ROADWAY AND TRAFFIC DESIGN STANDARDS

FOR DESIGN, CONSTRUCTION, MAINTENANCE AND UTILITY OPERATIONS FOR STREETS AND HIGHWAYS ON STATE MAINTAINED SYSTEMS

K. C. H. Stipp
DIRECTOR OF DESIGN

JANUARY 1990
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<table>
<thead>
<tr>
<th>INDEX NUMBER</th>
<th>SHEET NUMBER</th>
<th>DESCRIPTION</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Every standard drawing sheet in the 1990 Roadway and Traffic Design Standards has been produced by computer drafting. Future standards will also be produced by computerized design and drafting (CADD). In taking advantage of verification, registering and other features of CADD, and due to certain restraints of CADD, changes appear on the sheets that are not listed in the tabulated Revisions. These changes may include reformating, typographical corrections, alignment of views and details, scale, rotation, skew, abbreviation, grouping, shape, proportion and other nonfunctional changes. Revisions to the standards that reflect function, intent and purpose are tabulated below.</td>
</tr>
<tr>
<td>002</td>
<td>2 of 3</td>
<td>Symbols added for 'Survey Reference Point'. Symbol for 'Point of Intersection' revised. Width dimension added to Gate symbol.</td>
</tr>
<tr>
<td>101</td>
<td>1 of 1</td>
<td>Details for 'Type A' retainer and basin modified. General Notes for method of payment added.</td>
</tr>
<tr>
<td>103</td>
<td>1 of 1</td>
<td>Changes to 'Floating Turbidity Barrier' detail: Flotation weights corrected; depths of curtains redefined; proprietary design notice added.</td>
</tr>
<tr>
<td>104</td>
<td>1 of 1</td>
<td>Transitional portion of shoulder pavement extended on details for 'Shoulder And Slope Treatment For Superelevated Roadways'.</td>
</tr>
<tr>
<td>105</td>
<td>1 of 1</td>
<td>Reworking shoulder width and seed and mulch redescribed on sectional views for reworking 'Type R-2'. General Note No. 5 added.</td>
</tr>
<tr>
<td>200</td>
<td>1 of 1</td>
<td>Bar designation corrected to vertical on Type J, Alternate B. Cross references updated.</td>
</tr>
<tr>
<td>201</td>
<td>1 of 6</td>
<td>Tack welding of covers to frame deleted. General Notes Nos. 6 &amp; 7 deleted and new Note No. 6 added to describe new and retrofit cover application. Details revised for Type 7-T and 7-NT Structure Tops to clarify frame and cover positioning.</td>
</tr>
<tr>
<td>2 of 6</td>
<td></td>
<td>Barrier Wall Inlet, Index 219, added to 'Eye Bolt and Chain Requirements' table.</td>
</tr>
<tr>
<td>3-6 of 6</td>
<td></td>
<td>Details added for Median Barrier Inlets Types 3, 4 &amp; 5. Other details rearranged on sheets.</td>
</tr>
<tr>
<td>205</td>
<td>1 of 4</td>
<td>Values for Type 1-R (Spiral Rim) pipe added to tables. General Note No. 4 added.</td>
</tr>
<tr>
<td>2 of 4</td>
<td></td>
<td>Class II pipe added. Height of fill measurement defined. Footnotes added. D-Loads revised.</td>
</tr>
<tr>
<td>3 or 4</td>
<td></td>
<td>Cover, recorrugation, material availability and footnotes revised. Headnotes added.</td>
</tr>
<tr>
<td>INDEX NUMBER</td>
<td>SHEET NUMBER</td>
<td>DESCRIPTION</td>
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<tr>
<td>--------------</td>
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</tr>
<tr>
<td>205</td>
<td>4 of 4</td>
<td>Cover and material availability notes revised. Headnotes added.</td>
</tr>
<tr>
<td>209</td>
<td>1 of 1</td>
<td>Title changed in title block and table heading.</td>
</tr>
<tr>
<td>210</td>
<td>1 of 1</td>
<td>Dimensional Section for 'Inlets Types 1 and 2' corrected. Slab reinforcing dimensional table deleted and plan views relabeled. General Note 9 added.</td>
</tr>
<tr>
<td>211</td>
<td>1 of 2</td>
<td>Section QQ added. Section PP modified. Sketch showing frame seat and throat recess expanded. General Note No. 13 replaced. Modified throat to minimize debris trapping.</td>
</tr>
<tr>
<td></td>
<td>2 of 2</td>
<td>Tack weld between grate and frame deleted. Sections EE improved.</td>
</tr>
<tr>
<td>212</td>
<td>1 of 1</td>
<td>Pavement depression detail added. General Notes No. 1 revised and No. 5 added.</td>
</tr>
<tr>
<td>213</td>
<td>1 of 1</td>
<td>Pavement depression detail added. General Notes No. 1 revised and No. 5 added.</td>
</tr>
<tr>
<td>217</td>
<td>1 of 1</td>
<td>Modified to suite new F-Shape barrier wall.</td>
</tr>
<tr>
<td>218</td>
<td>1 of 2</td>
<td>General Note No. 7 added.</td>
</tr>
<tr>
<td>219</td>
<td>1&amp;2 of 2</td>
<td>New index.</td>
</tr>
<tr>
<td>220</td>
<td>1 of 1</td>
<td>Bar stub relocated on grate.</td>
</tr>
<tr>
<td>229</td>
<td>1 of 1</td>
<td>Hydraulic capacities revised. Assumptions used to establish capacities clarified (see revised General Note No. 7 and accompanying detail). Titles in title block and chart heading changed.</td>
</tr>
<tr>
<td>232</td>
<td>1 of 4</td>
<td>General Note No. 3 replaced. Steel grate bars and spacing redrawn. 'Notice' added to 'Steel Grates'.</td>
</tr>
<tr>
<td></td>
<td>3 of 4</td>
<td>Section CC notation describing use of existing grates revised.</td>
</tr>
<tr>
<td>232</td>
<td>4 of 4</td>
<td>Sections CC notations describing use of existing grates revised. 'Method of Payment' note number 4 revised.</td>
</tr>
<tr>
<td>235</td>
<td>1 of 1</td>
<td>Weathering steel grate eliminated; galvanizing required (See General Note No. 7). General Notes reoriented.</td>
</tr>
<tr>
<td>INDEX NUMBER</td>
<td>SHEET NUMBER</td>
<td>DESCRIPTION</td>
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</tr>
<tr>
<td>249</td>
<td>1 of 1</td>
<td>Titles in title block and chart heading changed. Note added to Index 250 data.</td>
</tr>
<tr>
<td>250</td>
<td>1 of 2</td>
<td>General Note No. 3 revised and General Notes No. 4 and No. 11 added.</td>
</tr>
<tr>
<td>258</td>
<td>1 of 1</td>
<td>Index redrawn. Dimensional and tabulated values corrected. Notes 1 and 2 added.</td>
</tr>
<tr>
<td>260</td>
<td>1 of 1</td>
<td>Weathering steel grate discontinued (see General Note No. 3); galvanizing required.</td>
</tr>
<tr>
<td>261</td>
<td>1 of 3</td>
<td>Weathering steel grate discontinued (see General Note No. 4); galvanizing required.</td>
</tr>
<tr>
<td>268</td>
<td>1 of 1</td>
<td>Filter fabric (notations) added to riprap.</td>
</tr>
<tr>
<td>270</td>
<td>1 of 1</td>
<td>Optional taper shape added. General Note No. 2a, pp.2 replaced.</td>
</tr>
<tr>
<td>272</td>
<td>1-4 of 6</td>
<td>Slope notations on Sections revised.</td>
</tr>
<tr>
<td></td>
<td>6 of 6</td>
<td>General Notes reoriented; Notes Nos. 10 and 11 (old 1 and 2) revised.</td>
</tr>
<tr>
<td>273</td>
<td>1-4 of 6</td>
<td>Slope notations on Sections revised.</td>
</tr>
<tr>
<td></td>
<td>6 of 6</td>
<td>General Notes reoriented; Notes Nos. 13 and 14 (old 2 and 1) revised.</td>
</tr>
<tr>
<td>274</td>
<td>1 of 1</td>
<td>Index deleted (to become non-indexed standard details).</td>
</tr>
<tr>
<td>280</td>
<td>1 of 4</td>
<td>'Concrete Gutter And Drains At Retaining Walls' transferred to Sheet 2 of 4. Concrete jackets for dissimilar concrete pipe joints added (2 details).</td>
</tr>
<tr>
<td></td>
<td>2 of 4</td>
<td>'Concrete Gutter And Drains At Retaining Walls' transferred from Sheet 1 of 4. Class II pipe added to 'Schedule Of Bevel Reinforcement' table.</td>
</tr>
<tr>
<td></td>
<td>3 of 4</td>
<td>'Inlet In Top Of Box Culvert' details and 'Bridge Culvert Number Location' detail transferred to Sheet 4 of 4. Interior wall connection details added.</td>
</tr>
<tr>
<td></td>
<td>4 of 4</td>
<td>'Inlet In Top Of Box Culvert' and 'Bridge Culvert Number Location' details transferred from old Sheets 1 and 3 of 3.</td>
</tr>
<tr>
<td>INDEX NUMBER</td>
<td>SHEET NUMBER</td>
<td>DESCRIPTION</td>
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</tr>
<tr>
<td>285</td>
<td>1 of 2</td>
<td>'Slotted Pipe Options' details transferred to Sheet 2 of 2. 'Utility Pipes Thru French Drain' detail added. General Notes Nos. 3 and 10(a), (b) &amp; (c) revised.</td>
</tr>
<tr>
<td></td>
<td>2 of 2</td>
<td>Added sheet for transfer of 'Slotted Pipe Options' details from Sheet 1 of 2. Elliptical slotted pipe details added to 'Option B'. Pipe sizes added to 'Round Pipe' table.</td>
</tr>
<tr>
<td>286</td>
<td>1 of 2</td>
<td>General Notes For Underdrain reoriented. Note No. 1 expanded; No. 8 is old No. 9; No. 9 added; and, No. 10 (old No. 8) expanded. Clearance above design water table redefined in Underdrain Types Va &amp; Vb.</td>
</tr>
<tr>
<td></td>
<td>2 of 2</td>
<td>General Notes For Edgedrain revised to cover edgedrain exclusively. Pipe notation in Section AA revised.</td>
</tr>
<tr>
<td>290</td>
<td>1 of 5</td>
<td>'Culvert Extension' added to General Notes. Item 'F' added to Reinforcing Bar Schedule. Headwall Valid Angle note to right of Headwall And Wingwall Alignment, Plan revised.</td>
</tr>
<tr>
<td></td>
<td>2 of 5</td>
<td>Asterisk (*) applied to Bars C-1, with reference note revised. Dimensions added to Detail B. Detail D and headwall redrawn for relative shape and detail.</td>
</tr>
<tr>
<td></td>
<td>3 or 5</td>
<td>Same changes as 2 of 5, and, Bars *S2 correctly shown in Part Plan Top Slab and Section LL added.</td>
</tr>
<tr>
<td></td>
<td>4&amp;5 of 5</td>
<td>Same changes as 3 of 5.</td>
</tr>
<tr>
<td>295</td>
<td>1 of 1</td>
<td>Weathering steel grate eliminated; galvanizing required (See General Note No. 2).</td>
</tr>
<tr>
<td>301</td>
<td>1 of 2</td>
<td>Dimensions and quantities added for 6' separator and 22' median under 'Option 2'. Notations added to table for 'Median Openings For Undivided Side Streets'.</td>
</tr>
<tr>
<td></td>
<td>2 of 2</td>
<td>New sheet and new details (5) for turn key tapers for uncurbed medians.</td>
</tr>
<tr>
<td>302</td>
<td>1 of 1</td>
<td>Dimension correction in Longitudinal Section of Type V separator.</td>
</tr>
<tr>
<td>304</td>
<td>2 of 2</td>
<td>General Note No. 1 added. Surface break lines added to plan views.</td>
</tr>
<tr>
<td>INDEX NUMBER</td>
<td>SHEET NUMBER</td>
<td>DESCRIPTION</td>
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<td>--------------</td>
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<td>-------------</td>
</tr>
<tr>
<td>305</td>
<td>1 of 4</td>
<td>Plastic caps for dowel bars added. 'Transverse Expansion Joint' subheading revised.</td>
</tr>
<tr>
<td></td>
<td>2 of 4</td>
<td>Hot pour sealants replaced by specified materials (see individual details).</td>
</tr>
<tr>
<td>400</td>
<td>1 of 14</td>
<td>Departure line moved to pass through face of rail at No. 3 post, and (delta) footnote added to 'Length Of Advancement' detail. Guardrail offset controls changed and use of concrete barrier required as outlined in General Note No. 3. Refer to Index 410, Sheet 12 of 12 for rigid barrier application.</td>
</tr>
<tr>
<td></td>
<td>4 of 14</td>
<td>For 'Median 50 Feet Or Greater' the guardrail was moved from the flare position to a position parallel to the travelway. A table for guardrail lengths was added. The use of barriers between divided bridges is now limited to guardrail and is to be included as a roadway item.</td>
</tr>
<tr>
<td></td>
<td>5 of 14</td>
<td>The use of barriers between divided bridges is now limited to guardrail and is to be included as a roadway item.</td>
</tr>
<tr>
<td></td>
<td>7 of 14</td>
<td>Departure line moved to pass through face of rail at No. 3 post in 'Standard Flare - Detail P'.</td>
</tr>
<tr>
<td></td>
<td>8 of 14</td>
<td>'Guardrail Location - Detail K' expanded to show guardrail location on front slopes and mounting detail for ribrails. Shoulder transitions of standard flares lengthened to 50' (min.).</td>
</tr>
<tr>
<td></td>
<td>9 of 14</td>
<td>Safety pipe rail shortened to show end of pipe at post No. 4 when steel post flare constructed adjacent to pedestrianway or bikeway.</td>
</tr>
<tr>
<td></td>
<td>10 of 14</td>
<td>All details revised to conform to wing posts and approach slabs (Structures Indexes 700 and 900), modified to accommodate new F-Shaped barriers.</td>
</tr>
<tr>
<td></td>
<td>11 of 14</td>
<td>Details for post mounted reflectors deleted and details for adhesive mounted reflectors added (Detail M); phase out of post mounted reflector included in 'Reflector Notes'. Hazards removed from 'Detail L'.</td>
</tr>
<tr>
<td></td>
<td>12 of 14</td>
<td>'Notes: (Special Steel Post)' completely revised. Standard timber post sectional dimensions marked 'nominal'. Standard steel post galvanizing specification added.</td>
</tr>
<tr>
<td></td>
<td>14 of 14</td>
<td>Note stating application of rectangular beam washer added to 'Beam Washer' detail. Beam washed removed from 'Rail Splice' detail.</td>
</tr>
<tr>
<td>INDEX NUMBER</td>
<td>SHEET NUMBER</td>
<td>DESCRIPTION</td>
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<td>-------------</td>
</tr>
<tr>
<td>410</td>
<td>1 of 12</td>
<td>All details modified to suit F-Shape barrier wall.</td>
</tr>
<tr>
<td></td>
<td>2 of 12</td>
<td>All details modified to suit F-Shape barrier wall. Timber offset block for special end shoe connection to barrier reshaped.</td>
</tr>
<tr>
<td></td>
<td>3 of 12</td>
<td>Light pole mounting details transferred to this sheet and new detail added for electrical pull box installation. Details suited to F-Shape barrier.</td>
</tr>
<tr>
<td></td>
<td>4 of 12</td>
<td>Cantilever wall added to 'Reinforced Concrete Barrier Wall (Rigid)' details. All details modified to suit F-Shape barrier wall. Section added to show reinforcing details of barrier wall inlets (Index No. 218). Details for transitions at bridges deleted.</td>
</tr>
<tr>
<td></td>
<td>5 of 12</td>
<td>'Reinforced Concrete Barrier Wall (Retaining) moved to this sheet to separate from shoulder barriers, and bending diagrams revised to suit all F-Shape shoulder barriers (rigid).</td>
</tr>
<tr>
<td></td>
<td>6 of 12</td>
<td>New sheet for all new details for 'Concrete Barrier Walls On Approaches To Bridges', for roadways with shoulder approaches.</td>
</tr>
<tr>
<td></td>
<td>7-11 of 12</td>
<td>All details modified to suit F-Shape barrier wall.</td>
</tr>
<tr>
<td></td>
<td>12 of 12</td>
<td>New sheet. 'Shoulder Barrier Wall At Above Ground Rigid Hazard When Guardrail Offset For Hazard Less Than 3 Feet'. Refer to General Note No. 3 on Index No. 400.</td>
</tr>
<tr>
<td>415</td>
<td>1 of 2</td>
<td>Module spacing and attenuator skew to barrier wall added to 'Temporary Inertial Attenuator' detail. 'Lifting Sleeve' detail added. F-Shape dimensions added to 'Wall Unit' Section. General Note No. 1 is a new note (old notes renumbered) to allow use of optional safety shapes. General Note No. 8 (old No. 7) expanded to clarify unit end types that are acceptable to become Department property, and to emphasize the prohibition of the use of plain end units (old Class E units).</td>
</tr>
<tr>
<td></td>
<td>2 of 2</td>
<td>'Notice' of proprietary design and rights added to 'Optional 1' end treatment. Footnote restated in table for 'Wall Tie End Anchorage Requirements'.</td>
</tr>
<tr>
<td>450</td>
<td>162 of 2</td>
<td>Expanded to two sheets for enlargement and clarity.</td>
</tr>
<tr>
<td>INDEX NUMBER</td>
<td>SHEET NUMBER</td>
<td>DESCRIPTION</td>
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</tr>
<tr>
<td>451</td>
<td>1 of 2</td>
<td>Completely revised. Pull assembly modified. Fabric design and fence height restricted unless superceded by details in plans. Other miscellaneous revisions.</td>
</tr>
<tr>
<td></td>
<td>2 of 2</td>
<td>Added sheet for miscellaneous details.</td>
</tr>
<tr>
<td>452</td>
<td>1 of 2</td>
<td>Completely revised. Pull assembly modified. Each assembly now requires a separate pay item. Line post settings redefined (see General Note No. 7). Other miscellaneous revisions.</td>
</tr>
<tr>
<td></td>
<td>2 of 2</td>
<td>Added sheet for miscellaneous details.</td>
</tr>
<tr>
<td>461</td>
<td>1 of 1</td>
<td>F-Shape barrier wall outlined. NJ Shape retained for installations on existing walls.</td>
</tr>
<tr>
<td>500</td>
<td>1 of 1</td>
<td>Half Section enlarged and notations restated for clarification on detail for 'Removal Of Plastic Material And Location Of Underdrain In Municipal Construction'. General Notes reoriented; No. 2 (old No. 5) expanded.</td>
</tr>
<tr>
<td>510</td>
<td>1 of 2</td>
<td>Ft./Pt. &amp; ft./ft. removed from all cross slope and superelevation rates.</td>
</tr>
<tr>
<td>511</td>
<td>1 of 2</td>
<td>Curves replotted for rates of cross slope for 'Removal Of Crown And/Or Superelevation For Curvature At Various Design Speeds'. Superfluous and inconsistent terminology removed from all details and notes. General Note No. 2 revised.</td>
</tr>
<tr>
<td></td>
<td>2 of 2</td>
<td>Ft./Pt. removed from all cross slope and superelevation rates. Lane terminology changed. Minor revision made to section and profile drawings. 'd(Slope Ratio)' table revised. Limited application of values in superelevation table emphasized by subheading 'Special Application Superelevation Rates'.</td>
</tr>
<tr>
<td>513</td>
<td>1 of 1</td>
<td>Complete revision of chart and notes to conform with attachment to special provision issued 11/10/88.</td>
</tr>
<tr>
<td>514</td>
<td>1 of 1</td>
<td>Revised to conform with chart and notes attached to special provision issued 11/10/88.</td>
</tr>
<tr>
<td>515</td>
<td>1 of 3</td>
<td>Rural turnouts and notes retained on this sheet. Urban turnouts transferred to Sheet 2 of 3.</td>
</tr>
<tr>
<td></td>
<td>2 of 3</td>
<td>All urban plans and section shown on this sheet. The upper plan details added to show driveway construction when right of way located more than 2' back of sidewalk or construction when there is no sidewalk.</td>
</tr>
<tr>
<td></td>
<td>3 of 3</td>
<td>Added sheet for turnout profiles (old Sheet 2 of 2).</td>
</tr>
<tr>
<td>INDEX NUMBER</td>
<td>SHEET NUMBER</td>
<td>DESCRIPTION</td>
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</tr>
<tr>
<td>516</td>
<td>1 of 1</td>
<td>Sand-Clay Base changed to LER 75.</td>
</tr>
<tr>
<td>520</td>
<td>1 of 1</td>
<td>Quantities added to 1' high 'Gravity Wall' to cover 10' dropoff application. General Note No. 3 added. Toe depth from 'Surface' to cover natural ground, sidewalk, pavement or other structure at toe.</td>
</tr>
<tr>
<td>526</td>
<td>1-6 of 6</td>
<td>New index for roadway transitions covering intersection turns and storage, flared and painted left turns, lane and roadway divergence and convergence, shoulder and pavement edge treatments, two-lane to four-lane transitions, and, taper applications.</td>
</tr>
<tr>
<td>532</td>
<td>1 of 3</td>
<td>General Notes revised: No. 4 reworded; No. 9, paragraph 3 redescribes base plates; No. 11 is expanded to cover component finishes.</td>
</tr>
<tr>
<td>545</td>
<td>1 of 1</td>
<td>Sheet headings added for quick identification by post types. Notation added to 'Post Spacing'.</td>
</tr>
<tr>
<td>546</td>
<td>1 of 1</td>
<td>Title changed.</td>
</tr>
<tr>
<td>560</td>
<td>1 of 1</td>
<td>New index providing clear sight criteria for Landscaping at intersections.</td>
</tr>
<tr>
<td>600</td>
<td>1 of 8</td>
<td>Rail standard gage dimension added by General Note No. 3.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>'Table Of Contents' updated. Symbol text refers to CADT TCZ cell Library. Symbol changes: Individual symbols added for 'Drum', 'Cone Or Tubular Delineator', and, 'Truck Mounted Attenuators (TMA)'. Truck symbol 'X' redefined; includes old 'AV'. 'G' deleted.</td>
</tr>
<tr>
<td>2 or 8</td>
<td></td>
<td>Refer to 'Table Of Contents' for reorientation of entries. Definitions for 'Regulatory Speed (In Work Zones)' and 'Advisory Speed' revised, and 'Above Ground Hazard' added. 'Advisory Speed Plate' text deleted. 'Regulatory Speeds In Work Zones' text added. 'Adjoining And/Or Overlapping Work Zone Signing' is a text heading change. 'Intersecting Road Signing And Signals' text, paragraphs 1 &amp; 2 revised.</td>
</tr>
<tr>
<td>3 of 8</td>
<td></td>
<td>Refer to 'Table Of Contents' for reorientation of entries. Warning Lights text, paragraph 1 &amp; 2 revised, and Payment text added. 'Reflectorized Raised Pavement Markers' text revised to add markers on gore edgelines. 'Sign Covering And Intermittent Work Stoppage Signing' text, paragraph 2 revised. 'Removing Pavement Markings' text revised. Posted speed tabulation deleted from 'Superelevation' table. 'Lane Width' minimum widths redefined.</td>
</tr>
<tr>
<td>INDEX NUMBER</td>
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<td>DESCRIPTION</td>
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</tr>
<tr>
<td>600</td>
<td>4 of 8</td>
<td>'Variable Message Signs (VMS)' and 'Roadside Barriers' are added subjects. 'Above Ground Hazard' is a subject transferred from 'Definitions' but restructured.</td>
</tr>
<tr>
<td>5 of 8</td>
<td>Chart column headings 'Day' and 'Night' converted to 'Active' and 'Inactive' work zone conditions with footnoted definitions. Notation added to 'Optional Shoulder Treatment' detail. General Note No. 5B revised.</td>
<td></td>
</tr>
<tr>
<td>6 of 8</td>
<td>'Vertical Panel' A-Frame detail and 'Tubular Marker' detail added. 'Channelizing And Lighting Device Notes' added.</td>
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</tr>
<tr>
<td>7 of 8</td>
<td>New sheet and details for barrier wall transitions in work zones.</td>
<td></td>
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<tr>
<td>8 of 8</td>
<td>'Reduced Speed Ahead' sign color changed to R/W. 'End Reduced Speed' sign deleted. 'Stay In Your Lane' sign, MUT-1, and lane shift signs, MUT-2 and MUT-3 added. Paragraph 3 of 'Notes' revised to reference sign codes to current cell Library.</td>
<td></td>
</tr>
<tr>
<td>602</td>
<td>1 of 1</td>
<td>Cone, barricade and drum spacing notation expanded. General Note No. 7, L to L (min.).</td>
</tr>
<tr>
<td>603</td>
<td>1 of 1</td>
<td>Cone, barricade and drum spacing notation expanded. General Notes No. 5 Improved and No. 8, L to L (min.).</td>
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<tr>
<td>604</td>
<td>1 of 1</td>
<td>Cone, barricade and drum spacing notation expanded. General Notes No. 4 improved and No. 7, L to L (min.).</td>
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<tr>
<td>605</td>
<td>1 of 1</td>
<td>Cone, barricade and drum spacing notation expanded. General Note No. 6, L to L (min.).</td>
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<td>606</td>
<td>1 of 1</td>
<td>Cone, barricade and drum spacing notation expanded. Worker shield replaced by 'One Lane Road Ahead' sign. Transition length marked (min.). General Notes Nos. 5, 7 &amp; 8 revised.</td>
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<tr>
<td>607</td>
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<td>'Pavement Coring And Straight Edging' added to 'Typical Applications'.</td>
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<tr>
<td>608</td>
<td>1-4 of 4</td>
<td>All new sheets replacing previous Index 608, Sheet 1 of 1, detailing frequently used portable and temporary traffic signal applications.</td>
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<tr>
<td>609</td>
<td>1 of 1</td>
<td>Advisory Speed signing replaced by Regulatory Speed Signing. General Notes Nos. 1 and 2 revised.</td>
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<tr>
<td>611</td>
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<td>Cone, barricade and drum spacing notation expanded. General Notes No. 4 improved and No. 6, L to L (min.).</td>
</tr>
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<td>INDEX NUMBER</td>
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<tr>
<td>612</td>
<td>1 of 1</td>
<td>Flagman (symbol and shield) replaced by merge left sign. Worker shield added. Buffer spaces added. General Notes No. 3 improved; No. 6 corrected; and, No. 8, L to L (min.). 'Pavement Coring And Straight Edging' added to 'Typical Applications'.</td>
</tr>
<tr>
<td>613</td>
<td>1 of 2</td>
<td>Buffer space added. General Notes No. 3 improved, No. 7 revised, and No. 8, L to L (min.).</td>
</tr>
<tr>
<td></td>
<td>2 of 2</td>
<td>New sheet showing signing, arrow panel and barricade modification when lane temporarily reopened to traffic.</td>
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<tr>
<td>614</td>
<td>1 of 2</td>
<td>Steel base requirement removed from Section AA. General Notes No. 2 improved; No. 5, L to L (min.); and, No. 6, paragraph 2 revised.</td>
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<td></td>
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<td>Tabulated 'Z' lengths modified. Regulatory speed signing and attenuators added.</td>
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<td>615</td>
<td>1 of 1</td>
<td>General Notes No. 2 improved; No. 5, L to L (min.); and, No. 6, paragraph 2 revised.</td>
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<td>616</td>
<td>1 of 2</td>
<td>Completely revised (review all elements on sheet).</td>
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<tr>
<td></td>
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<td>New sheet containing all new details and notes for using shoulder pavement as a temporary travel lane.</td>
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<tr>
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<td>Buffer space added. General Notes No. 2 improved; No. 5, L to L (min.); and, No. 8 arrow panel renamed.</td>
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<td>General Note No. 2 improved.</td>
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<td>622</td>
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<td>Worker shields (2 of 4) replaced with merge shields. General Note No. 3 improved.</td>
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<tr>
<td>623</td>
<td>1 of 1</td>
<td>Worker shields replaced by merge shields. General Notes No. 2, paragraph expanded; No. 5 improved; and, worker legend note (old No. 7) deleted.</td>
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<td></td>
<td>2 of 2</td>
<td>Worker shields replaced by merge shields. General Note No. 8 (old No. 9), paragraph 2 expanded.</td>
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<td>Worker shields replaced by merge shields and other merge shields added. General Notes No. 4 improved; worker legend note (old No. 6) deleted; and, No. 7 expanded.</td>
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<td>Worker shields replaced by merge shields. General Notes No. 2, paragraph 2, expanded; No. 5 revised to include merge shields; and, No. 6 improved.</td>
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<td>Worker shields replaced by merge shields. Worker legend note (old General Note No. 8) delete. General Note No. 8, paragraph 2, expanded.</td>
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<td>626</td>
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<td>Worker shield replaced by 'Center Lane Closed' legend sign. General Notes No. 5 improved; worker legend note (old No. 7) deleted; and, No. 8 expanded.</td>
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<td>627</td>
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<td>Former sheets 1 and 2 replaced by single sheet. Fixed hazard details deleted. Advance warning vehicle converted to optional use vehicle and moved from the shoulder location to the driving lane. Attenuator applications increased. General Note No. 3 replaced. Symbols revised. 'Typical Applications' added. Emergency operations at fixed hazards deleted from 'Conditions'.</td>
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<td>Advisory Speed Plates deleted. Regulatory speed signing added. Phase I Step 2 and Phase II Step 1 revised.</td>
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<tr>
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<td>2 of 2</td>
<td>Advisory Speed Plates deleted. Regulatory speed signing added. Phase III step 1 revised. General Notes No. 1 improved and No. 6 revised.</td>
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<td>Advisory Speed Plates deleted. Phase I, steps 1 &amp; 4 and Phase II step 1 revised.</td>
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<td>Advisory Speed Plates deleted. General Notes No. 2 improved and advisory speed plate note (old No. 3) deleted.</td>
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<td>Advisory Speed Plates at beginning and end of project deleted. Regulatory speed signing added. Temporary crash cushion notation revised.</td>
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<td>General Notes No. 2 improved and Nos. 3 and 4 revised.</td>
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<td>New index (Maintaining all travel lanes on multilane divided facility by routing one roadway to utilize portions of opposing roadway).</td>
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| 700         | 1 of 2       | Chart column changes (columns 1 thru 6):  
CLEAR ZONE (CZ): Footnote reference 9 added in column 1.  
UTILITY POLES, FIRE HYDRANTS, ETC: Footnote reference symbol note added to columns 2, 3 & 4.  
RAILROAD CROSSING DEVICES: Upper speed limit (mph) increased, columns 4 and 5.  
MEDIAN WIDTHS: (40' min.--) added to 'Freeways' in column 2.  
Footnote changes: Line 2 revised. note added.  
'Clear Zone Footnotes' changes: note added.  
2 of 2  
'CZc' diagram added. |
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- **624** Multilane, Divided With traversable Median Or Undivided, Urban Day Or Night Operations
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### Design Criteria

