILS SEE INDEX NO 1202-7
4. CUT AND BEND BARS OUT OF WAY OF PIPE WHEN NECESSARY; BARS TO CLEAR PLATE.
5. WHERE MATERIAL UNSATISFACTORY FOR FOUNDATION, FOUNDATION SHOULDN'T BE USED.
6. FOUNDATION SHOULDN'T BE USED.
7. WHERE MATERIAL UNSATISFACTORY FOR FOUNDATION IS ENCOUNTERED AT FL, FOR PLATE FOUNDATION, BACKFILL UP TO FL, WITH CLEAN SAND
8. TWO INLETS OR MORE ARE SUBJECT TO HEAVY TRAFFIC AREAS WHERE DEBRIS MAY BE PROBLEMATIC MORE THAN 5 UPS TRAFFIC IS NOT FOR USE IN AREAS SUBJECT TO REGISTRATION AN/JOINS BICYCLE TRAFFIC.
9. RECOMMEND 4" PIPING FOR CONCRETE PIPING, FOR LARGER PIPING, "J"-B INLET SHOULD BE CONSIDERED.

---GENERAL NOTES---

PAVING DETAIL FOR ALL INLETS

TYPICAL DITCH BLOCK

STEEL GRATING DETAIL

TWO REQUIRED PER INLET
- 3" BARS, FERROUS STEEL 85% AIR VOLUME, MINIMUM 0.035 INCH DIAMETER.
- MAIN BARS 3" X 3" 3,000 P.S.I. NOMINAL, MINIMUM 0.035 INCH DIAMETER.
- 1/4" X 2" (20 equiv)

DIAGRAM SHOWN: 4' X 4' X 4'

---END OF DRAWING---
PVEMENT DETAIL FOR ALL "J" INLETS

SECTION C-C

SECTION B-B

SECTION A-A

TYPICAL DITCH BLOCK

For all inlets except "J" inlets

Construction Joint

Provide area for
depths greater than 10'-0".

Construction Joint
Permitted

RECOMMENDED MAXIMUM PIPE SIZES (See Notes 4 & 5)
3'-11" Wall - 24" 4'-0" Wall - 36"

Steel Grating, see Detail

"J-3" DETAIL

NOTES:
- For details of "J" inlets, see Index DSS-O1 (alt "B-6"") only.
- "J" top to be ordered as required by note 4.

GENERAL NOTES
1. Cost of Ditch Paving to be included in cost of inlet.
2. Reinforcing - #4 4 bars at 12" centers both ways with 2" clearance to inside face.
3. Where material unsatisfactory for foundation is encountered at F.L. elevation omit floor and carry walls down to satisfactory foundation. Backfill to F.L. with clean sand.
4. Direction of 1/4" x 2" Main bars to be in same direction as predominate flow.
5. Chamfer exposed edges. (1/4" Chamfer)
6. Cut and bond bars out of way of pipe when necessary.
7. Bars to clear pipe by 1'-0".
8. For supplemental details, see Index DSS-O1.
9. Recommended minimum pipe sizes are for concrete pipe. Check larger sizes for fit. For larger pipe, a "J-3" inlet should be considered (see detail above).
10. This inlet was designed for ditches, medians or other areas subject to heavy wheel loads where debris may be a problem and pedestrian traffic is anticipated; it is not for use in areas subject to bicycle traffic.

FLORIDA DEPARTMENT OF TRANSPORTATION
Road Design Section

DITCH BOTTOM INLET - TYPE "J"

DRAWING NO. INDEX NO.
1 of 1 501-05
GUTTER INLET TYPE V
FOR PIPES 24" DIA. AND UNDER

NOTE: Cut and bond bars out of way of flow when necessary. Bars to clear 1/4" Deck.

GUTTER INLET TYPE V
FOR PIPES 30" DIA. AND LARGER

NOTE: All reinforcing Steel Bars are 3/8" B. & G. (Dia.)

GENERAL NOTES:
1. All exposed edges and corners shall be
   rounded by 1/2" radius.
2. For supplementary details see index No. D01-D01.
3. This detail was designed for string wall,0.800 ft. or other areas subject to heavy exhaust loads
   where deflection is maximum, and PVI is subjected to pedestrian and right-angle traffic.

For details of A48 Bars
see INDEX No. D00-D00.
DETAIL OF BOTTOM CONSTRUCTION WHEN INLET SERVES AS MANHOLE

GENERAL NOTE:
Mortar used to seal the pipe into the walls of prestressed units will be of such a mix that shrinkage will not cause leakage into or out of the units. Maximum opening for pipe shall be the O.D. of the pipe required plus 6".

DETAIL OF CHANNELIZATION

Note: Channelization required at all drainage structures with two or more pipes.

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.

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

COMPLETE FLOW CHANNEL IS REQUIRED WHEN THERE IS FLOW THROUGH THE STRUCTURE
CAST-IRON PIPE CONSTRUCTED
THRU STRUCTURE BY OTHERS

DETAIL SHOWING PIPE CONSTRUCTED
THRU STORM SEWER STRUCTURE

NOTES:
1. Any type joint may be used in conjunction with any other type joint.
2. All grouted joints are to have a minimum thickness of 1/4".
3. Keyways are to be a minimum of 1/2" deep.
4. Joint dowels are to be M6 bars, 12" long with a minimum of 6 bars per joint
   every span.
5. Minimum cover on reinforcing bars is 1 1/2".

OPTIONAL CONSTRUCTION
JOINTS

DITCH PAVEMENT PAD FOR
STANDARD DITCH BOTTOM INLETS

IN ORDER TO FACILITATE DRAINAGE DURING CONSTRUCTION,
THIS SECTION OF THE PIPE (RED) MAY BE ELIMINATED
FROM THE FIRST POUR AND PLACED AFTER THE TOP AND
SURFACE COURSE ARE IN PLACE.

ALTERNATE A

ALTERNATE B

DETAIL OF TEMPORARY SUBGRADE DRAINS

(state of new york department of transportation
roadway plans section
supplementary details for
manhole & inlet structures

NOTE:
For all manhole, inlet and junction box structures:
the mortar used to seal the pipe into the walls of the cast iron units will be of such mix that
groundwater will not leak into any or out of the units. Minimum opening for pipe shall be
max. 1/8" x 1/8".
DETAIL OF MEDIAN ENDWALL
(MODIFICATION OF DETAILS SHOWN ON INDEX SHEETS
SCALE: 1"=1')
Class II Concrete 12% Cu.W. Cost of Steel to be included in price per Concrete

SAFETY MODIFICATION FOR
OPENING IN BOX CULVERTS

SAFETY MODIFICATION FOR
MEDIAN INLETS

PROPOSED INLET MODIFICATION
WHERE GRADE WAS SET 0.5' ABOVE THE DITCH

PROPOSED DITCH MODIFICATIONS WHERE GRADE WAS SET 0.5' ABOVE DITCH ELEV.
Modify Top to match Type E Curb & Gutter

118' MC

Send Top & Bottom Steel Bars

= 2 @ 6'-0" Cm (Both Ways)

SECTION A-A

Note: This modification will be required where Type E Curb & Gutter is constructed adjacent to the inlet.

PLAN

SECTION B-B

TYPE E CURB AND GUTTER

SAFETY MODIFICATION FOR TYPE P-6 INLET (FROM DETAIL S ON INDEX PG102)

SAFETY MODIFICATION

STATE ROAD DEPARTMENT OF FLORIDA
ROADWAY PLANS DEPARTMENT

NOTE: These modifications will be made only on projects now under construction. Do not use these codes for projects being designed.

SCM-01
### TABLE OF CONSTRUCTION DATA AND ESTIMATED QUANTITIES FOR ROUND PIPE CULVERT ENDWALLS

<table>
<thead>
<tr>
<th>Area of Opening</th>
<th>One Pipe Culvert</th>
<th>Two Pipe Culvert</th>
<th>Three Pipe Culvert</th>
<th>Four Pipe Culvert</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dimensions A</td>
<td>B</td>
<td>C</td>
<td>D</td>
<td>E</td>
</tr>
<tr>
<td>12ft.</td>
<td>1.19</td>
<td>1.74</td>
<td>2.29</td>
<td>2.84</td>
</tr>
<tr>
<td>12-1/2ft.</td>
<td>1.16</td>
<td>1.71</td>
<td>2.26</td>
<td>2.81</td>
</tr>
<tr>
<td>13ft.</td>
<td>1.14</td>
<td>1.69</td>
<td>2.24</td>
<td>2.79</td>
</tr>
<tr>
<td>13-1/2ft.</td>
<td>1.12</td>
<td>1.67</td>
<td>2.22</td>
<td>2.77</td>
</tr>
<tr>
<td>14ft.</td>
<td>1.10</td>
<td>1.65</td>
<td>2.20</td>
<td>2.75</td>
</tr>
</tbody>
</table>

**GENERAL NOTES:**
1. Reinforcing Steel grade 40 or 60. Cost of bar shall be included in the contract unit price for concrete.
2. For sodding around endwall, see detail on Index No. GRC-01.
3. Provide 20' transverse transition from endwall to ditch slopes where side slopes on outfall ditches are flatter than 1:1.

---

### TABLE OF CONSTRUCTION DATA AND ESTIMATED QUANTITIES FOR METAL PIPE ARCH CULVERT ENDWALLS

<table>
<thead>
<tr>
<th>Area of Opening</th>
<th>One Pipe Culvert</th>
<th>Two Pipe Culvert</th>
<th>Three Pipe Culvert</th>
<th>Four Pipe Culvert</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dimensions A</td>
<td>B</td>
<td>C</td>
<td>D</td>
<td>E</td>
</tr>
<tr>
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<tr>
<td>14ft.</td>
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<td>2.75</td>
</tr>
</tbody>
</table>

**GENERAL NOTES:**
1. Reinforcing Steel grade 40 or 60. Cost of bar shall be included in the contract unit price for concrete.
2. For sodding around endwall, see detail on Index No. GRC-01.
3. Provide 20' transverse transition from endwall to ditch slopes where side slopes on outfall ditches are flatter than 1:1.

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### TABLE OF CONSTRUCTION DATA AND ESTIMATED QUANTITIES FOR CONCRETE ELIPTICAL PIPE CULVERT ENDWALLS

<table>
<thead>
<tr>
<th>Area of Opening</th>
<th>One Pipe Culvert</th>
<th>Two Pipe Culvert</th>
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</tr>
</thead>
<tbody>
<tr>
<td>Dimensions A</td>
<td>B</td>
<td>C</td>
<td>D</td>
<td>E</td>
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<tr>
<td>12ft.</td>
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<td>1.74</td>
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<td>2.84</td>
</tr>
<tr>
<td>12-1/2ft.</td>
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<td>1.71</td>
<td>2.26</td>
<td>2.81</td>
</tr>
<tr>
<td>13ft.</td>
<td>1.14</td>
<td>1.69</td>
<td>2.24</td>
<td>2.79</td>
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<tr>
<td>13-1/2ft.</td>
<td>1.12</td>
<td>1.67</td>
<td>2.22</td>
<td>2.77</td>
</tr>
<tr>
<td>14ft.</td>
<td>1.10</td>
<td>1.65</td>
<td>2.20</td>
<td>2.75</td>
</tr>
</tbody>
</table>