- **700** Design Criteria Related To Highway Safety (2 Sheets)
### STANDARD SYMBOLS FOR PLAN SHEETS

#### GENERAL SYMBOLS

- **State Line**
- **County Line**
- **Township Line**
- **Section Line**
- **City Line**
- **Base or Survey Line**
- **Right-of-Way Line**
- **Easement Line**
- **Limited Access Line**
- **Fence Line**
- **National or State Park or Forest Grant Line**
- **Railroad (Drainage Maps)**
- **Railroad (Detail Plans)**
- **Fence (Limited Access)**
- **Bridge**
- **Side Drain Pipe**
- **Storm Sewer**
- **Inlet**
- **Manhole**
- **Tied Longitudinal Joint**
- **Keyed Longitudinal Joint**
- **Doweled Transverse Expansion Joint**
- **Doweled Transverse Contraction Joint**
- **Transverse Contraction Joint Without Dovels**
- **Survey Reference Point**
- **Alaskauskaw**
- **Triangulation Station**
- **Bench Mark**
- **Point of Intersection**
- **North Point**
- **Edges of Existing Pavement and Sidewalk**
- **Base Line**
- **Centerline**
- **Property Line**
- **Delta Angle**
- **Approximate**
- **Round**
- **Curb and Gutter**
- **Water Well, Spring**
- **Levee**
- **Railroad Mile Post**
- **Gate**
- **Pump Island**
- **Storage Tank (Surface)**
- **Storage Tank (Underground)**

#### WOOD SYMBOLS

- **Mine or Quarry**
- **Borrow Pit**
- **Church**
- **Store**
- **Residence**
- **School**
- **Stream**
- **Shore Line**
- **Hedge**
- **Trees**
- **Edge of Wooded Area**
- **Shrubbery**
- **Grove or Orchard**
- **Definition of Skew for Cross Drains and Barrels of Concrete Box Culverts**
- **Concrete**
- **Wood**
- **Rate of Superelevation**

### UTILITY ADJUSTMENT SYMBOLS

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<td>Combination Pole</td>
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### STANDARD SYMBOLS FOR PLAN SHEETS

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<tr>
<td>TRAFFIC SIGNAL POLE (CONCRETE, WOOD, METAL)</td>
<td>![Image]</td>
<td>![Image]</td>
</tr>
<tr>
<td>VEHICLE DETECTOR (LOOP)</td>
<td>![Image]</td>
<td>![Image]</td>
</tr>
<tr>
<td>SIGNAL CABLE (ON MESSENGER WIRE)</td>
<td>![Image]</td>
<td>![Image]</td>
</tr>
<tr>
<td>CONDUIT</td>
<td>![Image]</td>
<td>![Image]</td>
</tr>
<tr>
<td>VEHICLE DETECTOR (OTHERS)</td>
<td>![Image]</td>
<td>![Image]</td>
</tr>
<tr>
<td>PEDESTRIAN DETECTOR (PROHIBITOR)</td>
<td>![Image]</td>
<td>![Image]</td>
</tr>
<tr>
<td>PEDESTRIAN SIGNAL HEAD (POLE OR PEDESTAL MOUNTED)</td>
<td>![Image]</td>
<td>![Image]</td>
</tr>
<tr>
<td>CONTROLLER CABINET (BASE MOUNTED)</td>
<td>![Image]</td>
<td>![Image]</td>
</tr>
<tr>
<td>CONTROLLER CABINET (POLE MOUNTED)</td>
<td>![Image]</td>
<td>![Image]</td>
</tr>
<tr>
<td>WALK - DON'T WALK</td>
<td>![Image]</td>
<td>![Image]</td>
</tr>
<tr>
<td>FLASH</td>
<td>![Image]</td>
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</tr>
<tr>
<td>SIGNAL FACE NUMBER</td>
<td>![Image]</td>
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<td>ITEM NUMBER</td>
<td>![Image]</td>
<td>![Image]</td>
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<tr>
<td>SIGNAL LENS</td>
<td>![Image]</td>
<td>![Image]</td>
</tr>
<tr>
<td>PROGRAMMED SIGNAL HEAD</td>
<td>![Image]</td>
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</tr>
<tr>
<td>MESSENGER WIRE</td>
<td>![Image]</td>
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<tr>
<td>POLE TABULATION CROSS REFERENCE</td>
<td>![Image]</td>
<td>![Image]</td>
</tr>
<tr>
<td>POLE TABULATION CROSS REFERENCE (JOINT USE POLE)</td>
<td>![Image]</td>
<td>![Image]</td>
</tr>
<tr>
<td>SIGNAL PHASE</td>
<td>![Image]</td>
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</tr>
</tbody>
</table>

#### LIGHTING SYMBOLS

<table>
<thead>
<tr>
<th>SYMBOL</th>
<th>EXISTING</th>
<th>PROPOSED</th>
</tr>
</thead>
<tbody>
<tr>
<td>NEW POLE &amp; LUMINAIRE</td>
<td>![Image]</td>
<td>![Image]</td>
</tr>
<tr>
<td>EXISTING POLE &amp; LUMINAIRE</td>
<td>![Image]</td>
<td>![Image]</td>
</tr>
<tr>
<td>EXISTING POLE &amp; LUMINAIRE TO BE REMOVED</td>
<td>![Image]</td>
<td>![Image]</td>
</tr>
<tr>
<td>FINAL POSITION OF RELOCATED OR ADJUSTED POLE &amp; LUMINAIRE</td>
<td>![Image]</td>
<td>![Image]</td>
</tr>
<tr>
<td>NEW HIGH MAST LUMINAIRE</td>
<td>![Image]</td>
<td>![Image]</td>
</tr>
<tr>
<td>CITY OR UTILITY OWNED LUMINAIRE &amp; POLE</td>
<td>![Image]</td>
<td>![Image]</td>
</tr>
<tr>
<td>PVC - POLYVINYL CHLORIDE LIGHTING CONDUIT AND CONDUCTORS</td>
<td>![Image]</td>
<td>![Image]</td>
</tr>
<tr>
<td>RISE GALVANIZED LIGHTING CONDUIT AND CONDUCTORS</td>
<td>![Image]</td>
<td>![Image]</td>
</tr>
<tr>
<td>CONCRETE LIGHTING PULL-BOX</td>
<td>![Image]</td>
<td>![Image]</td>
</tr>
<tr>
<td>WATERPROOF LIGHTING PULL-BOX</td>
<td>![Image]</td>
<td>![Image]</td>
</tr>
<tr>
<td>LIGHTING DISTRIBUTION POINT</td>
<td>![Image]</td>
<td>![Image]</td>
</tr>
<tr>
<td>NEW JOINT USE POLE</td>
<td>![Image]</td>
<td>![Image]</td>
</tr>
<tr>
<td>EXISTING USE POLE</td>
<td>![Image]</td>
<td>![Image]</td>
</tr>
<tr>
<td>UNDER DECK LIGHTING FIXTURE</td>
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</table>

#### SIGNING AND PAVEMENT MARKING SYMBOLS

<table>
<thead>
<tr>
<th>SYMBOL</th>
<th>EXISTING</th>
<th>PROPOSED</th>
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<tr>
<td>PAVEMENT ARROW</td>
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<td>SINGLE SOLID LINE</td>
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<td>![Image]</td>
</tr>
<tr>
<td>DOUBLE SOLID LINE</td>
<td>![Image]</td>
<td>![Image]</td>
</tr>
<tr>
<td>SKIP LINE</td>
<td>![Image]</td>
<td>![Image]</td>
</tr>
<tr>
<td>STOP BAR</td>
<td>![Image]</td>
<td>![Image]</td>
</tr>
<tr>
<td>TRAFFIC SIGN (POST MOUNTED)</td>
<td>![Image]</td>
<td>![Image]</td>
</tr>
<tr>
<td>TRAFFIC SIGN (OVERHEAD)</td>
<td>![Image]</td>
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<td>SIGN NUMBER</td>
<td>![Image]</td>
<td>![Image]</td>
</tr>
<tr>
<td>SIGN ITEM NUMBER</td>
<td>![Image]</td>
<td>![Image]</td>
</tr>
<tr>
<td>TRAFFIC FLOW ARROW</td>
<td>![Image]</td>
<td>![Image]</td>
</tr>
</tbody>
</table>
DESIGN NOTES

1. Bases should be as deep as practical with a minimum depth of 2.0 feet.
2. In Type A, when the top of embankment is below high water, fence ties will be required along the top of the embankment.
3. In Type B, the weir shall be located far from the embankment as practical. On sloping ditch grades two or more weirs may be required. Intermediate weirs shall be constructed without slitting ditch.
4. In Type B, the 6" PVC pipe shall be constructed unless shown otherwise in the plans.

GENERAL CONSTRUCTION NOTES

1. Fence materials shall be aluminum or concrete only.
2. Aluminum posts shall be 3" diameter minimum. Aluminum roll braces shall be in accordance with Indiana IND. 3. Concrete posts and roll braces shall be in accordance with Indiana IND.
3. Fabric shall be installed to hold posts and roll braces, one tied to posts and braces of 6" centers.
4. For additional details on fencing, see Indiana IND. 4.5.
5. All basis slopes to be terminated as shown in the plans.
6. Sediment basins to be constructed prior to commencement of upstream construction. Maintenance and slope cut to be by the Contractor, until conclusion of project by the Engineer.

GENERAL NOTES

1. The cost for Type A and Type B trash retainers and sediment basins shall include the cost for fencing, filtering, baffles, piping, and for keeping and with earthwork over and above 1G.3 which is included in the plans. Payment for both Type A and Type B shall be under the contract unit price for Sediment Basins. Each Rip, Item No. 3, 004-7. Cutoffs as shown on the plans shall be paid for under the contract unit price for Sediment Basins. Cutoffs, ID. Rip Item No. 4, 004-5.
TYPE III SILT FENCE

Note: SILT Fence to be placed under the contract.

UNIT PRICE FOR SHINING SILT FENCE (LF)

TYPE II SILT FENCE

SILT FENCE APPLICATIONS

Do not place in a manner that SILT fences will act as a dam across permanent flowing watercourses. SILT fences are to be used at upper headlands and to control water use at permanent bodies of water.

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION

ROAD DESIGN

BALED HAY OR STRAW BARRIERS AND SILT FENCES

Note: Spacing for Type II and Type III fences to be in accordance with Cold Steel
of drainage structures Sheet 2 of 5.
NOTES:
1. Turbidity barriers are to be used in all permanent bodies of water regardless of water depth.
2. Number and spacing of anchors depend on current velocities.
3. Deployment of barrier around pile locations may vary to accommodate construction operations.
4. Navigation may require segmenting barrier during construction operations.
5. For additional information see Section 04 of the Standard Specifications.

TURBIDITY BARRIER APPLICATIONS

STAKED TURBIDITY BARRIER

LEGEND
- Rife Location
- Dredge or Fill Area
- Warning Buoy w/Anchor
- Anchor
- Barrier Movement Due to Current Action

Note: Turbidity barriers for flowing streams and tidal creeks may be either floating, or staked types, or any combination of types, and will reflect conditions and meet erosion control and water quality requirements. The barrier type(s) will be at the Contractor's option unless otherwise specified in the plans. However, payment will be under the amount(s) established in the plans for Floating Turbidity Barrier and/or Staked Turbidity Barrier. Posts in staked turbidity barriers to be installed in vertical position unless otherwise directed by the Engineer.

GENERAL NOTES
1. Floating turbidity barriers are to be paid for under the contract unit price for Floating Turbidity Barrier, S.F. Pay Item No. 04.02.
2. Staked turbidity barriers are to be paid for under the contract unit price for Staked Turbidity Barrier, S.F. Pay Item No. 04.04.

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION
PQC DESIGN

TURBIDITY BARRIERS
SHOULDER AND SLOPE TREATMENT FOR SUPERELEVATED ROADWAYS

SEEDING RATES (Lbs/Ac) FOR NEW SHOULDERS AND SLOPES

<table>
<thead>
<tr>
<th>TYPE OF SEED</th>
<th>ZONE I</th>
<th>ZONE II</th>
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</thead>
<tbody>
<tr>
<td></td>
<td>COASTAL</td>
<td>MARSH</td>
</tr>
<tr>
<td>PERMANENT GRASS</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Unhulled Bermudagrass</td>
<td>20</td>
<td>20</td>
</tr>
<tr>
<td>Bahia Grass</td>
<td>10</td>
<td>10</td>
</tr>
<tr>
<td>QUICK GROWING</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Brown Top Millet</td>
<td>20</td>
<td>20</td>
</tr>
<tr>
<td>Annual Ryegrass</td>
<td>20</td>
<td>20</td>
</tr>
<tr>
<td>TOTAL POUNDS PER ACRE</td>
<td>40</td>
<td>40</td>
</tr>
</tbody>
</table>

Note: The seeding rates shown in this table apply only when seed is spread by an approved mechanical seeder meeting the requirements of Section 1112 and 1157 of the Standard Specifications.

GENERAL NOTES
1. Erosion control details are applicable to new construction, reconstruction, and RMD projects.
2. For seeding adjacent to ditches and headwalls, see Table 4B.
3. All front slopes steeper than 3:1 are to be seeded.