**GENERAL NOTES:**
1. Reinforcing Steel grade 40 or 60. Cost of bar shall be included in the contract unit price for concrete.
2. For sodding around endwall, see detail on Index No. GRC-01.
3. Provide 20' transverse transition from endwall to ditch slopes where side slopes on outfall ditches are flatter than 1:1.
### Table of Dimensions and Quantities for One U-Endwall (Section A-A)

| Slope | El | C | D | E | F | G | H | I | J | K | L | M | N | O | P | Q | R | S | T | U |
| 2:1   |    |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |
| 1:1   |    |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |
| 1:2   |    |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |

### Table of Dimensions and Quantities for Baffles (Section B-B)

<table>
<thead>
<tr>
<th>El</th>
<th>C</th>
<th>D</th>
<th>E</th>
<th>F</th>
<th>G</th>
<th>H</th>
<th>I</th>
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</tbody>
</table>

### Table of Dimensions and Quantities for One U-Endwall with Baffles for 2:1 Slope (Section B-B)

<table>
<thead>
<tr>
<th>El</th>
<th>C</th>
<th>D</th>
<th>E</th>
<th>F</th>
<th>G</th>
<th>H</th>
<th>I</th>
<th>J</th>
<th>K</th>
<th>L</th>
<th>M</th>
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</tr>
</tbody>
</table>

### Details of U-Endwall with Baffles for 2:1 Slope

- **Note:** All reinforcing steel is 1/2" bars, all bar dimensions are given out to our bar clearance + 2" except as noted.

### Details of U-Endwall with or without Baffles for 4:1 and 6:1 SLOPES

- **Note:** All reinforcing steel is 1/2" bars, all bar dimensions are given out to our bar clearance + 2" except as noted.

### Plan

- **Note:** Baffle shall be constructed only where specified in the plans.

---

**Florida Department of Transportation**

**U-Endwalls for Pipe Culverts**

---

**Details A**

**Bending Diagram**
MOUNTING DETAILS FOR STEEL GRATING

STEEL GRATING USE CRITERIA

1. Weathering steel and/or channel to be used on pipe culverts when in the
   unattended clear recovery area and when one of the following conditions
   prevail in the clear recovery area:
   a. Area prone to collect (ditches, gullies, or void areas) or
      areas where debris and/or drift is available.
   b. Enough of culvert is under flow or in such as dimenions that debris transport is not considered a minor problem.
   c. Water to collect is minor except on an infrequent basis
   or in very frequent bases. For example, a normally dry in
      flu under terrain with normally low ground water table.
   d. Area where debris gathering will assist backwater would not
      seriously affect roadway embankment, traffic operation or
      pipeline project.

2. Steel grating to be used only where called for in plans and
   shall be made of a 3/4 in. #8 grating, and/or endwalls having either 6½ in. or 8½ in.
   area of closure.
GENERAL NOTES

1. Flared end sections shall conform to the requirements of AASHTO 7.5 with the exception that dimensions and reinforcement shall be as prescribed in the table above. Cross-sectional reinforcement may consist of either one cage or two cages of steel. Compressive strength of concrete shall be 4000 psi. Shop drawings for flared and sections having dimensions other than those above must be submitted for approval to the Engineer of Drainage.

2. Connections between the flared end section and the pipe culvert may be any of the following types unless otherwise shown on the plans.
   a. Joints meeting the requirements of Section 941-1.5 of the Standard Specifications.
      The manufacturer of the flared and section shall identify the manufacturer of the pipe culvert and certify that the flared end section is sealed to prevent the pipe culvert.
   b. Joints sealed with preformed plastic gaskets.
      The gaskets shall meet the requirements of Section 942-2 of the Standard Specifications and the minimum sizes for gaskets shall be as that specified for equivalent sizes of elliptical pipes.
   c. Reinforced concrete jackets, as detailed on this drawing.
      Cost of the reinforced concrete jacket to be included in the contract unit price for the flared end section.
      When non-coated corrugated metal pipe is used in the plans, the pipe shall be chromium coated in the jacketed area as specified on Index E05-01. Chromium coating to be included in the contract unit price for the pipe culvert.
   d. Toe walls shall be constructed when shown on the plans or at locations designated by the Engineer. Toe walls are to be cast in-place with Class I Concrete and paid for under the contract unit price for Class I Concrete (Miscellaneous).
      Reinforcing steel to be included in cost of toe wall.
   e. Sodding shall be placed about the flared end section in accordance with Index S01-01, and paid for under the contract unit price for Sodding.

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

REINFORCED CONCRETE JACKET DETAIL

DESIGN NOTES

1. Flared end sections are intended for use outside the clear recovery area on median drain and cross drain installations.
2. Reinforced concrete jackets shall be used at all locations where high velocities and/or highly erodible soils may cause displacement. These locations will be shown on the plans.
3. Toe walls shall be used whenever the anticipated velocity of discharge and soil type is such that erosion action would occur. Toe walls are not required where ditch pavement is provided, except when dislodging would occur if the ditch pavement should fail.
### Bill of Reinforcing Steel

<table>
<thead>
<tr>
<th>Mark</th>
<th>Size</th>
<th>No. Rod</th>
<th>Length</th>
<th>Bending</th>
</tr>
</thead>
<tbody>
<tr>
<td>E1</td>
<td>6</td>
<td>6</td>
<td>3-9</td>
<td>Straight</td>
</tr>
<tr>
<td>E2</td>
<td>6</td>
<td>6</td>
<td>3-9</td>
<td>Straight</td>
</tr>
<tr>
<td>E3</td>
<td>6</td>
<td>6</td>
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</tr>
<tr>
<td>E4</td>
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</tr>
<tr>
<td>E9</td>
<td>6</td>
<td>6</td>
<td>3-9</td>
<td>Straight</td>
</tr>
</tbody>
</table>

### Bending Diagrams

Note: All bar dimensions are net-to-net.