SHOULDER AND SLOPE TREATMENT IN SAG VERTICAL CURVES

RURAL UNDIVIDED

RURAL DIVIDED

CRITERIA FOR PAYING SHOULDER ON DIVIDED AND UNDIVIDED FACILITIES

<table>
<thead>
<tr>
<th>Design Speed</th>
<th>Degree Of Curve</th>
</tr>
</thead>
<tbody>
<tr>
<td>30</td>
<td>1° Or Greater</td>
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<tr>
<td>40</td>
<td>2° Or Greater</td>
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<tr>
<td>50</td>
<td>3° Or Greater</td>
</tr>
<tr>
<td>60</td>
<td>3° Or Greater</td>
</tr>
<tr>
<td>70</td>
<td>3° Or Greater</td>
</tr>
</tbody>
</table>

Note: Paved shoulders are required on all curves meeting the criteria above. For curves not meeting the criteria, shoulders are to be paved where erosion of the shoulder is evident or anticipated.
EYE BOLT AND CHAIN REQUIREMENTS

<table>
<thead>
<tr>
<th>Index Number</th>
<th>Bolt Type</th>
<th>Length of Chain</th>
<th>Holding &amp; Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>207</td>
<td>1/4&quot;</td>
<td>4&quot;</td>
<td>Side &amp; Spin</td>
</tr>
<tr>
<td>208</td>
<td>3/8&quot;</td>
<td>8&quot;</td>
<td>Side &amp; Spin</td>
</tr>
<tr>
<td>209</td>
<td>1/2&quot;</td>
<td>12&quot;</td>
<td>Side &amp; Spin</td>
</tr>
<tr>
<td>210</td>
<td>5/8&quot;</td>
<td>16&quot;</td>
<td>Side &amp; Spin</td>
</tr>
<tr>
<td>211</td>
<td>3/4&quot;</td>
<td>20&quot;</td>
<td>Side &amp; Spin</td>
</tr>
<tr>
<td>212</td>
<td>1&quot;</td>
<td>24&quot;</td>
<td>Side &amp; Spin</td>
</tr>
</tbody>
</table>

EYE BOLT AND CHAIN FOR LOCKING GRATES TO INLETS

DRAINAGE STRUCTURE INVERT

PICTORIAL VIEW

OPTIONAL BAR TYPES

LADDER BARS

FOR STRUCTURES OVER 10' IN DEPTH

TEMPORARY DRAINS FOR SUBGRADE AND BASE

SUPPLEMENTARY DETAILS FOR MANHOLEs AND INLETS

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION Direct Attention To Water Main Connections, When Checking Two Drains Together, Provide Adequate Loop For Easy Handling.

Note: When Alternate Grade is specified, the chains, bolts, nuts, washers and cold shuts shall be supplied in accordance with the specifications for the grade.

Cost of eye bolt and chain to be included in the contract unit price for inlets.

Filter Fabric

Filter Fabric

4" PVC Pipe, 45° Lateral And Slides

G-150 Grade Or Equivalent

Grout Seal Or Integral Cost

Note: Cost of pipe, fittings and saddling must be included in the contract unit price for inlets. See Index No. 622 for Level Barrier protection at inlet.

NOTE: When alternate grade is specified, the chains, bolts, nuts, washers and cold shuts shall be supplied in accordance with the specifications for the grade.

Cost of eye bolt and chain to be included in the contract unit price for inlets.

4" PVC Pipe, 45° Lateral And Slides

G-150 Grade Or Equivalent

Grout Seal Or Integral Cost

Note: Cost of pipe, fittings and saddling must be included in the contract unit price for inlets. See Index No. 622 for Level Barrier protection at inlet.

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION

Direct Attention To Water Main Connections, When Checking Two Drains Together, Provide Adequate Loop For Easy Handling.

Note: When Alternate Grade is specified, the chains, bolts, nuts, washers and cold shuts shall be supplied in accordance with the specifications for the grade.

Cost of eye bolt and chain to be included in the contract unit price for inlets.

Filter Fabric

Filter Fabric

4" PVC Pipe, 45° Lateral And Slides

G-150 Grade Or Equivalent

Grout Seal Or Integral Cost

Note: Cost of pipe, fittings and saddling must be included in the contract unit price for inlets. See Index No. 622 for Level Barrier protection at inlet.

NOTE: When alternate grade is specified, the chains, bolts, nuts, washers and cold shuts shall be supplied in accordance with the specifications for the grade.

Cost of eye bolt and chain to be included in the contract unit price for inlets.

4" PVC Pipe, 45° Lateral And Slides

G-150 Grade Or Equivalent

Grout Seal Or Integral Cost

Note: Cost of pipe, fittings and saddling must be included in the contract unit price for inlets. See Index No. 622 for Level Barrier protection at inlet.

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION

Direct Attention To Water Main Connections, When Checking Two Drains Together, Provide Adequate Loop For Easy Handling.

Note: When Alternate Grade is specified, the chains, bolts, nuts, washers and cold shuts shall be supplied in accordance with the specifications for the grade.

Cost of eye bolt and chain to be included in the contract unit price for inlets.

Filter Fabric

Filter Fabric

4" PVC Pipe, 45° Lateral And Slides

G-150 Grade Or Equivalent

Grout Seal Or Integral Cost

Note: Cost of pipe, fittings and saddling must be included in the contract unit price for inlets. See Index No. 622 for Level Barrier protection at inlet.

NOTE: When alternate grade is specified, the chains, bolts, nuts, washers and cold shuts shall be supplied in accordance with the specifications for the grade.

Cost of eye bolt and chain to be included in the contract unit price for inlets.

4" PVC Pipe, 45° Lateral And Slides

G-150 Grade Or Equivalent

Grout Seal Or Integral Cost

Note: Cost of pipe, fittings and saddling must be included in the contract unit price for inlets. See Index No. 622 for Level Barrier protection at inlet.

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION

Direct Attention To Water Main Connections, When Checking Two Drains Together, Provide Adequate Loop For Easy Handling.

Note: When Alternate Grade is specified, the chains, bolts, nuts, washers and cold shuts shall be supplied in accordance with the specifications for the grade.

Cost of eye bolt and chain to be included in the contract unit price for inlets.

Filter Fabric

Filter Fabric

4" PVC Pipe, 45° Lateral And Slides

G-150 Grade Or Equivalent

Grout Seal Or Integral Cost

Note: Cost of pipe, fittings and saddling must be included in the contract unit price for inlets. See Index No. 622 for Level Barrier protection at inlet.

NOTE: When alternate grade is specified, the chains, bolts, nuts, washers and cold shuts shall be supplied in accordance with the specifications for the grade.

Cost of eye bolt and chain to be included in the contract unit price for inlets.

4" PVC Pipe, 45° Lateral And Slides

G-150 Grade Or Equivalent

Grout Seal Or Integral Cost

Note: Cost of pipe, fittings and saddling must be included in the contract unit price for inlets. See Index No. 622 for Level Barrier protection at inlet.
### Rigid Pavement

<table>
<thead>
<tr>
<th>Pipe Type/Size &amp; Shape</th>
<th>Minimum Cover</th>
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<tbody>
<tr>
<td>Concrete</td>
<td>6&quot;</td>
</tr>
<tr>
<td>Corrugated Steel</td>
<td>6&quot;</td>
</tr>
<tr>
<td>Corrugated Aluminum</td>
<td>9&quot;</td>
</tr>
<tr>
<td>Corrugated Polyethylene</td>
<td>10&quot;</td>
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</table>

### Flexible Pavement

<table>
<thead>
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<th>Pipe Type/Size &amp; Shape</th>
<th>Minimum Cover</th>
</tr>
</thead>
<tbody>
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<td>Concrete</td>
<td>6&quot;</td>
</tr>
<tr>
<td>Corrugated Steel</td>
<td>6&quot;</td>
</tr>
<tr>
<td>Corrugated Aluminum</td>
<td>9&quot;</td>
</tr>
<tr>
<td>Corrugated Polyethylene</td>
<td>10&quot;</td>
</tr>
</tbody>
</table>

### Unpaved W/O Select Bedding

<table>
<thead>
<tr>
<th>Pipe Type/Size &amp; Shape</th>
<th>Minimum Cover</th>
</tr>
</thead>
<tbody>
<tr>
<td>Concrete</td>
<td>6&quot;</td>
</tr>
<tr>
<td>Corrugated Steel</td>
<td>6&quot;</td>
</tr>
<tr>
<td>Corrugated Aluminum</td>
<td>9&quot;</td>
</tr>
<tr>
<td>Corrugated Polyethylene</td>
<td>10&quot;</td>
</tr>
</tbody>
</table>

### Unpaved With Select Bedding

<table>
<thead>
<tr>
<th>Pipe Type/Size &amp; Shape</th>
<th>Minimum Cover</th>
</tr>
</thead>
<tbody>
<tr>
<td>Concrete</td>
<td>6&quot;</td>
</tr>
<tr>
<td>Corrugated Steel</td>
<td>6&quot;</td>
</tr>
<tr>
<td>Corrugated Aluminum</td>
<td>9&quot;</td>
</tr>
<tr>
<td>Corrugated Polyethylene</td>
<td>10&quot;</td>
</tr>
</tbody>
</table>

### General Notes
1. The indicated values are recommended minimum dimensions to withstand anticipated highway traffic loads. Additional cover may be required to satisfy requirements of adjacent utilities or highway traffic loads before pavement is completed. Some size thickness combinations may require minimum cover greater than those listed. See Figures 2, 5, 6, 7, 8, and 9.
2. Less than the indicated minimum cover may be used provided suitable method is employed in the area. These features may include but are not limited to extra strength pipe, select bedding, seepage barrier and embankment.

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

<table>
<thead>
<tr>
<th>Cover Height</th>
<th>Concrete</th>
<th>Corrugated Steel</th>
<th>Corrugated Aluminum</th>
<th>Corrugated Polyethylene</th>
</tr>
</thead>
</table>
### ROUND PIPE DIMENSIONS

<table>
<thead>
<tr>
<th>Equiv. Dia. (In.)</th>
<th>Area (in.²)</th>
<th>Wall Thickness (in.)</th>
<th>A Wall</th>
<th>B Wall</th>
<th>C Wall</th>
</tr>
</thead>
<tbody>
<tr>
<td>12.0</td>
<td>1.8</td>
<td>0.8</td>
<td>1</td>
<td>1</td>
<td>NA</td>
</tr>
<tr>
<td>15.0</td>
<td>1.2</td>
<td>1.6</td>
<td>1</td>
<td>1</td>
<td>NA</td>
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<tr>
<td>24.0</td>
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<td>1</td>
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<td>1</td>
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<td>1</td>
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</tbody>
</table>

*For Informational Purposes Only
Do Not Specify Wall Thickness
Option B Wall is Industry Standard

### ROUND PIPE INSTALLATIONS

<table>
<thead>
<tr>
<th>Design</th>
<th>Height of Fill (ft)</th>
<th>Pipe Class</th>
<th>Bedding</th>
<th>Projection Condition</th>
</tr>
</thead>
<tbody>
<tr>
<td>Standard</td>
<td>0-14</td>
<td>II</td>
<td>C</td>
<td>Positive</td>
</tr>
<tr>
<td>Modified Bedding</td>
<td>15-22</td>
<td>III</td>
<td>C</td>
<td>Positive</td>
</tr>
<tr>
<td>Modified Trench</td>
<td>23-26</td>
<td>IV</td>
<td>*</td>
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</tbody>
</table>

### ELLIPTICAL PIPE DIMENSIONS

<table>
<thead>
<tr>
<th>Nominal Dimensions</th>
<th>Elliptical (ft²)</th>
<th>Pipe Class</th>
<th>Bedding</th>
<th>Projection Condition</th>
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<tbody>
<tr>
<td></td>
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<table>
<thead>
<tr>
<th>Elliptical Pipe Dimensions</th>
<th>Nominal Dimensions</th>
<th>Pipe Class</th>
<th>Bedding</th>
<th>Projection Condition</th>
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</thead>
<tbody>
<tr>
<td></td>
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</tbody>
</table>

*Under some conditions, the use of Class II pipe and Class B bedding should be considered in lieu of Class I with Class C bedding.

### ELLIPTICAL PIPE INSTALLATIONS

<table>
<thead>
<tr>
<th>Installation</th>
<th>Height of Fill (ft)</th>
<th>Pipe Class</th>
<th>Bedding</th>
</tr>
</thead>
<tbody>
<tr>
<td>Horizontal</td>
<td></td>
<td>HE II</td>
<td>C</td>
</tr>
<tr>
<td>Vertical</td>
<td></td>
<td>HE III</td>
<td>C</td>
</tr>
</tbody>
</table>

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

**Note:** Height of Fill (maximum cover) is measured from top of finished grade to outside top of pipe.

**For Informational Purposes Only**
### Round Pipe - \( 2\frac{1}{4}'' \times \frac{1}{4}'' \) Corrugation

<table>
<thead>
<tr>
<th>D (in.)</th>
<th>Area (in.²)</th>
<th>Sheet Thickness in Inches (gage)</th>
<th>Minimum Cover (ft)</th>
</tr>
</thead>
<tbody>
<tr>
<td>3.2</td>
<td>0.064</td>
<td>0.019</td>
<td>0.006</td>
</tr>
<tr>
<td>3.5</td>
<td>0.069</td>
<td>0.025</td>
<td>0.006</td>
</tr>
<tr>
<td>3.8</td>
<td>0.075</td>
<td>0.030</td>
<td>0.006</td>
</tr>
<tr>
<td>4.1</td>
<td>0.081</td>
<td>0.035</td>
<td>0.006</td>
</tr>
<tr>
<td>4.4</td>
<td>0.087</td>
<td>0.040</td>
<td>0.006</td>
</tr>
<tr>
<td>4.7</td>
<td>0.093</td>
<td>0.045</td>
<td>0.006</td>
</tr>
<tr>
<td>5.0</td>
<td>0.099</td>
<td>0.050</td>
<td>0.006</td>
</tr>
<tr>
<td>5.3</td>
<td>0.105</td>
<td>0.055</td>
<td>0.006</td>
</tr>
<tr>
<td>5.6</td>
<td>0.111</td>
<td>0.060</td>
<td>0.006</td>
</tr>
<tr>
<td>5.9</td>
<td>0.117</td>
<td>0.065</td>
<td>0.006</td>
</tr>
</tbody>
</table>

### Round Pipe - \( 3'' \times \frac{1}{4}'' \) Corrugation

<table>
<thead>
<tr>
<th>D (in.)</th>
<th>Area (in.²)</th>
<th>Sheet Thickness in Inches (gage)</th>
<th>Minimum Cover (ft)</th>
</tr>
</thead>
<tbody>
<tr>
<td>3.2</td>
<td>0.064</td>
<td>0.019</td>
<td>0.006</td>
</tr>
<tr>
<td>3.5</td>
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<td>0.006</td>
</tr>
<tr>
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<td>0.030</td>
<td>0.006</td>
</tr>
<tr>
<td>4.1</td>
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<td>0.035</td>
<td>0.006</td>
</tr>
<tr>
<td>4.4</td>
<td>0.087</td>
<td>0.040</td>
<td>0.006</td>
</tr>
<tr>
<td>4.7</td>
<td>0.093</td>
<td>0.045</td>
<td>0.006</td>
</tr>
<tr>
<td>5.0</td>
<td>0.099</td>
<td>0.050</td>
<td>0.006</td>
</tr>
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<td>5.3</td>
<td>0.105</td>
<td>0.055</td>
<td>0.006</td>
</tr>
<tr>
<td>5.6</td>
<td>0.111</td>
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<td>0.006</td>
</tr>
<tr>
<td>5.9</td>
<td>0.117</td>
<td>0.065</td>
<td>0.006</td>
</tr>
</tbody>
</table>

### Round Pipe - \( 5'' \times \frac{1}{4}'' \) Corrugation

<table>
<thead>
<tr>
<th>D (in.)</th>
<th>Area (in.²)</th>
<th>Sheet Thickness in Inches (gage)</th>
<th>Minimum Cover (ft)</th>
</tr>
</thead>
<tbody>
<tr>
<td>3.2</td>
<td>0.064</td>
<td>0.019</td>
<td>0.006</td>
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<tr>
<td>3.5</td>
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<tr>
<td>3.8</td>
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<td>0.006</td>
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<tr>
<td>4.1</td>
<td>0.081</td>
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</tr>
<tr>
<td>4.4</td>
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<tr>
<td>4.7</td>
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<td>0.099</td>
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<tr>
<td>5.3</td>
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<td>5.6</td>
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</tr>
<tr>
<td>5.9</td>
<td>0.117</td>
<td>0.065</td>
<td>0.006</td>
</tr>
</tbody>
</table>

Notes:
1. Increase the minimum cover values shown on Sheet 1 of 4 by \( 6'' \) for pipe and size combinations above the heavy lines.
2. Round cover and not available. May be considered for cross drain and saddle drain applications only.
3. NS - Not Available
4. 360° perforated pipe or French drain pipe is not recommended. Do not specify without checking suitability and availability.
5. Round pipe is currently not manufactured for the Florida market. Check availability before specifying.

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

<table>
<thead>
<tr>
<th>Span (ft)</th>
<th>Height (ft)</th>
<th>Minimum Cover (ft)</th>
</tr>
</thead>
<tbody>
<tr>
<td>12</td>
<td>0.79</td>
<td>NA</td>
</tr>
<tr>
<td>15</td>
<td>0.85</td>
<td>NA</td>
</tr>
<tr>
<td>18</td>
<td>0.87</td>
<td>NA</td>
</tr>
<tr>
<td>21</td>
<td>0.86</td>
<td>NA</td>
</tr>
<tr>
<td>24</td>
<td>0.87</td>
<td>NA</td>
</tr>
<tr>
<td>27</td>
<td>0.89</td>
<td>NA</td>
</tr>
<tr>
<td>30</td>
<td>1.00</td>
<td>NA</td>
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<tr>
<td>33</td>
<td>1.01</td>
<td>NA</td>
</tr>
<tr>
<td>36</td>
<td>1.02</td>
<td>NA</td>
</tr>
</tbody>
</table>

### Pipe Arch - \( 2\frac{1}{4}'' \times \frac{1}{4}'' \) Corrugation

<table>
<thead>
<tr>
<th>Span (ft)</th>
<th>Height (ft)</th>
<th>Minimum Cover (ft)</th>
</tr>
</thead>
<tbody>
<tr>
<td>12</td>
<td>0.79</td>
<td>NA</td>
</tr>
<tr>
<td>15</td>
<td>0.85</td>
<td>NA</td>
</tr>
<tr>
<td>18</td>
<td>0.87</td>
<td>NA</td>
</tr>
<tr>
<td>21</td>
<td>0.86</td>
<td>NA</td>
</tr>
<tr>
<td>24</td>
<td>0.87</td>
<td>NA</td>
</tr>
<tr>
<td>27</td>
<td>0.89</td>
<td>NA</td>
</tr>
<tr>
<td>30</td>
<td>1.00</td>
<td>NA</td>
</tr>
<tr>
<td>33</td>
<td>1.01</td>
<td>NA</td>
</tr>
<tr>
<td>36</td>
<td>1.02</td>
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</tr>
</tbody>
</table>

### Pipe Arch - \( 3'' \times \frac{1}{4}'' \) and \( 5'' \times \frac{1}{4}'' \) Corrugation

<table>
<thead>
<tr>
<th>Span (ft)</th>
<th>Height (ft)</th>
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</tr>
</thead>
<tbody>
<tr>
<td>12</td>
<td>0.79</td>
<td>NA</td>
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<tr>
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<td>0.85</td>
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<tr>
<td>18</td>
<td>0.87</td>
<td>NA</td>
</tr>
<tr>
<td>21</td>
<td>0.86</td>
<td>NA</td>
</tr>
<tr>
<td>24</td>
<td>0.87</td>
<td>NA</td>
</tr>
<tr>
<td>27</td>
<td>0.89</td>
<td>NA</td>
</tr>
<tr>
<td>30</td>
<td>1.00</td>
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<td>1.01</td>
<td>NA</td>
</tr>
<tr>
<td>36</td>
<td>1.02</td>
<td>NA</td>
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### Round Pipe - Spiral Rib

<table>
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</thead>
<tbody>
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<tr>
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<td>0.85</td>
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<tr>
<td>18</td>
<td>0.87</td>
<td>NA</td>
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<tr>
<td>21</td>
<td>0.86</td>
<td>NA</td>
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<tr>
<td>24</td>
<td>0.87</td>
<td>NA</td>
</tr>
<tr>
<td>27</td>
<td>0.89</td>
<td>NA</td>
</tr>
<tr>
<td>30</td>
<td>1.00</td>
<td>NA</td>
</tr>
<tr>
<td>33</td>
<td>1.01</td>
<td>NA</td>
</tr>
<tr>
<td>36</td>
<td>1.02</td>
<td>NA</td>
</tr>
</tbody>
</table>

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

<table>
<thead>
<tr>
<th>Span (ft)</th>
<th>Height (ft)</th>
<th>Minimum Cover (ft)</th>
</tr>
</thead>
<tbody>
<tr>
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<td>0.79</td>
<td>NA</td>
</tr>
<tr>
<td>15</td>
<td>0.85</td>
<td>NA</td>
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<tr>
<td>18</td>
<td>0.87</td>
<td>NA</td>
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<tr>
<td>21</td>
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<tr>
<td>24</td>
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<tr>
<td>27</td>
<td>0.89</td>
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<tr>
<td>30</td>
<td>1.00</td>
<td>NA</td>
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<tr>
<td>33</td>
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<td>NA</td>
</tr>
<tr>
<td>36</td>
<td>1.02</td>
<td>NA</td>
</tr>
</tbody>
</table>

**Notes:**
- Increase the minimum cover values shown on Sheet 1 of 4 by \( 6'' \) for pipe and size combinations above the heavy lines.
- Round cover and not available. May be considered for cross drain and saddle drain applications only.
- NS - Not Available
- Limited availability of this product. Check availability before specifying. Generally limited to \( 3'' \times \frac{1}{4}'' \) corrugated pipe made fabricated from 60" and smaller diameter round pipe in 1G, and thicker material.
- 360° perforated pipe or French drain pipe is not recommended. Do not specify without checking suitability and availability.
- Round pipe is currently not manufactured for the Florida market. Check availability before specifying.
### PIPE ARCH - \( 3\frac{1}{8} \times 1\frac{1}{8} \) CORRUGATION

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
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<tbody>
<tr>
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<td>15</td>
<td>40</td>
<td>4000</td>
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<td>6000</td>
</tr>
<tr>
<td>48</td>
<td>48</td>
<td>35</td>
<td>60</td>
<td>6000</td>
</tr>
<tr>
<td>60</td>
<td>60</td>
<td>45</td>
<td>60</td>
<td>6000</td>
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<tr>
<td>72</td>
<td>72</td>
<td>60</td>
<td>60</td>
<td>6000</td>
</tr>
</tbody>
</table>

### Cover Height

- **Outside pipe diameter**: 8 in.
- **Minimum cover for pipe**: 20 in.
- **Minimum cover for pipeline**: 24 in.
- **Minimum cover for pressure pipe**: 36 in.
- **Maximum cover for pipeline**: 48 in.
- **Maximum cover for pressure pipe**: 60 in.

**Notes**:
- **PLA** - Not Available
- **PLA** - Not Suitable (For Highway H-20 loadings.)
- **DN** - Design Review is recommended for each specific application. The review should identify any special handling, installation, backfill procedures, and construction load restrictions which may be required. See FDB 1 Drainage Manual, Chapter 18, Section 19.3, Vol., 1987. The specification of the next thicker cover in lieu of this review is not appropriate. The review performed by the designer does not relieve the contractor from analyzing and taking any necessary precautions required to protect partially or completely congested pipe from the equipment used during construction.

### Pipelines

- **Maximum height of fill (maximum cover)** is measured from top of finished grade to outside top of pipe. Increase the minimum cover values shown on Sheet 4 for gauges and sizes combinations below in the heavy lines.

- **Limited availability of this product. Check availability before specifying.**

- **360° perforated pipe (French drain pipe)** is not recommended in the pipe arch stage. Do not specify without checking both for suitability and availability.
<table>
<thead>
<tr>
<th>INDEX NO.</th>
<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>
</tr>
</thead>
<tbody>
<tr>
<td>20</td>
<td>E &amp; F</td>
<td>Continuous</td>
<td>4.1</td>
<td>Yes / Limited</td>
<td>Inside</td>
<td>30°</td>
<td>15° Longitudinal 30° Transverse</td>
<td></td>
</tr>
<tr>
<td>21</td>
<td>E &amp; F</td>
<td>Sag</td>
<td>9.0</td>
<td>Yes / Limited</td>
<td>Inside</td>
<td>30°</td>
<td>15° Longitudinal 30° Transverse</td>
<td></td>
</tr>
<tr>
<td>22</td>
<td>E &amp; F</td>
<td>Continuous</td>
<td>1.9</td>
<td>Yes / Limited</td>
<td>Inside</td>
<td>30°</td>
<td>15° Longitudinal 30° Transverse</td>
<td></td>
</tr>
<tr>
<td>23</td>
<td>E &amp; F</td>
<td>Sag</td>
<td>6.5</td>
<td>Yes / Limited</td>
<td>Inside</td>
<td>30°</td>
<td>15° Longitudinal 30° Transverse</td>
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<tr>
<td>24</td>
<td>E &amp; F</td>
<td>Continuous</td>
<td>3.1</td>
<td>Yes / Limited</td>
<td>Outside</td>
<td>30°</td>
<td>15° Longitudinal 30° Transverse</td>
<td></td>
</tr>
<tr>
<td>25</td>
<td>E &amp; F</td>
<td>Sag</td>
<td>7.5</td>
<td>Yes / Limited</td>
<td>Outside</td>
<td>30°</td>
<td>15° Longitudinal 30° Transverse</td>
<td></td>
</tr>
<tr>
<td>26</td>
<td>Separator I &amp; II</td>
<td>Continuous or Sag</td>
<td>4.4</td>
<td>Yes / Limited</td>
<td>Inside</td>
<td>24° Longitudinal 30° Transverse</td>
<td></td>
<td></td>
</tr>
<tr>
<td>27</td>
<td>Separator II &amp; III</td>
<td>Continuous or Sag</td>
<td>4.4</td>
<td>Yes / Limited</td>
<td>Inside</td>
<td>24° Longitudinal 30° Transverse</td>
<td></td>
<td></td>
</tr>
<tr>
<td>28</td>
<td>F</td>
<td>Continuous or Sag</td>
<td>0.5</td>
<td>Yes / Yes</td>
<td>Outside</td>
<td>30°</td>
<td>To be used only where flows are light and ROW does not permit the use of through curb inlets.</td>
<td></td>
</tr>
<tr>
<td>29</td>
<td>F</td>
<td>Continuous or Sag</td>
<td>0.3</td>
<td>Yes / Yes</td>
<td>Outside</td>
<td>30°</td>
<td>To be used only where flows are light and ROW does not permit the use of through curb inlets.</td>
<td></td>
</tr>
</tbody>
</table>

1. Hydraulic intake values do not represent hydraulic capacity but are shown to compare inlets based on a 0.80 longitudinal slope, 30° ramp slope, and 90° intersection curve. For other conditions, values should be adjusted for peak flow or other design factors. Sag inlet intake values are based on ending the outside lane in a shoulder, where not separated by other hydraulic intake means over sewer or sanitary piping. Full design costs and additional information can be found in "A Study of Stormwater Inlet Capacities" by C.F.J. and the Department of Highways Drainage Manual Vol. 2, Chapter 12 and Vol. 3, Chapter 2.

2. Curb inlets and transitions should be located outside of pedestrian crossing areas, preferably separate from these locations.

3. Double nested inlets are usually not warranted unless the inlet flow is in excess of 50 feet per minute or 0.50 CFS.

4. Median barrier inlets Types I, II, III, IV, and V should be designed by specifying the veritable grade.

5. Pipe sizes are similar. Class III, B, and C, concrete pipe. Elliptical pipe and corrugated pipe are to be selected for S/I in accordance with Index No. 20. Precipitation sizes should be reviewed using 3% x 3% correlation up to 30° and 3% x 1° correlation for larger sizes.
BARRIER WALL / RETAINING WALL
SINGLE FACE ROADWAY BARRIER

INLET SECTION AT WALLS

INLET WITH BOTTOM TYPE J

GENERAL NOTES
1. This inlet is primarily intended for use adjacent to concrete barriers or guard rails. Use of the inlet adjacent to other wall types shall be approved by the Drainage Engineer. The inlet is suitable for single and duplicated pavement traffic. It is not intended for use in curb and gutter or other areas where through traffic are required, nor areas subject to high debris.

2. Inlets located in embankments constructed with earth or embankment trenching wall shall be designed with incline drainage to reduce adverse impact on the drainage system. Flow of grass pipe to one and rear anchored wall shall be limited wherever practical. Special consideration must be exercised during the design and construction of storm water systems within anchored wall systems.

3. Inlet bottoms and/or tops may be either pressure or cast-in-place. Whether cast as a single unit or as multiple segments, and whether pressure or cast-in-place, the upper 2'-3' of the inlet shall be reinforced in accordance with sections CC, DD and EE.

4. Exposed edges shall be chamfered 1/2." 

5. When Alternatives 6 grate is specified in the plans, the grate is to be not dipped galvanized after fabrication. Flange inspection of the Filter bar used for inlets B will not be permitted, thereby requiring removal equipment during fabrication and/or setting, or, welding grate to a horizontal平面 during fabrication of grate and filter bar.

6. For supplemental details see Index Nos. 200 and 202.

7. Halts to be paid for under the contract unit for Inlets I Barrier Wall J, each. Pay less than No. 805-1-88B.

BARRIER WALL INLET
OPTIONAL STEEL GRATES

CROSS BAR OPTIONS

CROSS BAR

PLAN

SECTION KK

INSET B

PLAN

SECTION EE

INSET C

RETICULINE

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION ROAD DESIGN

BARRIER WALL INLET
CONCRETE BARRIER WALL (RIGID) (C & G)

2 of 2
GENERAL NOTES

1. This inlet is designed for village streets, driveways, or other areas subject to heavy wheel loads, minimum debris and subject to pedestrian and/or bicycle traffic.

2. When alternate 6" grade is specified in plans, the grate is to be heli-dipped galvanized after fabrication.

3. Main Strengthening: 3 No. 12 or 12" dia. bars, both ways. Cut in bend bars out of way of pipe to clear pipe flange.

4. All exposed edges and corners shall be rounded to 1/8" radius.

5. For supplementary details see Index No. 260.

STEEL GRATE

TWO REQUIRED PER INLET

5" Steel Grate

Main Bars: 6" x 1/4"

Intermediate Bars: 1/2" x 1/4"

Material: Steel

Steel Grate: Manufactured by Gunmetal, Florida Steel, U.S. Foundry

Steel Grate = Manufactured by Gunmetal, Florida Steel, U.S. Foundry

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION

ROAD DESIGN

GUTTER INLET

TYPE V

Drawn By

G.E.D. 220

1 of 1
<table>
<thead>
<tr>
<th>INDEX NO.</th>
<th>TYPE</th>
<th>LOCATION</th>
<th>CAPACITY (CFS)</th>
<th>SAFETY</th>
<th>DEBRIS TOLERANCE</th>
<th>PIPE SIZE LIMITATION</th>
<th>OTHER DESIGN CONSIDERATIONS</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>FLOW CONDITION</td>
<td>TRAFFIC</td>
<td>PEDESTRIAN</td>
<td>BICYCLE</td>
<td>INLET INSIDE WIDTH / MAXIMUM PIPE SIZE</td>
</tr>
<tr>
<td></td>
<td></td>
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<td>FLOW CONDITION</td>
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<td>FLOW CONDITION</td>
<td>TRAFFIC</td>
<td>PEDESTRIAN</td>
<td>BICYCLE</td>
<td>INLET INSIDE WIDTH / MAXIMUM PIPE SIZE</td>
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<td></td>
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<td>FLOW CONDITION</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>230</td>
<td>A</td>
<td>Limited Access Facilities</td>
<td>Grate Only 7</td>
<td>Heavy Wheel Loads</td>
<td>No</td>
<td>No</td>
<td>Good</td>
</tr>
<tr>
<td>231</td>
<td>B</td>
<td>Limited Access Facilities</td>
<td>Grate with Single Tray Slot 6</td>
<td>Heavy Wheel Loads</td>
<td>No</td>
<td>No</td>
<td>Excellent</td>
</tr>
<tr>
<td>232</td>
<td>C</td>
<td>Outside C2</td>
<td>Grate with Single Tray Slot 5</td>
<td>Infrquent Traffic</td>
<td>Yes</td>
<td>Yes</td>
<td>Poor*</td>
</tr>
<tr>
<td>232</td>
<td>D</td>
<td>Outside C2</td>
<td>Grate with Single Tray Slot 4</td>
<td>Infrquent Traffic</td>
<td>Yes</td>
<td>Yes</td>
<td>Poor*</td>
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<tr>
<td>232</td>
<td>E</td>
<td>Outside C2</td>
<td>Grate with Single Tray Slot 3</td>
<td>Infrquent Traffic</td>
<td>Yes</td>
<td>Yes</td>
<td>Poor*</td>
</tr>
<tr>
<td>233</td>
<td>F</td>
<td>Inside C2</td>
<td>Grate with Single Tray Slot 2</td>
<td>Infrquent Traffic</td>
<td>Yes</td>
<td>Yes</td>
<td>Poor*</td>
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<td>234</td>
<td>G</td>
<td>Inside C2</td>
<td>Grate with Single Tray Slot 1</td>
<td>Infrquent Traffic</td>
<td>Yes</td>
<td>Yes</td>
<td>Poor*</td>
</tr>
<tr>
<td>235</td>
<td>K</td>
<td>Outside C2</td>
<td>Grate with Single Tray Slot 0</td>
<td>Infrquent Traffic</td>
<td>Yes</td>
<td>Yes</td>
<td>Poor*</td>
</tr>
</tbody>
</table>

**GENERAL NOTES**
1. All Inlets must be selected to satisfy hydraulic suitability, with proper consideration given to safety and economics.
2. C2 denotes clear zone, formerly CRA defining clear recovery area.
3. Alternate G grates 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 zones and in areas accessible to pedestrians shall have traversable slots. Traversable slots are not adaptable to Inlet Type H.
5. Special ditch blocks require plan details.
6. Pipe size limitations are based on circular Class EQ. A, B, C, Concrete Pipe, Elliptical pipe, and corrugated pipe are to be checked for fit in accordance with Index No. 200. Pipe size should be reviewed using 25% corrugation up through 3' and 3.25" corrugation for larger sizes.
7. The capacity values shown are approximate and are intended as a guide to assist in describing relative performance. Inlets are assumed to be in a sag condition. The effects of vortex flows have not been considered. Inlet control is assumed. The designer must verify the outlet conditions and design assumptions before accepting the capacity values shown. Outlet constraints are likely to control with minimum pipe sizes.

**Flow Condition A - Grate Flow Conditions**
1. Grates are 50% blocked with 3" of water depth above the grate.
2. The effective weir length is assumed to be equal to the inlet perimeter with no deduction for the grate or debris.
3. Grate Equation: Q = 0.67 (H^2/4) with the slot is 10" for standard 10" slots and 6" for traversable slots. The slot is assumed to be 25% blocked, in some instances the flow will be in orifice conditions into the slot.
4. Orifice Equation: Q = 3.60 L/W^2

Notes: NA - Not Applicable

* See Note 4.
* See Note 4.
* See Note 4.
* See Note 4.
This drawing is designed for ditch, weirs, and other areas subject to heavy wheel loads on limited access facilities where debris may be a problem and flow through this grate is less important. NOTICE: This item is for use in areas subject to pedestrian or bicycle traffic.

1. Reinforcing “C” dimension to inside face. Cut or bend bars out of way of pipe to clear pipe th[.]

2. Dentcher exposed edges (if Dentcher). When alternate “A” grate is specified in plans, the grate is to be not shipped galvanized after fabrication.

3. Cost of ditch gaging to be included in the cost of item. Soaping to be paid for under contract and price for Soaping, $[.]

4. For supplemental details see Index No. 200.
**DESIGN NOTES**

1. The general purpose of these conversions is to remove the hazard of the protruding inlet lips, which may create a hazard by approaching the top too deeply.

2. The corrective procedure depends upon the approach slot grade and hydraulic requirements of the site. The selection of the appropriate case depends on the relationship between inlet top and ditch elevation, and the vertical separation between the top of the approach grade and the grade. The purpose for the Case 3 conversion is to shift the traversable slot lip to an existing slot where it no longer interferes with traffic or creates a hazard. The traversable slot lip may be shallow enough, normally applicable to ditches with newer grades as existing slopes. Case 3 will normally be applicable to slopes with newer grades, adjusting the slot where both of the existing slots is acceptable.

3. The designer shall site the slot in the wall which is to be constructed at each individual inlet location.

Where the existing slot has to above the existing ditch (Case 1) but less than the approach slot or less than the existing slot, the designer shall move the slot to the approach slot. If the existing slot is required to be more than the existing slot, the designer shall move the slot to the approach slot.

When the intersection point is a Older point (Case 3), the designer shall shift the inlet. This is to Case 3 (Case 3) the inlet.

METHOD OF PAYMENT

1. Existing slopes converted to traversable slot tops under Cases 2 and 3 shall be paid for as live work, with each case shall be included in the pay item description.

2. All change in approach work within 35 feet of each traversable slot conversion, whether required by the contract documents or as a direct result of the conversion, shall be included in the pay item description. Construction work shall include the conversion and removal of surplus material or borrow material in zones, grading, ditching, and all other work required for the installation of the new pipe, excavation, and backfilling.

3. When the approach point is a Older point (Case 3), the designer shall move the slot to the approach slot. When the intersection point is a Older point (Case 3), the designer shall move the slot to the approach slot.

4. الحديد slot and grading shall be paid for in accordance with the section on this model and with the Godwin Sheet 4 and Sheet 5 of 5.

5. The designer shall move the slot to the approach slot. The designer shall move the slot to the approach slot.

6. A.D.O. bat and drainage shall be paid for the construction of the approach slot. A.D.O. bat and drainage shall be paid for the construction of the approach slot.

7. The designer shall move the slot to the approach slot. The designer shall move the slot to the approach slot.

8. Underramps carried for the design criteria for Case 3 conversions shall be paid for as Underramps, Type 1, and Underramps carried for the design criteria for Case 3 conversions shall be paid for as Underramps, Type 1.
<table>
<thead>
<tr>
<th>INDEX NO.</th>
<th>TYPE</th>
<th>PIPE SIZE</th>
<th>CROSSRAIN</th>
<th>SIDERAIN</th>
<th>MEDIUM</th>
<th>APPLICABLE</th>
<th>HYDRAULIC PERFORMANCE</th>
<th>Kp</th>
<th>APPLICABLE</th>
<th>EROSION TOLERANT</th>
<th>OUTLET END</th>
<th>PERMITTED LOCATION</th>
<th>TRAFFIC-SAFE GRADE AVAILABLE</th>
<th>ECONOMIC RATING</th>
</tr>
</thead>
<tbody>
<tr>
<td>250</td>
<td>Straight Concrete</td>
<td>Single and Multiple 95° Thru 54°</td>
<td>Yes</td>
<td>No</td>
<td>Limited</td>
<td>Yes</td>
<td>Excellent</td>
<td>0.2</td>
<td>Limited</td>
<td>Good</td>
<td>Outside C2</td>
<td>No</td>
<td>Fair</td>
<td>For back of street block location see Index No. 280</td>
</tr>
<tr>
<td>251</td>
<td>Straight Concrete</td>
<td>Single and Double 60°</td>
<td>Yes</td>
<td>No</td>
<td>Limited</td>
<td>Yes</td>
<td>Excellent</td>
<td>0.2</td>
<td>Limited</td>
<td>Good</td>
<td>Outside C2</td>
<td>No</td>
<td>Fair</td>
<td></td>
</tr>
<tr>
<td>252</td>
<td>Straight Concrete</td>
<td>Single and Double 66°</td>
<td>Yes</td>
<td>No</td>
<td>Limited</td>
<td>Yes</td>
<td>Excellent</td>
<td>0.2</td>
<td>Limited</td>
<td>Good</td>
<td>Outside C2</td>
<td>No</td>
<td>Fair</td>
<td></td>
</tr>
<tr>
<td>253</td>
<td>Straight Concrete</td>
<td>Single and Double 72°</td>
<td>Yes</td>
<td>No</td>
<td>Limited</td>
<td>Yes</td>
<td>Excellent</td>
<td>0.2</td>
<td>Limited</td>
<td>Good</td>
<td>Outside C2</td>
<td>No</td>
<td>Fair</td>
<td></td>
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<tr>
<td>255</td>
<td>Straight Concrete</td>
<td>Single 64°</td>
<td>Yes</td>
<td>No</td>
<td>Limited</td>
<td>Yes</td>
<td>Excellent</td>
<td>0.2</td>
<td>Limited</td>
<td>Good</td>
<td>Outside C2</td>
<td>No</td>
<td>Fair</td>
<td></td>
</tr>
<tr>
<td>256</td>
<td>Straight Sand Cement</td>
<td>Single &amp; Multiple 45° Thru 64°</td>
<td>Limited</td>
<td>No</td>
<td>Limited</td>
<td>Yes</td>
<td>Very Good</td>
<td>0.3</td>
<td>Yes</td>
<td>Good</td>
<td>Outside C2</td>
<td>No</td>
<td>Good</td>
<td>For temporary construction or use on a minor facility</td>
</tr>
<tr>
<td>260</td>
<td>U Type With Grade Concrete</td>
<td>Single 90° Thru 30°</td>
<td>Limited</td>
<td>No</td>
<td>Yes</td>
<td>Yes</td>
<td>Fair</td>
<td>0.7</td>
<td>Yes</td>
<td>Very Good</td>
<td>Inside C2</td>
<td>Required</td>
<td>Good</td>
<td></td>
</tr>
<tr>
<td>261</td>
<td>U Type Concrete</td>
<td>Single 90° Thru 30°</td>
<td>Limited</td>
<td>No</td>
<td>Yes</td>
<td>Yes</td>
<td>Limited</td>
<td>Good</td>
<td>0.5-0.7</td>
<td>Yes</td>
<td>Good</td>
<td>Grease Required Inside C2</td>
<td>Yes</td>
<td>Fair</td>
</tr>
<tr>
<td>264</td>
<td>Concrete Energy Dissipator</td>
<td>Single 30° Thru 72°</td>
<td>Limited</td>
<td>No</td>
<td>No</td>
<td>No</td>
<td>NA</td>
<td>NA</td>
<td>Yes</td>
<td>Excellent</td>
<td>Outside C2</td>
<td>No</td>
<td>NA</td>
<td></td>
</tr>
<tr>
<td>266</td>
<td>Winged Concrete</td>
<td>Single 12° Thru 48°</td>
<td>Yes</td>
<td>No</td>
<td>Yes</td>
<td>Yes</td>
<td>Very Good</td>
<td>0.3</td>
<td>Yes</td>
<td>Good</td>
<td>Outside C2</td>
<td>No</td>
<td>Good</td>
<td>For temporary construction or use on a minor facility</td>
</tr>
<tr>
<td>268</td>
<td>U Type Sand Cement</td>
<td>Single &amp; Multiple 90° Thru 50°</td>
<td>Limited</td>
<td>No</td>
<td>Limited</td>
<td>Yes</td>
<td>Good</td>
<td>0.5</td>
<td>Yes</td>
<td>Very Good</td>
<td>Outside C2</td>
<td>No</td>
<td>Good</td>
<td>Construction of optional teardrop concrete jacket may be necessary.</td>
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<tr>
<td>270</td>
<td>Flared End Section Concrete</td>
<td>Single 90° Thru 72°</td>
<td>Yes</td>
<td>No</td>
<td>Yes</td>
<td>Yes</td>
<td>Good</td>
<td>0.5</td>
<td>Yes</td>
<td>Very Good*</td>
<td>Outside C2</td>
<td>No</td>
<td>Very Good</td>
<td></td>
</tr>
<tr>
<td>272</td>
<td>Cross Drain Mitered End Section</td>
<td>Single &amp; Multiple 90° Thru 72°</td>
<td>Yes</td>
<td>No</td>
<td>Yes</td>
<td>Yes</td>
<td>Fair</td>
<td>0.7</td>
<td>Yes</td>
<td>Good</td>
<td>Outside C2</td>
<td>No</td>
<td>Very Good</td>
<td>Mitered end sections sizes 7°, 8°, and 24° may be located as close as 6' beyond the outside edge of the shoulder.</td>
</tr>
<tr>
<td>273</td>
<td>Side Drain Mitered End Section</td>
<td>Single &amp; Multiple 15° Thru 60°</td>
<td>No</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Fair</td>
<td>0.7</td>
<td>Yes</td>
<td>Good</td>
<td>Inside C2</td>
<td>Yes</td>
<td>Good</td>
<td>Mitered end sections size 30° and larger require use of grate. Grate may be selected if pipe is located outside c2 and is offset from approach drain alignment.</td>
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<tr>
<td>274</td>
<td>Side Drain Mitered End Section</td>
<td>Single 15° Thru 24°</td>
<td>No</td>
<td>Yes*</td>
<td>No</td>
<td>Yes</td>
<td>Fair</td>
<td>0.7</td>
<td>Yes</td>
<td>Good</td>
<td>Inside C2</td>
<td>Yes</td>
<td>Good</td>
<td>For street crossings constructed by FDOT maintenance forces or constructed under FDOT maintenance permit only.</td>
</tr>
</tbody>
</table>

1. All end treatments must be selected to satisfy hydraulic suitability with proper consideration given to safety and economics.
2. C2 denotes closer zone, formerly CDA denoting closer recovery area.
3. Flared should not be placed on all end unless positive debris protection is provided at inlet end.
4. Additional notes concerning application restrictions may be shown on individual sheets.
5. Economic ratings are based on statewide average costs.
6. End treatments with a Kp of 0.5 or greater should be used only in areas of low design velocities and negligible debris.
7. Pipe sizes are shown, Class III B. Well, concrete pipe. U-shaped and corrugated pipe are to be checked for fit in accordance with index No. 280, where pipe size should be reviewed only if 90° x 4 corrugation up to 30° and 3° x 1° corrugation for larger sizes.
ENDWALL DIMENSIONS (EXCLUSIVE OF MULTIPLE PIPE SPACING)

NORMAL PIPE

SKEWED PIPE

ENDWALL POSITIONS FOR SINGLE AND MULTIPLE PIPE AND SPACING FOR MULTIPLE PIPE
## ROUND CONCRETE AND CORRUGATED METAL PIPE

### DATA AND ESTIMATED QUANTITIES FOR ONE ENDWALL

<table>
<thead>
<tr>
<th>Opening Area (SF)</th>
<th>Dimensions</th>
<th>Class I Concrete (CY) Number and Type Of Pipe and Stow Angle Of Pipe</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Single Double</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Concrete Metal</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Concrete Metal</td>
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<tr>
<td></td>
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### CORRUGATED METAL PIPE ARCH

<table>
<thead>
<tr>
<th>Span Rise</th>
<th>Number Of Pipes</th>
<th>Opening Area (SF)</th>
<th>Dimensions</th>
<th>Class I Concrete (CY) Number Of Pipe And Stow Angle Of Pipe</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Single Double</td>
</tr>
<tr>
<td></td>
<td></td>
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<td>Concrete Metal</td>
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<td></td>
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<td>0° 0° 0° 0° 50° 45° 45° 45° 45°</td>
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</table>

### CONCRETE ELLIPTICAL PIPE

<table>
<thead>
<tr>
<th>Rise Span</th>
<th>Number Of Pipes</th>
<th>Opening Area (SF)</th>
<th>Dimensions</th>
<th>Class I Concrete (CY) Number Of Pipe A &amp; Show Angle Of Pipe</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Single Double</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Concrete Metal</td>
</tr>
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<td></td>
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<td></td>
<td>Concrete Metal</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>0° 0° 0° 0° 50° 45° 45° 45° 45°</td>
</tr>
</tbody>
</table>
GENERAL NOTES:

1. Elevation may be cast in-place, or prestressed concrete. Cast-in-place methods shall perform to the details on this sheet, design specifications, AISC/DOT. Prestressed construction which is not to this sheet, including any additional reinforcement required for bending which shall be determined by the Contractor or supplier, does not require additional approvals. Deviations from the details, for prestressed units shall require the approval of the State Structural Engineer prior to construction. For prestressed construction, see Index No. 260 for opening and grading details.