### Estimated Quantities

<table>
<thead>
<tr>
<th>Item</th>
<th>Unit Quantity</th>
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<tbody>
<tr>
<td>Concrete</td>
<td>14-1/2</td>
</tr>
<tr>
<td>Rebars</td>
<td>14-1/2</td>
</tr>
<tr>
<td>Reinforcing Steel</td>
<td>14-1/2</td>
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</tbody>
</table>

### General Notes

- Design Specifications: AASHTO 1975
- Chamfer: All edges must be chamfered 45° unless otherwise noted.
- Reinforcing Steel: Grade 60 or 60.
### Dimensions & Quantities


**Concrete (Cu. Yds.):**
- Single Pipe: 0.60
- Double Pipe: 0.90
- Triple Pipe: 1.21
- Quad Pipe: 1.50

**Soil (Sq. Yds.):**
- Single Pipe: 8.69
- Double Pipe: 10.26
- Triple Pipe: 12.8
- Quad Pipe: 15.31

---

**TOP VIEW - SINGLE PIPE**

Concrete Slab, 3" Thick, Reinforced with 6"x6" I/O/D Welded Wire Fabric.

---

**TOP VIEW - MULTIPLE PIPE**

Concrete Slab, 3" Thick, Reinforced with 6"x6" I/O/D Welded Wire Fabric.

---

**Note:**
See Sheet 4 for Details and Sheet 5 for Notes.
### Dimensions & Quantities

<table>
<thead>
<tr>
<th>D x A</th>
<th>B</th>
<th>C</th>
<th>E</th>
<th>F</th>
<th>G</th>
<th>M</th>
<th>N GRATE SIZES</th>
<th>CONCRETE (Cu. Yds.)</th>
<th>SOIL/ING (Sq. Yds.)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
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<td></td>
<td></td>
<td></td>
<td>Single Pipe</td>
<td>Double Pipe</td>
<td>Triple Pipe</td>
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<tr>
<td>2&quot; x 2&quot;-2&quot;</td>
<td>0.0</td>
<td>0.6</td>
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<td>0.0</td>
<td>1.23</td>
<td>4.33</td>
<td>9.18</td>
<td>9.92</td>
</tr>
</tbody>
</table>

**Note:**
- See Sheet 4 for details and Sheet 5 for notes.
- Concrete slab, 3" thick, reinforced with 6" x 6"
- IG/IO Welded Wire Fabric

**TOP VIEW - SINGLE PIPE**

**TOP VIEW - MULTIPLE PIPE**

---

**SIDE DRAIN**
**MITERED END SECTION**
**SINGLE AND MULTIPLE ROUND CORRUGATED METAL PIPE**

---

**FIGNED & APPROVED 08/27**
**FIGNED & APPROVED 08/27**
**FIGNED & APPROVED 08/27**

---

**HEAT**

---

2 of 5  DME-OI-1
GENERAL NOTES

1. The cost of all pipe, grates, fasteners, reinforcing, connectors, anchors, and concrete shall be included in the contract unit price for mitered and section, each. Bolting not included.

2. The reinforced concrete slab shall be constructed for all sizes of side drain pipe and cost in place with Class I concrete.

3. Round pipe size 350 or greater and pipe-arch size 35' x 24' or greater shall be grouted unless accepted in the plans. Smaller sizes of pipe shall be grouted only when called for in the plans.

4. Grates are to be fabricated from galvanized steel. The lower grates on all traffic approach ends shall be Schedule 80 ASTM A 120 extra strong pipe. All remaining grates shall be either ASTM A 501 standard tubing or A 53, grade B, pipe.

Base metal exposed during fabrication shall be repaired as specified in Section 562. Standard Specifications. Grates subject to salt water or highly corrosive environment shall be hot dipped galvanized after fabrication in accordance with ASTM A 253.

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

6. Corrugated metal pipe galvanizing that is damaged during handling and perforating for mitered end section shall be repaired.

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

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

9. When the mitered end section pipe is dissimilar to the side drain pipe, a concrete jacket shall be constructed in accordance with Standard Index DMD-Q1.

10. Ditch transitions shall be used on all grades in excess of 3% as directed by the Engineer.

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 1.5' of cover and grades in excess of 1% will require such an evaluation (General Note 3).

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 4).
END ELEVATION

Spacing between centers of pipes for Multiple Pipe Culverts

Symmetrical about this line for Single Pipe Culverts

END ELEVATION

PLAN

PLAN

SECTION A-A

SEC. E-E
SEC. D-D
SEC. C-C
SEC. B-B

Fill Slope

QUANTITY IN ONE ENDWALL, CU YDS
OF SAND-CEMENT SIPARP

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NOTE: Wingwalls based on 2:1 slope
Scale: 1' = 3'-0"
END ELEVATION

Symmetrical about this line for Single Pipe Converges

END ELEVATION

QUANTITY IN ONE ENDWALL, CU YDS.
OF SAND-CEMENT RIPRIP

1 PIPE 2 PIPES 3 PIPES 4 PIPES
10.6 14.6 17.7 20.1

NOTE: Wingwalls based on 2:1 slope

SCALE = 1" = 3'-0"

SAND-CEMENT ENDWALLS FOR 76" X 57" O.M. PIPE ARCH
FENCING TERMINALS AT RETAINING WALLS

FENCING TERMINALS AT BRIDGE ENDS (ROADWAY)

FENCING TERMINALS AT BRIDGE ENDS (STREAM CROSSING)

FENCING TERMINALS AT BOX CULVERTS
(For heights of headwall greater than 4')

FENCING TERMINALS AT URBAN INTERCHANGES

FENCING TERMINALS AT RURAL INTERCHANGES
1. This fence to be provided generally in rural areas.