2. Reinforcing shall be either Grade 60 or 80.

3. Concrete shall be Class II or prestressed concrete meeting the requirements of AASHTO/ACI 418-1960. For designs of Class II Exceeds to prestressed units manufactured in plants which are under the Standard Specifying Procedures for the inspection of prestressed concrete products.

4. Debro-Aircaption glasses and cortices to be sheared unless otherwise shown.

5. Wind and other loads shall be calculated on all surfaces in contact with concrete and shall be beyond the boundary of contact. Any suitable loads resulting may be applied.

6. Superstructure shall be constructed using Index No. 260 and details for the Contract unit and price for Scheduling.

7. Quantity of material for other costs in place or prestressed concrete shall be the estimated quantities itemized on the plans. Concrete and reinforcing steel shall be paid for under the contract unit and price for Class II (Concrete Endwalls 150 and Reinforcing Steel Omission 110).

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION

STRAIGHT CONCRETE ENDWALLS
SINGLE AND DOUBLE 60° PIPE

CONTRACT No. E4069

SCHEDULES:

SCHEDULE A

BIL OF REINFORCING STEEL

<table>
<thead>
<tr>
<th>MARK</th>
<th>SIZE</th>
<th>NO. #</th>
<th>LENGTH</th>
<th>LOCATION</th>
<th>BARS</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>6</td>
<td>6</td>
<td>12</td>
<td>Footing</td>
<td>STRESS</td>
</tr>
<tr>
<td>B</td>
<td>8</td>
<td>6</td>
<td>10</td>
<td>Footing</td>
<td>STRESS</td>
</tr>
<tr>
<td>C</td>
<td>4</td>
<td>6</td>
<td>10</td>
<td>Wall</td>
<td>STRESS</td>
</tr>
<tr>
<td>D</td>
<td>4</td>
<td>6</td>
<td>10</td>
<td>Wall</td>
<td>STRESS</td>
</tr>
<tr>
<td>E</td>
<td>4</td>
<td>6</td>
<td>10</td>
<td>Wall</td>
<td>STRESS</td>
</tr>
</tbody>
</table>

BENDING DIAGRAM

NOTE: All bar dimensions are not to scale.

ESTIMATED QUANTITIES

<table>
<thead>
<tr>
<th>ITEM</th>
<th>UNIT</th>
<th>RPC</th>
<th>CMF</th>
</tr>
</thead>
<tbody>
<tr>
<td>Concrete Class II</td>
<td>Cu. Yd.</td>
<td>0.69</td>
<td>0.69</td>
</tr>
<tr>
<td>Reinforcing Steel</td>
<td>Lb.</td>
<td>105</td>
<td>105</td>
</tr>
</tbody>
</table>

LONGER BRIDGE SOLUTIONS

1053.0x637.0
1. Endwalls may be cast-in-place or precast construction. Cast-in-place endwalls shall conform to the details on this sheet, design specifications AASHO R-267. Precast construction which adheres to the details on this sheet will require the approval of the State Engineer prior to construction. For precast construction, see page No. 205 for splicing and grouting details.

2. Reinforcing steel shall be either Grade 40 or 60.

3. Concrete shall be Class II except concrete meeting the requirements of ASTM C 476 (4000 PSI) may be used in lieu of Class II concrete in precast units manufactured to the plates which are under the Superintendent Procedures for the Inspection of precast concrete products.

4. Chamfer All exposed edges and corners to be chamfered $\frac{1}{8}$ unless otherwise shown.

5. Wet side shall be bituminous coated on all surfaces in contact with concrete and $\frac{1}{4}$ beyond the boundary of contact. Any surfacing bituminous material may be field applied.

6. Sealing shall be in accordance with page No. 205 and for all items covered in the project shall be paid for the contract unit price for Sealing St. 13.

7. Bases of joints for either cast-in-place or precast construction shall be the estimated quantities indicated on the Index. Concrete and reinforcing steel shall be paid for under the contract unit price for Class II Concrete Embankment St. 117 and Reinforcing Steel Hoopel St. 118.

---

**BILL OF REINFORCING STEEL**

<table>
<thead>
<tr>
<th>Bar</th>
<th>Size</th>
<th>No. Per Foot</th>
<th>Length</th>
</tr>
</thead>
<tbody>
<tr>
<td>$\bar{y}$</td>
<td>3/8</td>
<td>10</td>
<td>10'</td>
</tr>
<tr>
<td>$\bar{y}$</td>
<td>5/16</td>
<td>50</td>
<td>8'</td>
</tr>
<tr>
<td>$\bar{y}$</td>
<td>1/2</td>
<td>26</td>
<td>10'</td>
</tr>
<tr>
<td>$\bar{y}$</td>
<td>3/16</td>
<td>22</td>
<td>12'</td>
</tr>
<tr>
<td>$\bar{y}$</td>
<td>3/8</td>
<td>4</td>
<td>8'</td>
</tr>
</tbody>
</table>

---

**GENERAL NOTES**

- (Shewing Bars in Front Face of Wall)
- (Shewing Bars in Back Face of Wall)

---

**SECTION BB**

**STRAIGHT CONCRETE ENDWALL**

**SINGLE 84" PIPE**

---

**ESTIMATED QUANTITIES**

- Concrete Class II C 476 (4000 PSI) 3.05
- Reinforcing Steel 5.250 2.300

---

**PLAN**

(Shewing Bars in Front Face of Wall)

| A |

---

**SECTION AA**

(Shewing Bars in Front Face of Wall)

**TYPICAL SECTION THRU ENDWALL**

**OPTIONAL ENTRANCE FOR CONCRETE PIPE**

---

**NOTE:** All bar dimensions are cut to size.
TABLE OF DIMENSIONS AND QUANTITIES FOR ONE GRATE

<table>
<thead>
<tr>
<th>Rate of Flow</th>
<th>Size of Pipe</th>
<th>C</th>
<th>3</th>
<th>3</th>
<th>5</th>
<th>R</th>
<th>Total Weight (lbs)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
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<td></td>
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</tr>
<tr>
<td>60'</td>
<td>15&quot; - 18&quot;</td>
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<td>3&quot;</td>
<td>3&quot;</td>
<td>3&quot;</td>
<td>65</td>
<td>70</td>
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<tr>
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<td></td>
<td>52</td>
</tr>
<tr>
<td></td>
<td>18&quot; - 24&quot;</td>
<td>3&quot;</td>
<td>3&quot;</td>
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<td>3&quot;</td>
<td>65</td>
<td>70</td>
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<tr>
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</table>

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION
U-TYPE CONCRETE ENDWALLS
BAFFLES AND GRATE OPTIONAL
15" TO 30" PIPE

STEEL GRADE USE CRITERIA
1. Grating handbook shall be used for design and engineering.
2. Drainage areas to perform consist of median or island areas or areas where debris and debris is neglected.
3. Rainfall in surplus to pipe shall be allowed within the earth channel to be considered a major problem.
4. Design to be considered to be in accordance with the earth channel to be considered a major problem.
5. Design to be considered to be in accordance with the earth channel to be considered a major problem.
6. Design to be considered to be in accordance with the earth channel to be considered a major problem.
TABLE OF DIMENSIONS AND ESTIMATED QUANTITIES
PIPE Culvert ENDOALLS WITH U - TYPE WINGS

<table>
<thead>
<tr>
<th>Opening</th>
<th>D/A8</th>
<th>Type I</th>
<th>Concrete</th>
<th>Cm. Pipe</th>
<th>Cm. Plate</th>
<th>Shear Tile Bars</th>
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</thead>
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</tr>
<tr>
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<td>0.75</td>
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TABLE OF DIMENSIONS AND ESTIMATED QUANTITIES
PIPE Culvert ENDOALLS WITH 45° WINGS

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<th>Opening</th>
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<th>Cm. Pipe</th>
<th>Cm. Plate</th>
<th>Shear Tile Bars</th>
</tr>
</thead>
<tbody>
<tr>
<td>08&quot;</td>
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<td>0.75</td>
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</tr>
<tr>
<td>10&quot;</td>
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<td>0.09</td>
<td>0.25</td>
<td>0.75</td>
<td>0.06</td>
<td>none</td>
</tr>
<tr>
<td>12&quot;</td>
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<td>0.09</td>
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<td>0.75</td>
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</tr>
<tr>
<td>14&quot;</td>
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<td>0.09</td>
<td>0.25</td>
<td>0.75</td>
<td>0.06</td>
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<tr>
<td>16&quot;</td>
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<tr>
<td>18&quot;</td>
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<td>0.09</td>
<td>0.25</td>
<td>0.75</td>
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<tr>
<td>20&quot;</td>
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<td>0.09</td>
<td>0.25</td>
<td>0.75</td>
<td>0.06</td>
<td>none</td>
</tr>
</tbody>
</table>

GENERAL NOTES

1. Check all exposed edges.

2. Concrete meeting the requirements of AASHTO C-492-1991 and be used in lieu of Class I concrete inexcept units manufactured in plants which are under the Standard Operating Procedure for the Inspection of precast concrete products.

3. Steel to be provided for the contract unit price for Class I Concrete. (Excluding I.D.)

4. Embedment to be provided for under the contract unit price for Class I Concrete.

5. Steel to be in accordance with order No. 290, and paid for under the contract unit price for Shear Tile Bars.
## Dimensions and Quantities

<p>| | | | | | | | | | | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
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<tr>
<td>D</td>
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<td>A</td>
<td>B</td>
<td>C</td>
<td>E</td>
<td>F</td>
<td>G</td>
<td>H</td>
<td>I</td>
<td>J</td>
<td>K</td>
</tr>
<tr>
<td>---</td>
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</tbody>
</table>

### Comments
- See General Note No. 3.
- See Sheet 5 of 6 for 5/8" Slab Quantities.

### Notes
- 6.625" ~ 6.625" dimensions permitted to allow use of 6 ft standard pipe lengths.
- 6.625" ~ 6.625" dimensions permitted to allow use of 8 ft standard pipe lengths.
- Concrete slab shall be deepened to form bridge across crown of pipe. See section below.

### Diagrams
- Two views of a cross drain mitered end section with single and multiple pipe configurations.

### Cross Drain
Mitered End Section
Single and Multiple Round Concrete Pipe

### Notes
- See Sheet 6 for details and notes.
### Dimensions and Quantities

<table>
<thead>
<tr>
<th>D</th>
<th>X</th>
<th>A</th>
<th>B</th>
<th>C</th>
<th>E</th>
<th>F</th>
<th>G</th>
<th>8&quot; Concrete Slab LF/CS</th>
<th>6&quot; Concrete Slab LF/CS</th>
<th>Total LF/CS</th>
<th>Single-Qt</th>
<th>Double-Qt</th>
<th>Triple-Qt</th>
<th>Quadruple-Qt</th>
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<td>1.47</td>
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<td>0.50</td>
<td>0.68</td>
<td>0.70</td>
<td>75</td>
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<td>56</td>
<td>57</td>
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<td>0.97</td>
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<td>1.83</td>
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<td>5&quot;</td>
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<tr>
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<td>2.29</td>
<td>2.50</td>
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<td>2.50</td>
<td>149</td>
<td>136</td>
<td>132</td>
<td>135</td>
</tr>
</tbody>
</table>

**Note:** See General Note No. 1. See Sheet 5 of 6 for 5 1/2" slab quantities.

### Cross Drain Mitered End Section

**Single and Multiple Round Corrugated Metal Pipe**

**State of Florida Department of Transportation**

**Plan Section**

- Single-Phase: 4M, 6M, and 8M pipe for pipes 5" and smaller.
- Double-Phase: 8M pipes 24" and larger.
- Quadruple-Phase: 8M pipes 24" and larger.

**Slab Materials:**

- 8" Concrete Slab
- 6" Concrete Slab

**Dimensions:**

- 8" Concrete Slab LF/CS: 75 LF
- 6" Concrete Slab LF/CS: 62 LF

**Quantities:**

- Single-Qt: 75 LF
- Double-Qt: 62 LF
- Triple-Qt: 56 LF
- Quadruple-Qt: 57 LF

**Note:** See Sheet 6 for details and notes.
## Quantities for 5' x 5' Thick Concrete Slabs (Cy)

<table>
<thead>
<tr>
<th>Slab Type</th>
<th>Single Pipe</th>
<th>Double Pipe</th>
<th>Triple Pipe</th>
<th>Quad. Pipe</th>
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</thead>
<tbody>
<tr>
<td>Round - Concrete</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2:1 Slope</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3' 5/8”</td>
<td>0.35</td>
<td>0.30</td>
<td>0.32</td>
<td>0.24</td>
</tr>
<tr>
<td>4' 4.44</td>
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<td>0.41</td>
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<tr>
<td>5' 54.50</td>
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<td>0.53</td>
<td>0.44</td>
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<tr>
<td>6' 6.58</td>
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<td>0.61</td>
<td>0.63</td>
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</tr>
<tr>
<td>7' 7.75</td>
<td>0.75</td>
<td>0.72</td>
<td>0.74</td>
<td>0.66</td>
</tr>
<tr>
<td>8' 8.90</td>
<td>0.84</td>
<td>0.81</td>
<td>0.83</td>
<td>0.75</td>
</tr>
</tbody>
</table>

| Round - CMP |              |             |             |            |
| 2:1 Slope |              |             |             |            |
| 3' 5/8”    | 0.35        | 0.30        | 0.32        | 0.24       |
| 4' 4.44    | 0.44        | 0.41        | 0.42        | 0.34       |
| 5' 54.50   | 0.54        | 0.51        | 0.53        | 0.44       |
| 6' 6.58    | 0.64        | 0.61        | 0.63        | 0.54       |
| 7' 7.75    | 0.75        | 0.72        | 0.74        | 0.66       |
| 8' 8.90    | 0.84        | 0.81        | 0.83        | 0.75       |

| CMP - Arch |              |             |             |            |
| 2:1 Slope |              |             |             |            |
| 3' 5/8”    | 0.35        | 0.30        | 0.32        | 0.24       |
| 4' 4.44    | 0.44        | 0.41        | 0.42        | 0.34       |
| 5' 54.50   | 0.54        | 0.51        | 0.53        | 0.44       |
| 6' 6.58    | 0.64        | 0.61        | 0.63        | 0.54       |
| 7' 7.75    | 0.75        | 0.72        | 0.74        | 0.66       |
| 8' 8.90    | 0.84        | 0.81        | 0.83        | 0.75       |

| Elliptical - Concrete |              |             |             |            |
| 2:1 Slope |              |             |             |            |
| 3' 5/8”    | 0.35        | 0.30        | 0.32        | 0.24       |
| 4' 4.44    | 0.44        | 0.41        | 0.42        | 0.34       |
| 5' 54.50   | 0.54        | 0.51        | 0.53        | 0.44       |
| 6' 6.58    | 0.64        | 0.61        | 0.63        | 0.54       |
| 7' 7.75    | 0.75        | 0.72        | 0.74        | 0.66       |
| 8' 8.90    | 0.84        | 0.81        | 0.83        | 0.75       |

**State of Florida Department of Transportation**

**Mitered End Section**

**CROSS DRAW**

---

**Note:**

- All quantities are approximate and may vary based on specific project requirements.
- Dimensions and materials should be confirmed with official blueprints and drawings provided by the project designer.

**Total Number of Slabs: 5 of 6**
GENERAL NOTES

1. Mitered end sections for pipe sizes 5", 6", and 24" round or equivalent pipe or elliptical pipe are permitted within the clear zone. When the pipe intersection permits, the mitered end section may be locked with the subcutoff opening as close as 20" beyond the outside edge of the shoulder.

2. Slope and ditch transitions shall be used when the normal roadway slope must be flattened to place and section outside clear zone. See detail 2 below.

3. The reinforced concrete slab shall be constructed for all sizes of cross drain pipe and cast in place with Class 1 concrete. Slabs shall be 3" thick unless 3" thickness ordered for in plans.

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

5. Corrugated metal pipe grooving that is damaged during bending 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 of the concrete.

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

8. When the mitered and section pipe is dissimilar to the cross drain pipe, a concrete jacket shall be constructed in accordance with Standard 204.

9. When existing multiple cross drain pipes are spaced other than the dimensions shown in this section, or have non-parallellines, or have non-uniform sections, the mitered and section will be constructed either separately or as single pipe mitered and sections or collectively as multiple pipe and sections as directed by the Engineer; however, mitered and sections will not be paid for each based on each independent pipe end.

10. The cost of all pipe, bolts, nuts, reinforcing, anchors, concrete, seals, patents, and coating bands shall be included in the cost for the mitered and section. Sinking shall be paid for separately under the contract unit price of Sinking, ST.

Pay Item No. 505-1.

11. Mitered and section shall be paid for under the contract unit price for Mitered End Section (C93). Each, Pay Item No. 430-882-3, based on each independent pipe end. Mitered and section sections for separation/reinforcement blast cutters are to be paid for under the contract unit price for Mitered End Section, Each, Pay Item No. 430-885-2.

CONCRETE PIPE CONNECTOR

ANCHOR DETAIL

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION
ROAD DESIGN

CROSS DRAIN MITERED END SECTION
SPECIAL DETAILS AND NOTES

ANCHOR DETAIL

NOTE: See General Note 2.

ANCHOR DETAIL

NOTE: See General Note 2.

ANCHOR DETAIL

NOTE: See General Note 2.

ANCHOR DETAIL

NOTE: See General Note 2.
DIMENSIONS & QUANTITIES

<table>
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<th>B</th>
<th>C</th>
<th>E</th>
<th>F</th>
<th>G</th>
<th>N</th>
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<th>CONCRETE (Cu. Yds.)</th>
<th>SODDING (Sq. Yds.)</th>
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- Dimensions permitted to allow use of 8' standard pipe lengths.
- Concrete slab shall be deepened to form bridge across crown of pipe. See section below.

TOP VIEW - SINGLE PIPE

- Beveled or Round Corners
- Grade
- Concrete Slab, 3" Thick, Reinforced With #8 @ 6" Centers

TOP VIEW - MULTIPLE PIPE

- Beveled or Round Corners
- Grade
- Concrete Slab, 3" Thick, Reinforced With #8 @ 6" Centers

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION

SIDE DRAIN
MITERED END SECTION
SINGTEL AND MULTIPE PLANK CONCRETE PIPE

NOTES:
- See Sheets 5 and 6 for details and general notes.
- Concrete slab 3" thick, reinforced with #8 @ 6" centers.
- Dimensions permitted to allow use of 8' standard pipe lengths.
- Concrete slab shall be deepened to form bridge across crown of pipe. See section below.

SLOPE
- To 5 Pipe for Pipes 5" and Smaller
- To 6 Pipe for Pipes 6" and Larger

For Use With Pipe Colors A, B, C, D, E

PIPE TO BE INCLUDED UNDER UNIT PRICE FOR MITERED END SECTION
DIMENSIONS & QUANTITIES

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**REMARKS**
These sizes are recommended for inlet and outlet treatment for water management systems or similar applications.

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION

SIDE DRAIN MITERED END SECTION

SINGLE AND MULTIPLE DRAIN CIRCUMFERENCE METAL PIPE

SECTION

NOTE: See Sheets 5 and 6 for details and general notes.
GENERAL NOTES

1. Unless otherwise designated in the plans, concrete pipe utilized and sections may be used with any type of side drain pipe, corrugated steel pipe utilized and sections may be used with any type of side drain pipe except aluminum pipes, and, corrugated aluminum utilized and sections may be used with any type of side drain pipe except steel pipe. When bilinear coated metal pipe is specified for side drain pipe, utilized and sections shall be constructed with side pipe or concrete pipe. When the utilized and section pipe is dissimilar to the side drain pipe, a concrete jacket shall be constructed in accordance with Index No. 280.

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

3. Corrugated metal pipe gaskets that is damaged during bending and perforating for utilized and section shall be repaired.

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

5. Corrugated polyethylene pipe I CPE I for side drain applications of 15". 18" or 24" diameter shall utilize either corrugated metal or concrete utilized and sections. When used in conjunction with corrugated metal utilized and sections, connection shall be by either a formed metal bend specifically designed to join CPE pipe and metal tube or other elbow approved by the State Drainage Engineer. When used in conjunction with a concrete utilized and section, connection shall be by a concrete jacketed constructed in accordance with Index No. 280.