2. Posts and braces may be either steel, aluminum, timber, or concrete.

3. Steel posts and braces shall be standard steel posts, galvanized at the rate of 2 oz. per sq. ft., together with necessary hardware and wire clamps and meeting the following requirements:

   (a) Line post: 8½ ft., 133 lb. per lin. ft.; Stud post: anchored with necessary clamps, etc.

   (b) Approach post: 3½ x 5½ x 2½ ft., 8½ ft. long, fabricated for attaching brace, with necessary hardware, clamps, etc.

   (c) Splice: 4 ft. x 4 ft. x 4 ft., 8½ ft. long, fabricated for attaching brace, with necessary hardware, clamps, etc.

4. All timber posts, except corners and pull posts, are to be maximum 4½ in. diameter. Timber corner and pull posts are to be maximum 5½ in. diameter. Braces are not limited to 4½ in. diameter length of timber posts to be as indicated above for concrete posts.

5. Splices for line posts are to be minimum length of approach corner and pull posts. Maximum length at approach corner and pull posts, pulse every line wire, staple every line wire in top half and alternate line wires in bottom half.

6. Adequate connections between timber posts and braces are to be provided.

7. Wire to be wrapped around end or splice posts only.

8. Longer posts than those indicated above may be required by the plans or for deeper installations.

9. Material for Class I concrete for fence footings may be used by volume, however, by weight, Sections 345-10 and 345-11 of D.O.T. Standard Specifications will be deleted.

10. The contractor, at his option, may use any suitable precast or prestressed concrete post; however, approval by the engineer, or of posts not shown on this drawing, will be required prior to construction of the fence.
GENERAL NOTES (TYPE 'B' FENCE)

1. THIS FENCE SHALL BE PROVIDED GENERALLY IN URBAN AREAS.
2. LINE POSTS MAY BE ANY OF THE FOLLOWING:
   (A) GALVANIZED STEEL PIPE - 1-1/2" NOMINAL.
   (B) ALUMINUM COATED STEEL PIPE - 1-1/2" Nominal.
   (C) ALUMINUM ALLOY PIPE - 1-1/2" Nominal.
   (D) GALVANIZED STEEL H-BEAM - 1-1/2" x 7/8" x 16.
   (E) ALUMINUM ALLOY H-BEAM - 1-1/2" x 7/8" x 16.
3. CORNER, END OR FULL POSTS MAY BE ANY OF THE FOLLOWING:
   (A) GALVANIZED STEEL PIPE - 2" NOMINAL.
   (B) ALUMINUM COATED STEEL PIPE - 2" Nominal.
   (C) ALUMINUM ALLOY PIPE - 2" Nominal.
   (D) OTHER STEEL OR ALUMINUM SHAPES FOR CORNER, END
       OR FULL POST ASSEMBLIES MAY BE USES IF APPROVED BY
       THE ENGINEER.
4. CHAIN LINK FABRIC, POSTS, RAILS, GATE FRAMES, EXPANSION
   SLEEVES, WIRE TIMED, TENSION WIRE, AND ALL MIDDLE AND
   FITTINGS AND HARDWARE SHALL MEET THE REQUIREMENTS OF
   ASTM E41-78 AND M-78 UNLESS OTHERWISE NOTED.
5. CAUTION: OTHER WIRE GM 2 1/4"

GENERAL NOTES FOR ALL FENCE

THE TYPE OF FENCE TO BE INSTALLED SHALL BE SHOWN ON PLAN. PULL POSTS SHALL BE USED AT BREAKS IN
VERTICAL DRAINS OF 48" OR MORE. OR AT APPROXIMATELY 70 FT CENTERS EXCEPT THAT THE MAXIMUM
INTERVAL MAY BE REDUCED BY THE ENGINEER OR CIVIL ENGINEER WHERE THE DEGREE OF DURABILITY IS GREATER
THAN 3 DEGREES. PULL POSTS SHALL ALSO BE PLACED AT THE END OF EACH ROLL OR PIECE OF WIRE. 
CORNER POSTS ARE TO BE INSTALLED AT ALL HORIZONTAL BREAKS IN FENCE OF 16" OR MORE. 
A MAXIMUM LENGTH OF 150' OF WIRE MAY BE INSTALLED AS A UNIT.

4/5/93
10-15-1993

FLORIDA DEPARTMENT OF TRANSPORTATION

NOTES

1. GENERAL NOTES FOR ALL FENCE

2. LINE POSTS MAY BE ANY OF THE FOLLOWING:
   (A) GALVANIZED STEEL PIPE - 1-1/2" NOMINAL.
   (B) ALUMINUM COATED STEEL PIPE - 1-1/2" Nominal.
   (C) ALUMINUM ALLOY PIPE - 1-1/2" Nominal.
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   (A) GALVANIZED STEEL PIPE - 2" NOMINAL.
   (B) ALUMINUM COATED STEEL PIPE - 2" Nominal.
   (C) ALUMINUM ALLOY PIPE - 2" Nominal.
   (D) OTHER STEEL OR ALUMINUM SHAPES FOR CORNER, END
       OR FULL POST ASSEMBLIES MAY BE USES IF APPROVED BY
       THE ENGINEER.

4. CHAIN LINK FABRIC, POSTS, RAILS, GATE FRAMES, EXPANSION
   SLEEVES, WIRE TIMED, TENSION WIRE, AND ALL MIDDLE AND
   FITTINGS AND HARDWARE SHALL MEET THE REQUIREMENTS OF
   ASTM E41-78 AND M-78 UNLESS OTHERWISE NOTED.

5. CAUTION: OTHER WIRE GM 2 1/4"

6. MATERIAL FOR CLASS 1 CONCRETE FOR FENCE FOOTINGS MAY
   BE MEASURED BY VOLUMETRIC AND/OR BY WEIGHT.

7. DETAILS OF FENCING

8. DRAWING NO: FIB-31-7

9. INDEX NO: 1 OF 1
BILL OF REINFORCING STEEL

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ESTIMATED QUANTITIES

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GRATING DETAILS

Decking to be welded to slits (6") B.L. (2")
Slits (6") B.L. (2") to be welded to 8" W.F. 20-

Stringers (6" W.F. 20") to be anchored to concrete with 3/8" anchor bolts (4 bolts per stringer).

Steel bridge floor to be "A.F." type Air Field Grid, as manufactured
by Irving Subway Grating Co., Inc., Long Island City, N.Y.

Steel flooring shall be given a shop coat of red lead according to
manufacturer's specifications and one field coat of graphite paint.

Structural steel beams shall be given a shop coat of red lead and
two field coats of cut back asphalt, grade No. C-70.

Cut back asphalt may be applied by mapping.

RANGES APPROVED: 5-29-73

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION ROAD DESIGN MANUAL

CATTLE GUARD

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1 of 1: OCS-0
TEMPORARY SLOPE DRAINS FOR FILL SECTIONS

NOTE: THIS IS A SUGGESTED METHOD ONLY. ANY ALTERNATE SOLUTION MAY BE USED AS APPROVED BY THE PROJECT ENGINEER.

GENERAL NOTES
Glass Fiber, Stabilized Fiber, Plastic sheeting, or other materials specified by the Engineer may be used to line the Earth Slope Drain.
Pipe slope drains may be used as an alternate.
Where there is no existing concrete ditch a similar method may be used to anchor the toe of the drain into the earthbank or crossed ditch.

NATURAL GROUND

FINISHING OF SLOPE

NOTE: No separate payment will be made for sandbags within these limits. Repair for sandbags within those limits to be included in unit cost for Slope Drains.
Where multiple sections of filter materials are used the one foot filter top will be required.

SECTION A-A

SECTION B-B

SECTION C-C

TEMPORARY SLOPE DRAIN FOR FILL HEIGHTS GREATER THAN 10 CT OR ROADWAY GRADES STEEPER THAN 1.5%
**SUGGESTED SEDIMENT CHECK**

General Notes:
1. Width and depth of weir may be varied to fit conditions at site. However, a general guide is spill flow a depth between 6" to 12" deep with a width between 3' to 6' wide.

2. Top elevation of ditch check should be set to provide an effective check for silt without causing an objectionable backwater. Depending upon site conditions and the particular season of the year, this top elevation will have a wide range. As a general guide a suggested trail height of approximately 1/4 of the distance between natural ground and ditch bottom is used unless other criteria control.

3. Additional spill protection may be provided for slope protection if desired.

4. For use in lateral ditches or side ditches.
**GENERAL NOTES**

Silt Barrier to Prevent drifting of Silt caused by discharge of Storm Sewers during Construction, dredging or filling operations.

Each placement of silt barrier shall be so as to effectively control silt dispersion under the conditions present on a particular project.

The details shown on this sheet are suggested methods only. Alternate solutions and usage of materials may be used as approved by the Engineer.

**SILT RETENTION BARRIER**

WEIGHTS, STAKES ETC TO BE INSTALLED AS DIRECTED BY THE ENGINEER.

**DETAIL SHOWING PLACEMENT OF STAKED SILT BARRIER AT EXISTING DITCH LOCATIONS**

**SECTION AT PILING**

**DETAIL OF STAKED SILT BARRIER**

**NOTES**

The frame will be constructed with 2 x 4 @ 8. Pilings will be a minimum of 6½ in diameter at the pile end. The depth of pilings will be at the discretion of the A&D Engineer. Attached to the frame will be a 2½ gauge polyethylene tarp and a 2' x 6' silt mat. The frame will be held in position with weights available to the Contractor to effectively prevent silt from escaping from under the bottom of the barrier. (See detail below.)

**DETAIL OF FLOATING SILT BARRIER**

**SECTION A-A**

**SIDE VIEW**

**FOLDING DETAIL**

**TYPICAL APPLICATION**

**TYPICAL APPLICATION**

**FRONT VIEW**

**STATE PARK NO.**

**WASHINGTON**

**FLORIDA DEPARTMENT OF TRANSPORTATION**

**EROSION CONTROL DEVICES**

**SILT BARRIERS**

**DRAWING NO.**

**INDEX NO.**

**DEC-04**
FOUR LANE ROADWAY

TWO LANE ROADWAY

Note: All dimensions shown are standard. The details shown on this index drawing do not supersede the details shown on Sheets GRC-01 and GRC-02.

SYMBOLS

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<td>H</td>
<td>High Plastic</td>
<td>A-5 or A-7 (both with LL &gt; 50)</td>
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<td>M</td>
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* *ASHD Soil Classification System (ASHD-M-48)
* Certain types of A-2-4 material are likely to retain excess moisture and may be difficult to dry and therefore should be used in the embankment above water level existing at time of construction.

When otherwise shown on plans this dimension may be reduced to 34'.
SODDING QUANTITIES

FLORIDA DEPARTMENT OF TRANSPORTATION
Roadway Construction Details

SODDING QUANTITIES FOR PIPE CULVERT ENDSWALLS

<table>
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Note: Quantity for 2:1 is for smooth with bolts.

REVISIONS

DATE: 5-1-06

SODDING QUANTITIES

INDEX DCE-03 INDEX DCE-04

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Note: Quantity for 2:1 is for smooth with bolts.

GENERAL NOTES

1. All straight sections except index DCE-01 will require soddings on smooth hose growing. Quantities for each construction case to be determined by the Designer.

2. For minor intersections, where stream grades are low, 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. Inlet locations on all pipes should be located so that flow may be accommodated without material and drop on angle.