6. When existing multiple side drain pipes are spaced other than the dimensions shown in this detail, or are non-penetrating areas, or are non-uniform sections, the utilized and sections will be constructed either separately as single pipe utilized and sections or collectively as multiple pipe utilized and sections as directed by the Engineer; however, utilized and sections will be paid for each, based on each independent pipe end.

7. 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.

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

9. Round pipe size 30" or greater, pipe arch size 35" x 24" or greater and elliptical pipe 36" x 30" or greater shall be gasketed except in the plans. Smaller sizes of pipe shall be gasketed only when so called for in plans. The lower grate on grading downstream ends on divided highways shall be omitted.

10. Grates are to be fabricated from steel ASTM A 53, Grade B, pipe. The lower grate on all traffic approach ends shall be Schedule 80 and all remaining grates shall be Schedule 40.

11. Grate subject to salt free and corrosive free environment may be fabricated from galvanized pipe, with base metal exposed during fabrication required as specified in Section 562, Standard Specifications, or fabricated from black pipe and hot dipped galvanized after fabrication, in accordance with ASTM A 423. Grates subject to salt water or highly corrosive environment shall be hot dipped galvanized after fabrication in accordance with ASTM A 423.

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

13. The project engineer shall conduct the District Drainage Engineer for possible alternative treatment prior to constructing side drain utilized and sections where a minimum spacing of 30' will not result between the two facilities of the utilized and sections.

14. The cost of all pipe is 1½ times, grates, fittings, reinforcing, concrete, anchor, concrete, elements, jackets and coupling beads shall be included in the cost for the utilized and section. Soaking shall be paid for separately under the contract unit price for Soaking, St. Pay Item No. 351-1-xxx

15. Utilized and sections shall be paid for under the contract unit price for Utilized End Section (150), St. Pay Item No. 430-166-xxx, based on each independent pipe end.

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 3% or pipe with less than 1½ of cover and grades in excess of 1 ½ will require such an evaluation (General Note 91).

2. The design engineer shall determine highly corrosive locations and specify in the plans where the grates shall be hot dipped galvanized after fabrication (General Note 91).

3. The design engineer shall determine and designate in the plans which alternate tones of utilized and section will not be permitted. The restrictions shall be based on corrosive or structural requirements.
**SCHEDULE OF BELL REINFORCEMENT**

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**DETAILED OF BELL & SPIGOT CONCRETE PIPE JOINT USING ROUND RUBBER GASKET**

**CONCRETE GUTTER AND DRAINS AT RETAINING WALLS**

**SECTION CC**

- Use larger value of either:
  1. L - Ø i.e. H (no maximum)
  2. L - Ø x Ditch Offset (maximum L - 100')

**METHOD FOR DETERMINING THE LENGTH OF SPECIAL PIPE REQUIRED UNDER RAILROADS**

- Minimum Length Of Special Pipe Required
  1. To be in increments of 5'
  2. Be not less than 3' above bottom of rail

**MISCELLANEOUS DRAINAGE DETAILS**
Section BB

- Normal Slab Thickness
- Additional Concrete Required Only When Normal Slab Thickness Is Less Than 2".
- 3.5" Bars @ 3" Ctr.
- For Entire Width Of Culvert Slab.
- 6" Unless Otherwise Shown In Plans.

Plan

- Inlet Type A Grate
- 2.5" Bars @ 3" Ctr.
- Near Bottom Of Side Ausens Each Corner Of Opening.

Section CC

- Normal Slab Thickness
- Additional Concrete Required Only When Normal Slab Thickness Is Less Than 2".
- 3.5" Bars @ 3" Ctr.
- For Entire Width Of Culvert Slab.
- 2.5" Bars @ 3" Ctr.
- Near Bottom Of Side Ausens Each Corner Of Opening.

Plan

- Inlet Type B Grate

Note: 1. Cost of Steel Grating to be included in cost of Box Culvert.
2. All sheet shall be 1/8" clear.

Inlet in Top of Box Culvert

Extra Base for Cross Box Culverts Under Flexible Pavement

NOTE: Extra base is required when cross box culverts are located on facilities subject to high speed traffic (>45 mph) or high traffic volumes (>600 ADT) and the cover is within the range specified in the narrative above.

Extra base materials to be paid for as equivalent square yard base, except when material is valued for an equal yard of embankment base.
SODDING QUANTITIES (S.Y.)

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STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION
DITCH PAVEMENT & SODDING

[Diagram of Ditch Pavement and Sodding with various pipe sizes and pipe counts for different indexes (250, 260, 261, 266, 270).]
Provide Approach Hatch As Shown At 0.302 Grade On Gutter. Slightly Geared. The Surface Of The Wetted Areas Present Or Necessary, Within Limits Of The Median Curbs Or Curb and Gutter. Construct A Grasping Frame Of Frames At The Point Or Points At Low Grade. See Details.

SECTION AA

SECTION CC

Flume Detail

GENERAL NOTES

1. These details are to apply to projects unless otherwise stated for the construction of 2-lane sections of 4-lane divided highway sections and for super-arterial sections of new and substituted highway sections. Legend only is illustrative only. Cost of frame to be included in the contract price for curb or curb and gutter. Said to be paid for under the contract will price for Street, etc.

2. Frames to be located in the points of angles or at other points as designated in the plans. The locations may be adjusted by the Engineer during construction.
1. Spillway to be held for as shoulder gutter.
2. If spillway angles into a gully or ravine, then the detail should be modified as necessary.

DETAIL OF CONC. SPILLWAY AT END OF SHOULDER GUTTER

(TO BE USED WHERE INLETS, PIPES & EKOMALLS ARE IMPractical)
GENERAL NOTES

1. Pipe shall be of the optional types permitted in Section 443 of the Specifications unless otherwise required in the plans. Distiller types of pipe will not be permitted in a distribution run of pipe.

2. Concrete pipe shall be placed with the slabs positioned on slabs.

3. Alignment joints are standard practice. Grouted joints are not required.

4. The contractor may supply other methods for installing spans having equal or greater area of opening, if approved by the Engineer.

5. Filter fabric shall be Subsurface Drainage type meeting the requirements of Section A-245. All filter fabric joints shall lap a minimum of one (1) foot.

6. The standard cross section shall be constructed unless other sections are described or designated in the plans.

7. For supplemental details see addenda No. 290.

8. The contractor shall take the necessary precautions to prevent contamination of the French with waste, oil and foreign materials.

9. The 12" diameter wrap hoop shall be eliminated when the bottom of the invert is below the nearest water line unless otherwise shown in the plans.

10. French drains following the topdressed cross section shall be paid for under the contract unit price for French Drains, Cf. Pay Item No. 443-T1-10.

DRAINAGE NOTES

1. French drain with a significantly different cross section shall be paid for under the contract unit prices for separate lines as follows:

(a) Slurry or Preformed Pipe, Cf. Pay Item No. 443-T1-10a. Unit price shall include cost for pipe, gratings and fittings in places.

(b) Ductile Iron (French Design) Cf. Pay Item No. 443-T1-10b. Unit price shall include cost for main aggregate in place, and cost for trench excavation, backfill and compaction. The unit price shall also include the cost for disposal of sawdust and other material caused by French drain construction, but shall not include payment for items paid for elsewhere.

(c) Plastic Filter Fabric Subsections Cf. Pay Item No. 443-T1-10c. Unit price shall be paid for cost of fabric in place. Quantity shall be determined by plan notes or dimensions of the fabric envelope.

DESIGN NOTES

1. Pipe invert should be at or above the water table whenever possible.

2. French drains with minor dimensional changes or otherwise different from the standard cross section shall be either described or specified in the plans.

French drains with a significantly different cross section shall be detailed in the plans.
SLOTTED PIPE OPTIONS

OPTION A - ROUND PIPE

SIDE VIEW
SECTION AA
SECTION BB

OPTION B - ROUND OR ELLIPTICAL PIPE

ROUND PIPE

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ELLIPSOID PIPE

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A curved cut is acceptable provided the original dimension is maintained (Tight Fit For Elliptical & Round Pipe)

2.5" For 12" Joints of Pipe
2.5" For 6" Joints of Pipe

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION
ROAD DESIGN

FRENCH DRAIN
**DESIGN NOTES FOR UNDERDRAIN**

1. The type of underdrain shall be selected to meet design water removal rate and site conditions. Selection is prescribed by the use of these typical sections since special designs may be required to satisfy project conditions.

2. Type I underdrain is intended for minimum water removal conditions. Select a filter fabric envelope unless otherwise stated in the plans.

3. Type II underdrain is intended for moderate water removal conditions. A filter fabric envelope is required between the course aggregate and filter aggregate. The envelope filter fabric is typically 6 oz. x 6 oz. unless otherwise stated in the plans.

4. Type III underdrain is intended for maximum water removal conditions. The filter fabric envelope is required between the course aggregate and filter aggregate. The envelope filter fabric is typically 6 oz. x 6 oz. unless otherwise stated in the plans.

5. Type IV underdrain is intended for minimal water removal aggregate and underdrain applications.

6. Type V underdrain is intended for use in determination tables and other locations where a filter fabric envelope is not necessary unless otherwise stated in the plans.

7. The designer should evaluate whether a filter fabric envelope is required for underdrain Type V. If required, fabric must be specified in the plans. Fabric to be sold for separations.

**GENERAL NOTES FOR UNDERDRAIN**

1. The underdrain pipe shall be 6 inches in diameter or 8 inches in diameter unless otherwise shown in the plans. The size to be furnished will be based on the normal internal diameter of a pipe with a smooth interior except when prohibited by the plans. The pipe is a minimum of 5 inches in diameter when the pipe is used in aggregate or filter fabric envelopes.

2. Filter fabric envelope shall be sized and meeting the requirements of Section R 62.4 of the Standard Specifications.

3. Course aggregate shall be sized and meeting the requirements of Sections R 63.2.2 and R 63.3.

4. Underdrain Type I, II, and III shall be in accordance with Section 440 and underdrain Type V (Edgewise) in accordance with Section 442.

5. Filter fabric meeting Section 969 shall be a substrate drainage type.

6. When corrugated polyethylene tubes with 50% or 95% perforations are used in conjunction with fine aggregate, a filter fabric must be installed meeting Section 961.5 is required.

7. For standard location details, see Section 9150. Special location requires separate details in the plans.

8. All filter fabric joints shall overlap a minimum of the 111 ft.

9. Underdrain outlet pipes shall be constructed in accordance with the outlet pipe details and general notes.

10. Underdrain Type V is to be sold for under the contract unit price for Corrugated Polyethylene Tubing Edgewise, I.F., and shall include the cost for splitting, staking, and end agencies.

**UNDERDRAIN AND EDGEdRAIN**

Design Water

Underdrain

Type I, II, III, or IV

Filter Fabric

Edgewise

Corrugated Polyethylene

Tubing Edgewise, I.F.
**GENERAL NOTES**

1. For use criteria see "Steel Grating Use Criteria" (Index No. 280).
2. Grates shall be ASTM A 242, A 446, A 572 or A 588, Grade 50 steel, and galvanized in accordance with Section 962-7 of the Standard Specifications.
3. Channel section (C) x (O) may be substituted for the C x 5.4 shape(s).
4. Additional reinforcing No. 4 bars are required, with 2" clearance below grate. Spacings shown are center to center. Laps to be 12" minimum. Welded wire fabric shall be minimum 3/4" deep with a 1.5" grid in existing demand for anchor bars. Holes shall be thoroughly cleaned prior to placing down bars and concrete.
5. Endwall to be paid for under the contract unit price for Class 2 Concrete (Endwall) CY and Reinforcing Steel (Pattern) lb. Cost of dowel bars and dowel seat to be included in the contract unit price for reinforcing steel. Cost of grates to be paid for under the contract unit price for Endwall Grate (lb. per unit). Cost of galvanized bars to be included in the contract unit price for the grate.
6. Cast shapes 5 each side and above endwall. Sealing to be paid for under the contract unit price for Sealing 5Y.

**DIMENSIONS AND QUANTITIES PER GRATE**

<table>
<thead>
<tr>
<th>Grade</th>
<th>Pipe Size</th>
<th>Length (feet)</th>
<th>Quantity</th>
<th>Bars</th>
<th>$\mathbf{A} \times \mathbf{B}$</th>
<th>$\mathbf{C} \times \mathbf{D}$</th>
<th>$\mathbf{E} \times \mathbf{F}$</th>
<th>$\mathbf{G} \times \mathbf{H}$</th>
<th>Total Weight (lbs)</th>
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<tbody>
<tr>
<td>6d</td>
<td>6</td>
<td>6&quot;</td>
<td>6</td>
<td>6</td>
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<td>3&quot; x 3&quot;</td>
<td>3&quot; x 3&quot;</td>
<td>3&quot; x 3&quot;</td>
<td>60</td>
</tr>
<tr>
<td>6</td>
<td>6</td>
<td>6&quot;</td>
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<td>6</td>
<td>3&quot; x 3&quot;</td>
<td>3&quot; x 3&quot;</td>
<td>3&quot; x 3&quot;</td>
<td>3&quot; x 3&quot;</td>
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<tr>
<td>6d</td>
<td>6</td>
<td>6&quot;</td>
<td>6</td>
<td>6</td>
<td>3&quot; x 3&quot;</td>
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<td>3&quot; x 3&quot;</td>
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**DIMENSIONS AND QUANTITIES PER U-ENDWALL**

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<th>M</th>
<th>D</th>
<th>R</th>
<th>P</th>
<th>Class 1 Concrete (CY)</th>
<th>Reinforcing Steel (lb.)</th>
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<td>3&quot;</td>
<td>2&quot;</td>
<td>1&quot;</td>
<td>1&quot;</td>
<td>1.44</td>
<td>0.6</td>
<td>20</td>
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</table>

**SAFETY MODIFICATIONS FOR ENDWALLS**

STATE OF ILLINOIS DEPARTMENT OF TRANSPORTATION
ROAD DESIGN

SIGNED:

[Signature]

[Title]

[Name]

[Date]
**GENERAL NOTES**

1. Reverse curve treatment may be used for design speeds of 40 mph or less. Taper treatment may be used for all design speeds, but it is to be used in lieu of reverse curves for design speeds of 45 mph or greater.

2. For single lane storage, a taper rate of 15ft is to be used for design speeds up to 50 mph. For design speeds greater than 50 mph, the taper rate shall conform to the lengths shown in Table 28-15 of the Manual of Uniform Traffic Control Devices. Taper rates for Design Construction and Maintenance for Streets and Highways.

For dual lane storage, tapers shall conform to the following rates:

- **Design Speed (mph)**: 30
  - **Taper Rate (Length to Width)**: 8 ft
- **Design Speed (mph)**: 40
  - **Taper Rate (Length to Width)**: 12 ft
- **Design Speed (mph)**: 45 or greater
  - **Taper Rate (Length to Width)**: 15 ft

**DESIGN NOTES**

1. Any variation from the treatment described in the General Notes shall be detailed in the plans.

2. When space is limited and single lane storage is used, the length to width ratio (taper rate) may be as follows:
   - **Design Speed (mph)**: 30
     - 6 ft (20' length for 12' lane) or 80' length for 40' lane
   - **Design Speed (mph)**: 40
     - 9 ft
   - **Design Speed (mph)**: 45 or greater
     - 12 ft

---

**TABLE OF DIMENSIONS AND QUANTITIES FOR MEDIAN STORAGE LANES**

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<tr>
<th>OPTION 2</th>
<th>4&quot;</th>
<th>6&quot;</th>
<th>L</th>
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<th>T</th>
<th>U</th>
<th>V</th>
<th>W</th>
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<td>17'-6&quot;</td>
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<td>6</td>
<td>7</td>
<td>8</td>
<td>9</td>
<td>10</td>
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<td>12</td>
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<td>19'-6&quot;</td>
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<td>12</td>
</tr>
<tr>
<td>21'-6&quot;</td>
<td>7</td>
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<td>7</td>
<td>8</td>
<td>9</td>
<td>10</td>
<td>11</td>
<td>12</td>
</tr>
</tbody>
</table>

**METHOD OF DETERMINING MEDIAN OPENINGS AT SKewed SIDE STREETS**

1. The information shown is for opposing left turn conditions only.

2. Median openings are determined by curves at project separator with and skew angle of side streets not by project median to storage side width, in addition, the median and side streets vary with side street mediation width.
MEDIAN STORAGE LANE DESIGN

**TAPER RATE AND REVERSE CURVE GUIDELINES**

<table>
<thead>
<tr>
<th>SCHEME 1</th>
<th>SCHEME 2</th>
<th>SCHEME 3 &amp; 4</th>
<th>SCHEME 5</th>
<th>MPH</th>
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<tr>
<td>UNRESTRICTED</td>
<td>RESTRICTED</td>
<td>MEDIAN &gt; 22'</td>
<td>MEDIAN = 22'-30'</td>
<td>STRAIGHT TAPER</td>
</tr>
<tr>
<td>20</td>
<td>30</td>
<td>40</td>
<td>50</td>
<td>60</td>
</tr>
<tr>
<td>20'</td>
<td>30'</td>
<td>40'</td>
<td>50'</td>
<td>60'</td>
</tr>
</tbody>
</table>

**NOTE:** Restricted locations are those where existing or proposed turnouts and/or intersections are close by. Where existing street networks are significantly right where permanently fixed structures or adverse roadway geometry prevents the development of desirable bay taper lengths or where right of way for desirable bay taper development is not available.

**TURN BAY TAPERS FOR UNCurbed MEDIAN**
TYPICAL RETURN PROFILES
INCLUDING DETAIL SHOWING LOCATION OF INLETS ON RETURN

Note:
1. On normal intersections, profiles may not be included in the plans as the above typical profiles include the return; however, should situations require, the return shall be detailed in the plans.
2. For major intersections, where extreme grades are involved or where it is deemed necessary to include profiles in order to prevent obstructions, design data return profiles may be included in the plans.
3. Return grades should be established such that all flow shows to be contained within or the return whenever practicable. Liners should be installed to avoid contact with pedestrian movement. Special care must be exercised to prevent contact with such cut slopes for the glazed or hard-surfaced. For information on such cut slopes refer to HEC No. 294.
4. Grades of 0.2% or greater should be established on any profile outside the inlet limits.
INTRABLOCK RAMPS AND DIMENSIONAL FEATURES FOR RAMPS TRANSVERSE TO SIDEWALKS

SECTION AA

SECTION BB

SECTION CC

MEDIAN CROSS RAMP

DIAGONAL RAMPS

INTERMEDIATE RAMPS

CURB CUT RAMPS

PHYSICALLY HANDICAPPED
METAL OR PLASTIC CAPS FOR DOWEL BARS

DEFORMED METAL PLATE

LONGITUDINAL LANE-TIE JOINT

LONGITUDINAL CONSTRUCTION JOINT

DOE ST IT LAYOUT

TRANSVERSE EXPANSION JOINT

TRANSVERSE CONTRACTION JOINT, VIBRO CAST METHOD

TRANSVERSE CONTRACTION JOINT, SAWED METHOD

CONCRETE PAVEMENT JOINTS
CONCRETE-CONCRETE JOINTS

FOR NEW AND REHABILITATION PROJECTS:
EITHER TAPE OR BACKER ROD BOND BREAKER REQUIRED.
SHOULDER MUST BE REPAIRED IF PROPER JOINT SHAPE
CAN NOT BE ATTAINED.

CONCRETE-ASPHALT SHOULDER JOINTS

JOINT SEAL DIMENSIONS
Dowel Assemblies for Expansion and Contraction Joints

WADY INDUSTRIES, INC.

EXPANSION AND CONTRACTION ASSEMBLY

FLORIDA STEEL CORPORATION

CONCRETE PAVEMENT JOINTS

THE DAYTON SURE GRIP AND SHORE COMPANY
DETAIL SHOWING RIGID SHOULDER PAVEMENT
NOTE: Right shoulder pavement to be concrete or concrete as colored to the plan.

DETAIL SHOWING SHEET METAL STRIP
NOTE: Immediately prior to placing the seal, the joint shall be thoroughly cleaned and allowed to dry. As soon as the slab is placed, the metal strips shall be bent up against the pavement edge.

The sheet metal strip shall be a minimum of 16 gage sheet of white or gray and shall be galvanized in accordance with ASTM A-525, Corrosion-Resistant Steel.

GENERAL NOTES
1. Pay quantity of expansion joint to be calculated based on the area of the expansion joint.
2. For additional details see Section 305.
3. The E of expansion and the E of bridge do not necessarily coincide.
4. Prior to the placement of the expansion joint, the E of the roadway pavement shall be determined.

SECTION AA THROUGH EXPANSION JOINT

SECTION THRU SEALS
Either of the three seals shown may be used.
GENERAL NOTES

1. The illustrated applications for guardrails are standard requirements. Length of advancement shall be established by Figure 1 for all installations incorporating the Standard Frame (Stall P). However, length of guardrail shall not be less than the minimum lengths shown by detail as this index.

Bridges generally have associated control hazards, where the length of advancement is established by the intersection of the hazard boundary and the clear zone as shown in Figure 1. For bridges ends, approach roads and approach structures that are placed in abeyance, or of the intent hazard, the specific places to be used shall be used. All openings, gaps, or slopes between the concrete shall be considered as those openings, gaps, or slopes between the concrete hazards. Where the barrier shall be placed in abeyance, the length of advancement shall be taken as the distance between the barrier and the abeyance. Where the barrier shall be placed in abeyance, the length of advancement shall be taken as the distance between the barrier and the abeyance.

2. For rail roads, rail roads shall be 6'-5" except that reduced sections shall be used for transitions or modifications of rigid structures such as bridges (See Detail 1).

3. At grade right of ways, the face of the guardrail is often from the grade less than the desirable 4-6 foot minimum. In such cases, a 4-6 foot minimum offset may be used with a grade offset of 3'-1" extending over the length of the guardrail. In some cases, the grade offset may be used either as a 3'-1" maximum, or as a 3'-1" maximum offset or both, as determined by the Engineer. See the Figure 1. In addition, the approach and guardrail shall be shown where the grade offset shall be shown, with a clearance of 3'-1" over the guardrail, and the path for approach shall be shown.

4. Where the face of the guardrail is offset from the grade, the offset shall be shown on the grade offset. In some cases, the grade offset may be shown with a clearance of 3'-1" over the guardrail, and the path for approach shall be shown.

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

6. Corrugated steel plate rails, plates, and sections and built-up plates shall conform to the current requirements of ASTM A36, Class A 1/2 go 1, Type 2 rail coating. Aluminum guardrail materials shall not be permitted unless specifically approved for in the plans.

7. Permeability past and offset block combinations are installed on shear rail of the.

8. Where necessary to achieve or add specific to the aesthetic of the guardrail, the work shall be done by drilling, or raising. Where the aesthetic of the guardrail shall be raised to match the current requirements of Sections 502 and 503 of the Standard Specifications. No boring of rails shall be permitted.

9. Guardrail shall be shown as the proper structural edge times, as shown.

10. Guardrail shall be shown as the proper structural edge times, as shown.

11. Where guardrail is offset from the grade, it shall be shown as the proper structural edge times, as shown.

12. Where guardrail is offset from the grade, it shall be shown as the proper structural edge times, as shown.

13. At grade right of ways, the face of the guardrail is often from the grade less than the desirable 4-6 foot minimum. In such cases, a 4-6 foot minimum offset may be used with a grade offset of 3'-1" extending over the length of the guardrail. In some cases, the grade offset may be used either as a 3'-1" maximum, or as a 3'-1" maximum offset or both, as determined by the Engineer. See the Figure 1. In addition, the approach and guardrail shall be shown where the grade offset shall be shown, with a clearance of 3'-1" over the guardrail, and the path for approach shall be shown.

14. Magnets or rail sections may be used for all rail of 125 feet or greater. For rail less than 125 feet the rail shall be fabricated to fit.

15. Corrugated steel plate rails, plates, and sections and built-up plates shall conform to the current requirements of ASTM A36, Class A 1/2 go 1, Type 2 rail coating. Aluminum guardrail materials shall not be permitted unless specifically approved for in the plans.

16. Permeability past and offset block combinations are installed on shear rail of the.

17. Where necessary to achieve or add specific to the aesthetic of the guardrail, the work shall be done by drilling, or raising. Where the aesthetic of the guardrail shall be raised to match the current requirements of Sections 502 and 503 of the Standard Specifications. No boring of rails shall be permitted.

18. Guardrail shall be shown as the proper structural edge times, as shown.

19. The guardrail shall have a minimum clearance of 3'-1" over the guardrail, and the path for approach shall be shown.

20. Magnets or rail sections may be used for all rail of 125 feet or greater. For rail less than 125 feet the rail shall be fabricated to fit.

21. Corrugated steel plate rails, plates, and sections and built-up plates shall conform to the current requirements of ASTM A36, Class A 1/2 go 1, Type 2 rail coating. Aluminum guardrail materials shall not be permitted unless specifically approved for in the plans.

22. Permeability past and offset block combinations are installed on shear rail of the.

23. Where necessary to achieve or add specific to the aesthetic of the guardrail, the work shall be done by drilling, or raising. Where the aesthetic of the guardrail shall be raised to match the current requirements of Sections 502 and 503 of the Standard Specifications. No boring of rails shall be permitted.
GUARDRAIL APPLICATION FOR ROADSIDE HAZARDS

DIVIDED ROADWAY DETAIL B

UNDIVIDED ROADWAY DETAIL C

GUARDRAIL APPLICATION FOR MEDIAN AND GORE HAZARDS

OPPOSING TRAFFIC DETAIL D

ONE-WAY TRAFFIC DETAIL G
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 nearly parallel bridges with open medians 50' or less in width. When medians 50' or less in width are closed by continuous stacking between the bridge travel ways, traffic separation shall be attained by appropriate freeway side rails, but not limited to, raised barriers, curbs, guardrail, concrete barrier walls and special barriers.
APPRAOCH TREATMENT FOR STANDARD FLARE FOR CURB AND GUTTER

DETAIL Q
APPROACH POSTS AND SPECIAL OFFSET BLOCKS

OFFSET BLOCK DIMENSIONS

- Dimensions shown are subject to standard approach ideas with parapet curb configurations and typical guardrail lateral transitions. For other approach std configurations and guardrail alignments, the approach posts are to be adjusted and the depth of the offset blocks adjusted for a snug fit against the back of the post. Offset blocks can be no deeper than one special block plus one standard block.

APPROACH GUARDRAIL DETAILS FOR BRIDGE CONNECTIONS AND GUARDRAIL & SHOULDER GUTTER TRANSITIONS AT BRIDGE APPROACHES

DETAIL N

GUARDRAIL ATTACHMENT AT HANDRAIL BARRIER

GUARDRAIL
NOTES: (SPECIAL STEEL POST):

1. Either anchor bolts, concrete wedge anchors or approved concrete adhesive (chembolts) anchors may be used.

2. Anchor bolts, wedge anchors and adhesive anchors shall have a minimum tensile strength of 60,000 psi and guaranteed in accordance with ASTM A475. All stainless steel components may be substituted for components galvanized in accordance with ASTM A633. All stainless steel components shall be in accordance with the manufacturer's recommendations. Assuming 3000 psi compressive strength for concrete. Wedge anchors shall also meet the following requirements: (a) tensile load each anchor approach index 40,000 psi, other structures 180,000 psi, other structures 7000 psi.

3. Posts are to be plumbed with adjusting nuts or nuter seating. Posts installed using anchor bolts or adhesive anchors are to be set with adjusting nuts as detailed, unless the Engineer specifies the use of anchor seating in lieu of adjusting nuts. Posts installed using wedge anchors are to be set with nuter seating. Base plates shall be grouted with neat finishes.

4. Anchor bolts shall be set in accordance with the manufacturer's recommended adhesive or approved by the Qualified Product List, or as approved by the Engineer.

5. Steel post and base units shall be galvanized in accordance with ASTM A525. Any damaged galvanized areas are to be re-galvanized in accordance with Section 502 of the Standard Specifications.

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

SPECIAL STEEL GUARDRAIL POSTS

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION
ROAD DESIGN

GUARDRAIL

STANDARD TIMBER AND STEEL GUARDRAIL POST

6'L STEEL POST

6 X 9 OR 6 X 8.5 STEEL POST

6'H TIMBER POST
ENCASED GUARDRAIL POST

SPECIAL POST LOCATIONS ON CURB INLETS

LEGEND

Variation in Location Of Special Post:

- Single Offset Block or Double Offset Block On Adjacent Standard Post (x 1)

To be used principally over shallow utilities.

1. The locations shown for special posts mounted on inlets are to be used as guidelines for positioning the posts and for matching the number of required posts.

2. Special posts and their anchorage required on curb inlets shall be in accordance with specified guardrail posts Sheet 12 of 14, and paid for under the contract unit price for Special Guardrail Post, each.

3. Variations shown for the locations of special posts mounted on inlets are calculated from standard post spacing of 15' - 6" on centers of standard posts from Varion 1 - 15", 1/2 of a pipe, a use of single and double offset blocks on standard posts adjacent to the vehicle, horizontal grating mounted in concrete anchor, edge distance 2" for gravel and 3" for embankment meters 1.

4. Encased guardrail posts shall conform to section in standard timber or snow posts, and be paid for under the contract unit price for Special Guardrail Post, each. Grating shall include cut of foam wrap and concrete encasement.

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION

GUARDRAIL

SPECIAL POST LOCATIONS ON CURB INLETS
### GENERAL NOTES

- Whether or not existing bridge railings are to remain in place, as refurbished or be replaced, is a determination that must be made independent of any information contained in this section.
- It is recommended that an existing bridge railing be retained in place to be used as a guide rail in new bridge construction, unless it clearly shows signs of deterioration. Where existing railings show signs of deterioration, consideration should be given to the design of new rails that are compatible with existing railings. In some cases, it may not be possible to provide compatible new rails with existing railings.

### DESIGN NOTES

1. The details in this section are intended to be used for selecting bridge safety railings and approach systems constructed under former Department standards. These details are not intended to provide guidance for bridge construction. It is recommended that railings be consistent with current American Association of State Highway and Transportation Officials (AASHTO) standards and or current Highway Design Standards and Bridge Design Standards.

### SCHEME SELECTION GUIDE (NUMBERS)

<table>
<thead>
<tr>
<th>Scheme Selection Guide (Numbers)</th>
<th>WITH ROADWAY CURBS APPROACHING BRIDGES</th>
<th>WITHOUT ROADWAY CURBS APPROACHING BRIDGES</th>
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<tr>
<td></td>
<td>Sheets 2 thru 6</td>
<td>Sheets 7 thru 9</td>
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#### ONE-WAY BRIDGES

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<td>2-3, 4, 5, 6, 13-14</td>
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#### TWO-WAY BRIDGES

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<td>1, 16</td>
</tr>
<tr>
<td>Steel Guardrail</td>
<td>1, 16</td>
</tr>
</tbody>
</table>

### GUARDRAIL ANCHORAGE AND CONTINUOUS BARRIER FOR EXISTING BRIDGES

- The proposed selection of guardrails and barrier systems for new approaches should be consistent with current AASHTO standards and or current Highway Design Standards and Bridge Design Standards.
- Each individual guardrail system described in these schemes shall be used for an existing approach to be used for any approach that is consistent with current AASHTO standards and or current Highway Design Standards and Bridge Design Standards.
- Each individual guardrail system described in these schemes shall be used for an existing approach to be used for any approach that is consistent with current AASHTO standards and or current Highway Design Standards and Bridge Design Standards.

### STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION

- The proposed selection of guardrails and barrier systems for new approaches should be consistent with current AASHTO standards and or current Highway Design Standards and Bridge Design Standards.
- Each individual guardrail system described in these schemes shall be used for an existing approach to be used for any approach that is consistent with current AASHTO standards and or current Highway Design Standards and Bridge Design Standards.
- Each individual guardrail system described in these schemes shall be used for an existing approach to be used for any approach that is consistent with current AASHTO standards and or current Highway Design Standards and Bridge Design Standards.
Set Form Flush With Back Of Existing Path Between 2nd And 3rd Post And Cast Concrete Below PCC.

- Dispersion Bar Unit Vertical Slope At And Panel Can Be Used To Achieve Desired Height Or Depth Of Cast Concrete Below PCC.

See Scheme 2 For Typical Information

PICTORIAL VIEW

SECTION BB

APPLICATIONS

SAFETY CURB: 2'-9" Wide
Concrete Continuous Beam Rail
Approach and Trailing End Of Two-Way Bridges
Trailing End Of One-Way Bridges When Other Hazards Present

SCHEME 5

CAST IN PLACE PANELS

BRIDGES WITH APPROACHING ROADWAY CURB

PICTORIAL VIEW

SECTION BB

APPLICATIONS

SAFETY CURB: 2'-9" Wide
Concrete Continuous Beam Rail
Approach and Trailing End Of Two-Way Bridges
Trailing End Of One-Way Bridges When Other Hazards Present

SCHEME 5

CAST IN PLACE PANELS

BRIDGES WITH APPROACHING ROADWAY CURB

PICTORIAL VIEW

SECTION BB

APPLICATIONS

SAFETY CURB: 2'-9" Wide
Concrete Continuous Beam Rail
Approach and Trailing End Of Two-Way Bridges
Trailing End Of One-Way Bridges When Other Hazards Present

SCHEME 5

CAST IN PLACE PANELS

BRIDGES WITH APPROACHING ROADWAY CURB

PICTORIAL VIEW

SECTION BB

APPLICATIONS

SAFETY CURB: 2'-9" Wide
Concrete Continuous Beam Rail
Approach and Trailing End Of Two-Way Bridges
Trailing End Of One-Way Bridges When Other Hazards Present

SCHEME 6

CAST IN PLACE PANELS

BRIDGES WITH APPROACHING ROADWAY CURB

PICTORIAL VIEW

SECTION BB

APPLICATIONS

SAFETY CURB: 2'-9" Wide
Concrete Continuous Beam Rail
Approach and Trailing End Of Two-Way Bridges
Trailing End Of One-Way Bridges When Other Hazards Present

SCHEME 6

CAST IN PLACE PANELS

BRIDGES WITH APPROACHING ROADWAY CURB

PICTORIAL VIEW

SECTION BB

APPLICATIONS

SAFETY CURB: 2'-9" Wide
Concrete Continuous Beam Rail
Approach and Trailing End Of Two-Way Bridges
Trailing End Of One-Way Bridges When Other Hazards Present

SCHEME 6

CAST IN PLACE PANELS

BRIDGES WITH APPROACHING ROADWAY CURB

PICTORIAL VIEW

SECTION BB

APPLICATIONS

SAFETY CURB: 2'-9" Wide
Concrete Continuous Beam Rail
Approach and Trailing End Of Two-Way Bridges
Trailing End Of One-Way Bridges When Other Hazards Present

SCHEME 6

CAST IN PLACE PANELS

BRIDGES WITH APPROACHING ROADWAY CURB
BRIDGE WITH APPROACHING ROADWAY CURB

CAST IN PLACE TRANSITION WALL

APPLICATIONS
SAFETY CURB 2'-8" MIN, OR LESS
CONCRETE PARAPET WITH METAL WIRE RAILING
APPROACH AND TRAILING ENDS OF TWO-WAY BRIDGES
APPROACH END OF ONE-WAY BRIDGES
APPROACH RAIL FOUNDATION

SCHEME 9

SHEECE 10
CANTILEVER WALL

DIMENSIONS AND QUANTITIES

<table>
<thead>
<tr>
<th>LENGTH</th>
<th>WALL</th>
</tr>
</thead>
<tbody>
<tr>
<td>x 4'0&quot;</td>
<td>3'-0&quot;</td>
</tr>
<tr>
<td>5'-0&quot;</td>
<td>3'-0&quot;</td>
</tr>
<tr>
<td>1'-0&quot;</td>
<td>3'-0&quot;</td>
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</table>

Class 2 Concrete

Reinforcing Steel

L-WALL

WALL OPTIONS

NOTE:

PLAIN CONCRETE BARRIER WALL (SHOULDER)

CANTILEVER WALL

REINFORCING STEEL MODIFICATIONS

AT BARRIER WALL INLETS (INDEX NO. 218)

REINFORCED CONCRETE BARRIER WALL (SHOULDER)
REINFORCED CONCRETE BARRIER WALL (RETAINING)

BENDING DIAGRAMS

NOTE: All longitudinal reinforcement No. 4 bars. Minimum segment length for this wall is 20 feet. Walls to be cast for 8" under the nearest flat plate. For Concrete Barrier Wall (Right-Thickening) LF.

QUANTITIES:
- Class III Concrete: 0.29 CF/LF
- Prestressing Steel: 0.85 LF/CT

SHOULD PROPOSE...
WITH PLAIN CONCRETE BARRIER WALL (SHOULDER)

WITH SHOULDER GUTTER AND GUARDRAIL

WITH GRASSED OR PAVED SHOULDERS AND GUARDRAIL

* Special provision for concrete walls or retaining walls shall be in accordance with the Structures Design Office Standard Drawings and the plans. Guardrail connections at approaches to barrier concrete barrier walls shall be by the standard offset block detailed on Sheet 44. Guardrail connections shall be secured directly to the barrier. Back-up plates, Index 400, Detail 2, required for both connections.

* Guardrail connections to concrete traffic railing or retaining walls shall be in accordance with the Structures Design Office Standard Drawings and the plans. Guardrail connections at approaches to barrier concrete barrier walls shall be by the standard offset block detailed on Sheet 44. Guardrail connections shall be secured directly to the barrier. Back-up plates, Index 400, Detail 2, required for both connections.

* To be deleted on retaining ends except for 2-lane 2-way facilities.

* To be deleted on retaining ends except for 2-lane 2-way facilities.
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

CONCRETE BARRIER WALL (RIGID) (CURB & GUTTER) • CURB AND GUTTER WITH UTILITY STRIP
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

Concrete Barrier Wall (Rigid) (Curb & Gutter) • Curb and Gutter Without Utility Strip
SIDEWALK DRAINAGE SLOT FOR BARRIER WALL (RIGID) (CURB & GUTTER)

NOTE:

- Transition Segments Shall Be Drained Into The End Of The Barrier Wall In The Following Manner:
  - Four 1 1/4" diameter holes 6" deep on 6" centers shall be drilled in the end of the barrier and No. 6 bars 30" long set in epoxy mortar. The ends of the dowels extending into the transition segment shall be wrapped with one layer of 0.15 mil butyl film with the ends cramped.
- When Construction Joints Are Utilized For Transition Segment Construction The Stem Shall Be Drained To The Footing In The Following Manner:
  - Five No. 6 bars 30" long shall be embedded 1" into the footing. The dowels shall be spaced 30" on centers with the first dowel located 6" from the barrier wall. Dowels may be placed within or adjacent to the keyway.
OPTION 1 ANNOTATIONS

1. Trapezoidal Tongue Option (T): (1-1/2" thick) Steel Bar 
2. Barrier unit without welded plates, with the length at the top less than 3" for more than 4' end or with or without Fences purchased prior to August 1, 1990, that are not currently to be deemed as acceptable after August 1, 1990.

TONGUE END

GROOVE END

STRAIGHT TONGUE AND GROOVE OPTION 2

ROUND BAR CONNECTOR

OPTION 3

WALL TIE AND ANCHORAGE REQUIREMENTS

OPTION 4

WIRE NOSE CONNECTOR

OPTIONAL ENDS TREATMENTS FOR WALL UNITS

NOTICE: OPTION 1 IS A PROPRIETARY DESIGN. ANY REPRODUCTION OR REPRODUCTION ON THE PROPRIETARY RIGHTS OF THE DESIGNER SHALL BE THE SOLE RESPONSIBILITY OF THE USER.

TRAPEZIoidal TONGUE AND GROOVE OPTION 1

END VIEW

SIDE VIEW

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SIDE VI
FENCING TERMINALS AT RURAL INTERCHANGES

6" Where Footing Pervious

Terminates Fence Where Wall Height
Approximately Equals Fence Height.

Note A - The indicated distance shall be sufficient to provide satisfactory sight distance for the traffic from the ramp.

Note B - The indicated distance shall be identical to the above noted dimension, if practicable.

FENCING TERMINALS AT URBAN INTERCHANGES

FENCE LOCATION

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION
ROAD DESIGN

FENCING TERMINALS AT RETAINING WALLS

Ground Line

Proposed Fence

Terminates Fence Where Wall Height

6" Where Footing Pervious

PLAN

Proposed Fence

ELEVATION

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION
ROAD DESIGN

FENCING TERMINALS AT URBAN INTERCHANGES

FENCE LOCATION

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION
ROAD DESIGN

FENCING TERMINALS AT RETAINING WALLS

Ground Line

Proposed Fence

Terminates Fence Where Wall Height

6" Where Footing Pervious

PLAN

Proposed Fence

ELEVATION

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION
ROAD DESIGN

FENCING TERMINALS AT URBAN INTERCHANGES

FENCE LOCATION

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION
ROAD DESIGN

FENCING TERMINALS AT RETAINING WALLS

Ground Line

Proposed Fence

Terminates Fence Where Wall Height

6" Where Footing Pervious

PLAN

Proposed Fence

ELEVATION
BRACE AND POST  BRACE TO BRACE ON LINE  BRACE TO BRACE AT CORNER  FASTENER FOR CONCRETE POST AND BRACES

FASTENER FOR TIMBER POST AND BRACE

CORNER POSTS  END AND PULL POSTS

Each horizontal wire to be wrapped around corner and end pull posts and tied to same wire, see General Notes 5 and 6. Timber post illustrated. These methods also apply to steel and concrete post illustrations.

SPICES

PRESTRESSED POST  PRESTRESSED BRACE

PRECAST POST  PRECAST BRACE

CONCRETE BASE FOR ANGULAR STEEL POST

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION

FENCE

TYPE A

FENCE TYPE A
GENERAL NOTES

5. Unless a specific material is called for in the plans the Contractor may select to use either a single type of metal coil or different coil materials from the coil material options listed above. Combination of coil materials are restricted as follows: (a) Any one coil material will be permitted between corner and/or end post assemblies, (b) only one coil post material will be permitted between corner and/or end post assemblies. (a) Pull post assemblies shall be selected to meet the requirements of either the coil post option or materials the corner and end post option shall be the same coil material within the same coil end type, and post assemblies.

6. Concrete for bases shall be Class 3 as specified in Section 545 of the Standard Specifications, except that the requirements contained in 545-2.1.3.4 and 545-2.1.3.5 shall not apply. Workmanship for Cove 1 concrete may be proportioned by volume and/or by weight.

7. Line posts are to be set in concrete as detailed above and as shown in the following:

(a) In accordance with special details or as otherwise specified in the contract plans and specifications.
(b) In accordance with ASTM C979, minimum strength 4,440 psi at 47 days and 4,900 psi at 14 days as specified by the Engineer.

8. It is noted that four, five, six, and eight coil stands to be set in a single coil stand. Given shall be set to a minimum depth of 6 ft. Fence posts up to 6 ft. in height, for each 14 ft. of fence length between the plates shall be set in accordance with the following:

(a) 1 ft. of fence shall be set for each 6 ft. plate length.
(b) A minimum distance of 6 ft. of fence shall be set in accordance with the following:

9. Line and assembly posts set in concrete shall be set at a depth 3 ft. of fence height greater than 6 ft.

10. Pull posts shall be used at breaks in vertical grades of 65° or more, or at approximately 30° convex except that this maximum may be reduced by the Engineer or convex where the degree of curvature is greater than 3°.

11. Corner posts are to be installed at all horizontal breaks in fence at 65° or more and as required at vertical breaks in 65° or more determined by the Engineer.

12. Generally, pickets and spindles are to be set for in loops, all posts shall be set in accordance with the members requirements detailed above as specified by the Engineer. Payment shall include the gates, single or double, all necessary hardware for installation and each applicance length and/or side posts of the opening. Gates shall be paid for under the contract unit price for Fence Gates. Type B, Each Pay Item No. 550-1-200.

**TABLE 2C UNLINED COATED FABRIC**

<table>
<thead>
<tr>
<th>Spec. Subsurface 96C-1 and ASHTO A660-85</th>
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</thead>
<tbody>
<tr>
<td>Type of Coating</td>
</tr>
<tr>
<td>-----------------</td>
</tr>
<tr>
<td>Uncoated</td>
</tr>
<tr>
<td>Aluminum Coating</td>
</tr>
<tr>
<td>Galvanized</td>
</tr>
<tr>
<td>Stainless Steel</td>
</tr>
</tbody>
</table>

**FENCE TYPE B**

<table>
<thead>
<tr>
<th>Material</th>
<th>Description</th>
<th>Type</th>
<th>Unit Price (Each)</th>
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<tbody>
<tr>
<td>Steel</td>
<td>Uncoated</td>
<td>Type A</td>
<td>$550-1-800</td>
</tr>
<tr>
<td>Steel</td>
<td>Aluminum Coated</td>
<td>Type B</td>
<td>$550-1-850</td>
</tr>
<tr>
<td>Steel</td>
<td>Galvanized</td>
<td>Type C</td>
<td>$550-1-900</td>
</tr>
<tr>
<td>Steel</td>
<td>Stainless Steel</td>
<td>Type D</td>
<td>$550-1-950</td>
</tr>
</tbody>
</table>
OPTIONAL "C" LINE POST FOR TYPE B FENCE

NOTES:
Attachments to be used only when called for in the plans.
Attachments to extend in direction of restraint. Unless otherwise called for in plans, direction of restraint will be as follows:

(a) Outside or in direction of roadway.
(b) Outside or in direction of railroad track.
(c) Inside or in direction of railroad track.