4. A maximum 0.2% grade should be maintained on all cross sections outside inlet ends.
PLAN - 90° CROSSING

ELEVATION
DETAIL OF 5/8" X 1 1/2" ANCHORS
ANCHORS STAGGERED 18 C. TO C.
THIS ANCHOR EACH END CHANNEL
NOTE: 5/8" STUDS MAY BE USED
IN LIEU OF ANCHORS.

SECTION

FLEXIBLE BASE SLAB

PLAN - TYPICAL SLAB

PROVIDE HOLE IN CHANNEL TO FIT PIPE STUDS AND MELD

SECTION A-A

FLEXIBLE TYPE BASE
AND SURFACE

REVELED END SECTION

ALTERNATE END SECTION

NOTE:
- SACKS CONCRETE PLANTS TO BE SHAPPED PRIOR TO TREATMENT.
- ALL VENTS OR DRAINS TO BE FITTED WITH SELF-CONTAINED TIES.
- ALL VENTS OR DRAINS TO BE FITTED WITH SELF-CONTAINED TIES.
- ALL VENTS OR DRAINS TO BE FITTED WITH SELF-CONTAINED TIES.
- ALL VENTS OR DRAINS TO BE FITTED WITH SELF-CONTAINED TIES.
- ALL VENTS OR DRAINS TO BE FITTED WITH SELF-CONTAINED TIES.
- ALL VENTS OR DRAINS TO BE FITTED WITH SELF-CONTAINED TIES.
GENERAL NOTES

1. This drawing is based on using 3/8" 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 6 1/2" lag screws, and to Headwall by 5/8" anchor bolts. Double coil spring washers are used with lag screws to compensate for vertical movement.

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 flanges.

4. Flangeway and outside filler timbers to be rodded to ensure close fit prior to treatment.

5. All timbers to be 2 1/2 x 12 and spaced 12" o.c.

6. Crossing of any angle can be equipped with units of either 315-37-100 or 285-100.

7. Decking may be 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 under the following conditions: (a) All locations with more than double tracks, (b) all crossings with a skew angle in excess of 30 degrees or 1/3 within zones for an existing or scheduled future vehicular stop. Zone lengths are charted above.

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

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

CROSSING TYPE "P" (POLYETHYLENE)

STOP ZONE

Design Speed
45 MPH or less 250
50 - 55 350
60 - 65 500
70 600

Distance from stop

CROSSING TYPE "R" (RUBBER)

Shim thickness varies with height of rail.
GENERAL NOTES

1. The reinforced concrete slabs are manufactured in 8'0" sections, 5" in depth to fit all rail sections
5 1/4" in height or heavier. Slabs are interchangeable and relocatable.

2. Center slabs are one piece construction allowing for 2½" triangle 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 "floatation" 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
manufacturers specifications.
SKETCHES INDICATING SHOULDER TREATMENT AT
SPEED CHANGE LANES WITH SHOULDER GUTTER

SKETCHES INDICATING SHOULDER TREATMENT AT SPEED CHANGE
LANES WITHOUT SHOULDER GUTTER
Section A-A
Normal Crowned Section

2-Lane or 4-Lane Pavement, No Median

Normal Pavement Slope

Straight line transitions from normal pavement to super-elevated slope

Normal Pavement Transition

SECTION C-C
Fully Super-Elevated Section

Section B-B
Plane Inclined Section
CROSS SLOPE EQUAL TO NORMAL CROWN SLOPE. RESHAPE ROTATION ABOUT CENTERLINE AT THIS POINT.

Section A-A
Detail of Transition from Normal Crowned Section to Super-Elevated Section

These transition details are to apply in all cases, except at curves of insufficient length, insufficient transition length, or where soil conditions, base courses, etc., in which case the details of the transitions are to be included in the detail plans.

Design Super-Elevation Rates

General Notes for Super-Elevation

1. Use normal section with no super-elevation for curves up to 45 ft. 6 in. for design speeds of 70 mph.
2. Use minimum super-elevation to protect shoulders for design speeds of 70 mph and in the range of the horizontal portion of the curve, super-elevate at the normal cross slope rate of 0.2 ft/ft, or as indicated by the curve for the approved design speed.
3. The length of super-elevation transition is to be determined by using a relative slope of super-elevation to profile grade given in the table below, except that the minimum length of transition shall be 10 ft.
4. For curves in municipal areas, see section 2-6.
### Standard Symbols for Plan Sheets

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<td>🌳</td>
<td>Edge of Wooded Area</td>
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<tr>
<td>🌸</td>
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### Utility Adjustment Symbols

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<td>🛡️</td>
<td>Guy Wire and Anchor Pin</td>
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**Table of Standards Symbols for Key Maps and Plan Sheets**

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### STANDARD SYMBOLS FOR PLAN SHEETS

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<td>![Symbol Image]</td>
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<td>Rigid Galvanized Lighting Conduit and Conductors</td>
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<td>EXISTING USE POLE</td>
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#### SIGNING AND PAVEMENT MARKING SYMBOLS

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**STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION**

**ROAD DESIGN SECTION**

**STANDARD SYMBOLS FOR KEY MAPS AND PLAN SHEETS**

- **MATERIALS:**
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  - **DATE:** [Date]
  - **SHEET:** [Sheet]
  - **DRAWN BY:** [Drawn By]
  - **CHECKED:** [Checked]
  - **SIGNED:** [Signed]
NOTE
CLASS 1 CONCRETE IS TO BE USED UNLESS OTHERWISE NOTED IN PLANS OR SPECIAL PROVISIONS

NOTE
TRACTOR CROSSING TO BE CONSTRUCTED TO MATCH PAVEMENT CROSS SLOPE.
THE NUMBER OF NAILS REQUIRED WILL VARY WITH THE PAVEMENT WIDTH. A SUFFICIENT NUMBER OF NAILS WILL BE USED TO ENSURE THE OVERALL WIDTH OF THE TRACTOR CROSSING WILL BE A MINIMUM OF 2 INCHES WIDER THAN THE PAVEMENT WIDTH. THE TRACTOR CROSSING WILL BE CENTERED ON THE PAVEMENT CENTERLINE.

SECTION A-A
DETAIL OF TRACTOR CROSSING, TYPE 'A'
REINFORCED CONCRETE

SECTION X-X
DETAIL OF TRACTOR CROSSING, TYPE 'B'
TREATED TIMBER
CONCRETE CURB AND GUTTER DETAILS

Note: When Curb or Gutter and Traffic Separator are constructed adjacent to Rigid Pavement, the 1/8" expansion joint shown above will not be used.

DETAILS OF CONCRETE CURB

Note: When Curb or Gutter is constructed adjacent to Flexible Pavement, the 1/8" Expansion Joint shown above will not be used.

CONSTRUCTION OF CURB AND GUTTER ADJACENT TO RIGID PAVEMENT

Note: When Curb and Gutter, Traffic Separator, Gutter, Shoulder and Shoulder Drop are constructed adjacent to Flexible Pavement, the Face of the lip of the Gutter shall be beyond as shown in this detail.

GENERAL NOTES

1. For Curb and Gutter and Traffic Separator provide M-34" expansion joints at 10 centers.
2. All Curb and Gutter Details shown for construction adjacent to Flexible Pavement, unless otherwise noted.
NOTES:
1. Ramp surface shall be constructed to conform to Section 323-72 of Florida Department of Transportation Standards Specifications. Ramp shall not exceed a maximum slope of 12:1.
2. Curb cut ramps are to be located as shown on the plans.
3. Basis of payment: contract unit price per 60 sq ft of concrete sidewalk.
4. Complete curb cut ramps are to be constructed at all locations shown on plans even when sidewalk is not constructed concurrently.

CURB CUT RAMP
FACILITY FOR PHYSICALLY HANDICAPPED

Section A-A
DETAIL SHOWING RIGID SHOULDER PAVEMENT

Compression Seal

Concrete Pavement

Rigid Shoulder Pavement

Sheet Metal Strip

DETAIL SHOWING SHEET METAL STRIP

Compression Seal

Concrete Pavement

Rigid Shoulder Pavement

Sheet Metal Strip

REINFORCING STEEL

Finish surface smooth. Cure with heavy coating of wax base white pigmented curing compound. Apply second application immediately prior to placing pavement.

SECTION A-A THROUGH EXPANSION JOINT

Either of the three Seals shown may be used.

COMPRESSION SEAL DETAIL

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

GENERAL NOTES

1. Quantity of expansion joint to be determined by measurement along the entire length of the joint.

2. For additional details see Index No. P2-D.

3. The £ of roadway and the £ of bridge do not necessarily coincide. Prior to the placement of the expansion joint, the £ of the roadway pavement shall be determined.

4. When the shoulder pavement is constructed with either concrete or asphalt concrete, the expansion joint between contraction joint shall be continued across the shoulder pavement. See detail for construction in rigid shoulder pavement.
SECTION BB

To be paid for as P.C.C. Pavement (S.V.)

Low slump concrete hand finished in a smooth plane.

Paint this surface with minimum
1/2" coating of Asphalt Cement.

Seal joints with Asphalt Cement
Point with Tar Mix or
Asphalt Cement

Approach Slab

Form two transverse keys in Subslab or 2 rows of 1" dowels 12" long on 18" centers.

Subslab slope to be parallel to pavement slope.

NOTES:
- Outside edges of slab to be cast against compacted Subgrade without forms. Top slab edge of side away from bridge to be floated to present rounded edge.
- Asphaltic Concrete placed and compacted in layers not to exceed 2" compacted thickness.

SECTION AA

APPROXIMATE QUANTITIES
PER FOOT OF TRANSVERSE MEASURE

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<thead>
<tr>
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<td>W'-4&quot;</td>
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*NOTE:
- Beveled portion of pavement slab has been converted to equivalent design depth of main line pavement.

NOTES:
1. State of pavement to be linear feet of transverse measure (W) of the complete joint including subslab, asphaltic concrete, portion of pavement slab over the subslab between the pay lines shown in Section AA and all additional excavation.

2. Concrete in subslab to be Class I or Concrete Pavement Class.

3. Portions of bars A which are outside of the indicated pay lines are to be included in the price bid for complete job.

4. For additional details see Index No. PJ-01.

Bridge Approach Expansion Joint for Concrete Pavement

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<td>5/7/71</td>
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1/1/71 PEJO
METHOD OF DETERMINING MEDIAN OPENINGS AT SKewed SIDE STREETS

A short radii may be placed at breaks in the curb

MEDIAN STORAGE LANE - ALT. I

Details of Median Storage Lane - ALT II

Note: The table above is applicable only when median storage lanes occur on tangent construction.

<table>
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<th>VPR</th>
<th>R</th>
<th>S</th>
<th>T</th>
<th>U</th>
<th>V</th>
<th>W</th>
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Note: The table above is applicable only when median storage lanes occur on tangent construction.
DETAILS OF TYPE I CONCRETE TRAFFIC SEPARATOR
NOTE: STABILIZE FULL WIDTH OF TRAFFIC SEPARATOR

DETAILS OF TYPE II CONCRETE TRAFFIC SEPARATOR

DETAILS OF TYPE III CONCRETE TRAFFIC SEPARATOR

DETAILS OF TYPE IV CONCRETE TRAFFIC SEPARATOR

NOTE: CONCRETE TRAFFIC SEPARATORS TYPE I AND TYPE II ARE TO BE USED WHEN ADJACENT MMINES TO FLOODED ROADWAY ARE TO BE USED. WHEN ADJACENT MMINES IS DENT CONCRETE.

CONSTRUCTION JOINT DETAILS