All guidance lines and hazardous facilities located within sight line right of way.

(d) Outside from railroad grade, outfills, retaining basins, ditches, borrow areas and other support facilities.
(e) Inside in aspection ways.

The cap rail shall be designed to provide a tight fit over the top of posts and to exclude moisture in posts with header sections.
Attachments to be paid for under the contract unit price for Fencing, Type B (with Barb Wire Attachment) LF, Pay Item No. 350-2-vb.

BARB WIRE ATTACHMENT

TOP VIEW
BASE PLATE IDENTICAL FOR UNI, PULL END AND CORNER POSTS AND SHALL BE CONSIDERED AN INTEGRAL PART OF THE RESPECTIVE HOISTS FOR BAGS OF PAINT.

FENCE MOUNTING ON CONCRETE ENDWALL AND RETAINING WALLS

STATE OF HAWAII DEPARTMENT OF TRANSPORTATION

FENCE

TYPE B

OPTIMAL H-BEAM LINE
POST FOR TYPE B FENCE

<table>
<thead>
<tr>
<th>Width</th>
<th>Depth</th>
<th>Thickness</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 1/4&quot;</td>
<td>1 1/2&quot;</td>
<td>1/8&quot;</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Property</th>
<th>Material</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wire Fence</td>
<td>Steel</td>
</tr>
</tbody>
</table>

FENCE POSITION AT LOCATIONS WITHOUT FRONTAGE ROADS

(REFER TO DETAIL PLANS FOR FENCE POSITION AT LOCATIONS WITH FRONTAGE ROADS)
CONCRETE BARRIER WALL MOUNT

STEEL POST MOUNT

MOUNTING BRACKET

GUARDRAIL WOOD POST MOUNT

GLARE SCREEN SPICE

PLAN

TOP VIEW

SECTION DETAIL

CENTER POST

SUPPORT POST AND LOCK BAR

CHAIN END ANCHORAGE

GENERAL NOTES

1. Cost of fabrication of screen support posts, finish turnbuckles, and anchorage and all accessories shall be included in the contract unit price for Glare Screen Knitted Polyester 1:1.

2. All dimensions shown are center to center unless otherwise noted. All tolerances for glazing, conditioning and cleaning are as follows:

- 0.50" tolerance for glazing, conditioning and cleaning.
- 0.10" tolerance for glazing, conditioning and cleaning.
- 0.05" tolerance for glazing, conditioning and cleaning.

3. All materials and labor shall be in accordance with the project specifications.

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION

GLARE SCREEN KNITTED POLYESTER

CO. # 460
GENERAL NOTES

1. The opaque visual barrier is intended to function as a visual screen, and is not intended to resist vehicle impact load or to resist, control or redirect vehicles or cargo. The barrier is designed to withstand those wind loading and strikes by light debris and, designed to resist exceptional strikes by vehicles or cargo, and to contain any ruptured segments of the screen when subjected to such strikes.

2. When the opaque visual barrier is constructed on an existing barrier, down shall be 5'-0" in length, extended 6" into the barrier wall and set with an approved concrete grade, and concrete grade slab shall be 6" in diameter, drilled to a depth 0.5" below the top of the down unless greater depth is required to resist manufactured gray supports.

3. The opaque visual barrier shall be constructed in conjunction with any proposed concrete barrier walls, doors as may be as described above, in either the drilled or reinforced plates, or plates when the barrier wall is cast. For doors that are installed when the wall is cast, the door shall be 2'-0" in length and extended to a depth of 0'-6".

ESTIMATED QUANTITIES, LF
Concrete 0.042 Yd
Reinforcing Steel 0.087 Lb
4.18 Lb With 2'-0" Dowels

PICTORIAL

ELEVATION OF REINFORCEMENT AND Doweling

O PAQUE VISUAL BARRIER

END VIEW

ROADWAY SURFACE

Opague Visual Barrier

Type 1 Safety Shape
Barrier Wall (Geometric Or Alignment)
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 RT.

SECTION E - E
SUPERELEVATION TRANSITION LT. FULL SUPERELEVATION RT.

SECTION F - F
FULL SUPERELEVATION LT. & RT.

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

1. Maximum rate of superelevation (\(20 \text{ M.P.H. of Municipal Construction}\)) shall be 0.05.

2. Super-elevation shall be obtained by rotating the plane successively about the short axis of the section until the plane has attained a slope equal to that required by the chart. Should the rotation traverse the entire section and further super-elevation be required, the remaining rotation of the plane shall be about the low edge of the inside travel lane.

Crown is to be removed in the auxiliary lane to the outside of the plane only when the adjoining travel lanes require positive super-elevation.

3. When positive super-elevation is required, the slope of the gutter on the high side shall be a continuation of the slope of the super-elevated pavement.

4. In construction, short vertical curves shall be placed of at regular profile breaks within the limits of the super-elevation transition.

5. Minimum gutter grades within the limits of the super-elevation transition shall be 0.15.

6. The variable super-elevation transition length \(L\) shall have a minimum value of 50 feet for design speeds under 40, 65 feet for design speeds of 40 to 60, 85 feet for design speeds of 60 to 75, and 100 feet for design speeds of 75 feet or greater.

7. Municipal sections having lane arrangements different from those shown, but composed of a series of planes, shall be super-elevated in a similar manner.

8. For curves in rural areas, see Index No. 560.

REMOVAL OF CROWN AND/OR SUPERELEVATION FOR CURVE AT VARIOUS DESIGN SPEEDS

PARABOLIC SECTION

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION
HIGHWAY DESIGN

SUPERELEVATION
MUNICIPAL CONSTRUCTION
LINE | DESCRIPTION
---|---
A | Inside Travel Lane
B | Inside Lane Line
C | Inside Median Edge Pavement
D | E Construction
E | Outside Median Edge Pavement
F | Outside Lane Line
G | Outside Travel Lane
H | Inside And Outside Are Negative To Curve Center

**Profile Grade Refers To This Point**

**SECTION 0-A to O-E**

**TWO LANES EACH DIRECTION**

**PROFILE**

**SPECIAL APPLICATION SUPERELEVATION RATES**

The superelevation rates shown above are to be used for urban routes & gunnels wherein in turnover areas where development is such that uniform application of superelevation is not feasible, a transition should be provided where sufficiency at all times is expected to make gradual connections.

**EXAMPLE SUPERELEVATION SECTIONS AND PROFILES**

**STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION**

**MUNICIPAL CONSTRUCTION**
### Layer Thickness for Asphaltic Concrete Structural Courses

Layers are listed in sequence of construction.

<table>
<thead>
<tr>
<th>COURSE THICKNESS (Inches)</th>
<th>LAYER THICKNESS (Inches)</th>
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<tr>
<td></td>
<td>Type S-1 With Type S-2 Top Layer</td>
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<td></td>
<td>1st</td>
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<tr>
<td>1</td>
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<td>6</td>
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### General Notes

1. If combinations other than those shown in the table are used, the thickness must be consistent with the following thickness ranges.

2. In addition to the Min. Max. Thickness requirements, the following restrictions are placed on the respective material when used as a structural course:
   - S-1 may not be used in the first layer of asphalt over 45 lbs.
   - S-2 may not be used in the first top structural layer.
   - S-3 may be used in the first top structural layer, but limited to the lower than the 2nd or 3rd structural layer, one layer only.

3. When quantities are bid as tonnage items, equivalent tonnage layer thickness will be constructed (i.e., 1000=one square yard thick).

4. The designer should consider stage construction for course thickness greater than 45 lbs.

5. When construction includes the paving of additional 4-wide shoulders, the layer thickness for the upper pavement layer and shoulder shall be the same and placed in a single pass. See Design Notes for 15 and 20" overloads.

### Design Notes

1. When design calculations indicate a 15" structural course is required on the traveled way and a four-foot shoulder is to be constructed, the following data will be shown on the typical section by either an appropriate note or label:
   - Top layer: Type S-10 15" or 400 lbs./surf
   - All layers: Type S-2 14" or 200 lbs./surf

   The top layer will be shown as a structural layer for both the traveled way and shoulder.

2. When design calculations indicate a 15" structural course is required on the traveled way and a four-foot shoulder is to be constructed, the designer will determine whether the 15" structural course will be placed on the shoulder in lieu of the standard 15" or, the thickness increased and two layers constructed as described above.

---

**FLEXIBLE PAVEMENT**

**LAYER THICKNESS FOR STRUCTURAL COURSES**

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION

[Diagram of FLEXIBLE PAVEMENT]

Signatures and seals:
- [Signature]
- [Signature]
- [Signature]

Page: 513 of 514
GENERAL NOTES

4. For turnout classifications see the manual entitled "Policy And Guidelines For Vehicular Connections To Roads On The State Highway System" dated February 1985 and effective August 9, 1985. Information on this index in sections with the manual supersedes the information in the manual. This manual should be referred to for special applications and, for exceptions due to extreme conditions.

5. No driveways, turnouts or side driveways are to be constructed without compensation for materials from the owner except for replacement of approved driveways, turnouts and/or side driveways existing at the time of beginning of roadway construction and if utilized by the owner. All new or reconstructed driveways, turnouts, and side driveways must conform to the same specifications indicated above.

In rural areas where the developing property owner desires installation of turnouts and provided there is adequate frontage for proper driveway separation, the Department will construct or will allow the construction of at least one of two directions. Two directions are shown along the same frontage line with a minimum of 50 feet of space between them. For more desirable width and spacing, filing conditions and for exceptions see the manual.

4. In urban areas, at the request of the developing property owner or after adequate planning, and provided there is adequate frontage for proper driveway separation, the Department will construct or allow the construction of at least one of two directions. Two directions are shown along the same frontage line with a minimum of 50 feet of space between them. For more desirable width and spacing, filing conditions and for exceptions see the manual.

5. Class III turnouts in urban areas are to be constructed as intersecting streets with curb and gutter.

6. In both urban and rural areas, where dual driveways are allowed, that portion of the right-of-way between the driveways and outside the pavement limits of the highway should be maintained as a "No-Parking" area.

7. Stabilized subgrade not required for paved turnouts to private property.

8. For detail of drop curb see index No. 330.

RURAL TURNOUT CONSTRUCTION
STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION

TURNOUT

SECTION AA
WHEN DISTANCE BETWEEN CURB & SIDEWALK IS GREATER THAN 5'

CLASS I AND CLASS II URBAN TURNOUT CONSTRUCTION
### GENERAL NOTES

1. Turnouts are to be constructed or resurfaced for Class I connections as directed by the Engineer.
2. Turnout construction not required with paved shoulders for Class II connections.
3. Connections outside the 5' limit are to be constructed as directed by the Engineer.
4. Contract unit prices, 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 asphaltic concrete friction course placed on the roadway. Feathered areas will not be included in measured quantities. Feathering not required for FC-2 friction course.
7. For low volume two-lane facilities without a friction course the structural course is replaced by a surfacing course.

### TURNOUTS

#### RESURFACING PROJECTS

<table>
<thead>
<tr>
<th>Turnout Description</th>
<th>Unit Price</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>Turnout Construction</td>
<td>$X/ft</td>
<td>Include excavation and base.</td>
</tr>
<tr>
<td>Feathering Friction Course</td>
<td>$Y/ft</td>
<td>Included in asphaltic concrete friction course.</td>
</tr>
</tbody>
</table>

### TURNOUT PAVEMENT STRUCTURE MINIMUM REQUIREMENTS

#### COURSE | MATERIAL | MINIMUM THICKNESS
--- | --- | ---
Base | Aggregate Course | 6" |
Structural | Cemented Course | 6" |
Structural | Asphalt Course (1) | 6" |
Structural | Asphalt Course (2) | 6" |
Structural | Asphalt Course (3) | 6" |
Structural | Asphalt Course (4) | 6" |
Structural | Asphalt Course (5) | 6" |
Structural | Centerline Base | 6" |
Structural | Shoulder Base | 6" |
Structural | Surfaced Shoulder | 6" |

### QUANTITIES FOR ONE TURNOUT (1ST)

<table>
<thead>
<tr>
<th>Drive Width (ft.)</th>
<th>Normal</th>
<th>Intersection</th>
</tr>
</thead>
<tbody>
<tr>
<td>12</td>
<td>10</td>
<td>10</td>
</tr>
<tr>
<td>18</td>
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<td>60</td>
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<td>50</td>
</tr>
</tbody>
</table>

Notes:
1. Turnout structural course to be the same material as roadway paving or structural course. Structural course not required if asphalt base course is used.
2. Any approved approved pavement structure thickness may be used at the discretion of the Engineer.
3. Additional structural strength may be required if high traffic loads are anticipated.
GENERAL NOTES

1. Rumble strips shall be constructed at all structures with less than full-width shoulders. Rumble strips at intersections shall be constructed only when specified in the plans.

2. Rumble strips are to be constructed in accordance with Section 546 of the Specifications.

3. When any portion of a curve falls within the limit of pavement strips shown in these plans, additional rumble strip sets equal to 200' centers shall be constructed parallel to these curves, throughout the approaching curve.

4. Rumble strips shall be paid for under the contract unit price for Rumble Strips, Part 6. Such price and payment shall be full compensation for all work and materials required. Rumble strips shall be paid for per set without any adjustment due to length of pavement receiving the strip or length of strip.

INSET

- For Unpaved Access Highways, Including Roads
  - 45° For Paved Access Highways With Shoulder
  - 60° For All Other Highways With Shoulder

- For All-Gravel Intersections

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION
ROAD DESIGN

RUMBLE STRIPS

- Designed by
- Prepared by
- Checked by

518
THREE THRU LANES - APPROACH AUXILIARY LANE

EXIT TERMINALS

TWO-LANE RAMPS
ACCELERATION LANE WITH SHOULDER GUTTER

DECELERATION LANE WITH SHOULDER GUTTER

ACCELERATION LANE WITHOUT SHOULDER GUTTER

DECELERATION LANE WITHOUT SHOULDER GUTTER

SHOULDER TREATMENT
AT SPEED CHANGE LANES AT EXPRESSWAY RAMP TERMINALS

EXPRESSWAY RAMP TERMINALS
CROSSROAD TERMINALS

ENTRANCES AND EXITS ON CURVES

LEFT TURN CONTROL

UNSYGNALIZED ENTRANCES

UNSYGNALIZED EXITS

RAMP TERMINAL

RAMP TERMINALS
4-LANE UNDIVIDED WITH OPTIONAL LANE

4-LANE UNDIVIDED FLARED - SYMMETRICAL

INTERSECTION TURNS AND STORAGE
FLARED & PAINTED LEFTTurns FOR 2-LANE 2-WAY ROADWAYS
LANE DIVERGENCE AND CONVERGENCE FOR CENTERED ROADWAYS
CONNECTING DIFFERENT WIDTH PAVEMENTS

FLARED - PAVED SHOULDERS

FLARED - UNPAVED SHOULDERS

SHOULDER AND PAVEMENT EDGE TREATMENT AT TRANSITIONS AND CONNECTIONS
GENERAL NOTES FOR SHEETS 5 THRU 8

1. The transition details as represented on these sheets are intended as guidelines only. The transition lengths, curve data, road width, and offsets are valid only for tangent alignment and the median widths shown.

2. Approach lane departures (W+5') are suitable for design speeds up to 60 mph. Interior curves (D+3') are suitable for normal crown for design speeds up to 50 mph. Wearing curves (D+5') will require super-elevation.

3. The geometrics of these schemes are associated with the standard sub-sections for the side-by-side, or in any case with enough shoulder to accommodate side-by-side location, bi-lane and/or divided side roads, oblique side roads, crossover widths, storage and speed change lane requirements, and other related features.

LEFT ROADWAY CENTERED ON APPROACH ROADWAY
TWO LANE TO FOUR LANE TRANSITION
RIGHT ROADWAY CENTERED ON APPROACH ROADWAY
TWO LANE TO FOUR LANE TRANSITION
GENERAL NOTES

1. The location and construction of mailboxes shall conform to the rules and regulations of the United States Postal Service as modified by this design standard.

2. Mailboxes will not be permitted on interstate highways, freeways, or other highways where prohibited by law or regulation.

3. The contractor shall give the Postmaster of the delivery route(s) written notice of project construction 7 days prior to the beginning of work, with Saturdays, Sundays, and Holidays excluded.

4. The contractor shall furnish and install one mailbox in accordance with this design standard at each mail unit delivery location and maintain the box throughout the contract period. The contractor shall apply 2 boxes numbers to each patron box in accordance with identification specifications of the Domestic Mail Manual of the U.S. Postal Service. Where local street names and house numbers are authorized by the Postmaster as a postal address, the contractor shall inscribe the house number on the box. If the box is located on a different street from the patrons residence, the contractor shall inscribe the street name and house number on the box.

5. The contractor shall coordinate removal of the patrons existing mailboxes, immediately after installing the new mailboxes. The contractor shall notify each “Mail Delivery Patron” by certified mail that removal of the existing mailboxes must be accomplished in 20 days after receipt of notice. Patrons shall have the option of removing their existing mailboxes or leaving the mailboxes in place for removal by the contractor. Removal by the contractor shall be included in the contract unit price for Mailbox, Each. The contractor shall dispose of mailboxes and supports in areas provided by law.

6. Mailboxes shall be metal construction only. In traditional style only, and only in sizes as prescribed by the Domestic Mail Manual of the U.S. Postal Service (DMM). Mailbox production standards, lists of approved manufacturers and suppliers of mailboxes, design approval and guidance may be obtained by writing to the Rural Delivery Division, Delivery Service Department, Operations Group, USPS Headquarters, Washington, DC 20260.

7. No more than two mailboxes may be mounted on a support structureunless the support structure and mailbox arrangements have been shown to be safe by crash testing and approved by the State Design Engineer, Roadways.

8. Neighborhood Delivery and Collection Box Units (NODBU) are a specialized multiple mailbox installation that must be located outside the highway and street clear zones. The location of NODBUs is the sole responsibility of the Postmaster for the delivery route under consideration.

9. Wood and steel support posts for both single and double mailbox mountings shall be embedded no more than 24" into the ground.

10. At driveways entrances mailboxes shall be placed on the far side of the driveway In the direction of the delivery routes.

11. All support posts shall be in conformance with the material and dimensional requirements of Section 952 and the treatment requirements of Section 955 of the Standard Specifications.

12. Steel support posts shall have an external finish equal to or better than two coats of weather resistant, oil or alkyd, paint or enamel. Surfaces shall be cleaned of all loose scale prior to finishing. The Postal Service prefers that posts be painted white, but other colors may be used when approved by the Engineer. When galvanized posts are used painting is not required.

13. Mounting brackets, plates, platforms, shields and accessory hardware surface finishes are to be suitable to support post finish.

14. Mailboxes shall be paid for under the contract unit price for Mailboxes, Each. Payment shall be full compensation for boxes, posts and necessary items essential for installation in accordance with this standards, erection, and unit construction needs, cost, and for identification lettering and numbers.

15. Payment shall be limited to one mailbox per patron address whether the mailbox is new, reused, salvaged, reset or relocated. Payment shall be per mailbox regardless of the number of mailboxes per support or grouping arrangement.

16. The above compensation shall include any work and cost incurred by the contractor for removal and disposal of existing mailboxes.

There shall be no payment participation for NODBU furnishing, assembly, installation, resetting or relocation.
STEEL FLANGED CHANNEL SUPPORT POSTS

FLANGED CHANNEL

FRONT VIEW
SIDE VIEW

ELEVATION
SINGLE OR COMBINED WOOD, FLANGED CHANNEL OR PIPE POST TYPES SHOWN ON THIS SHEET
POST SPACING

TOP VIEW
BOTTOM VIEW
END VIEW
SIDE VIEW
STEEL PLATFORM

STEEL BRACKET
STEEL SPACER

Note: See General Notes for finish requirements.

State of Florida Department of Transportation
Reno Design

MAILBOXES

Designed By
Approved By

Mailbox No.

2 of 3
TYPE A
REINFORCED CONCRETE
INSTALLATION

NOTES

1. Direction of the top of each length of timber plate shall be determined as soon as it is installed and must immediately before the next length of timber plate is installed.

2. Settlement plate locations shall be tied off and protected from construction vehicles and equipment. If settlement plates are disturbed, they shall be replaced in kind.

3. Option used to construct plate should not have a mesh covering (plastic or other synthetic material).
GENERAL NOTES

1. The purpose of shrubs in areas back of guardrail is to eliminate head maintenance in those areas.
2. Shrubs are to be planted approximately 5' back from guardrail posts and hazard areas. Narrow plant areas are to have at least one row of shrubs, as directed by the Engineer.
3. Shrubs are to be planted approximately 5' on centers in rows with 10' spacings.
4. Shrubs are to be set in successive rows to create a zig-zag pattern between any two rows.
5. Shrubs shall be specified in the plans by landscape materials master plan from Unit 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. When guardrail painting is constructed in conjunction with shrub planting, soil sterilization shall be in accordance with Section 339 of the Standard Specifications.
8. For line of sight limits see index 536.
GENERAL NOTES

1. The reinforced concrete slabs are manufactured in 8'-0" sections, 3'-0" in depth to fit all rail sections.

2. Center slabs are one-piece construction allowing for 2'-0" flange opening. 80 lb. rail is used to ensure proper and reinforcement slabs and is held to gauge with 3 tie rods per slab.

3. Slabs are installed by a "floating" process, supported on non-shrinkable, non-metallic grout positioned on the slab. 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 with "running rails" with specially designed hardware. Insulation is to be provided for crossing in adjacent territory.

5. Curved slabs are fabricated to fit curved track to 22 degrees (360.24' 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.
SECTION AA
STANDARD SLABS (PRECAST CONCRETE)

SECTION BB
RAMP SLABS (PRECAST CONCRETE)

SECTION CC
SECTION DD
STANDARD AND RAMP SLAB SECTIONS
GENERAL NOTES

1. Slab frames are sized 90 lb. rails.
2. Slab reinforcement on No. 4 bars.
PREFACE

All projects and works on highways, roads and streets shall have a traffic control plan. All work shall be executed under the established plan and Department approved procedures. This index contains information specific to the Federal and State guidelines for the preparation of traffic control plans and for the execution of traffic control in work zones, for construction and maintenance operations and utility work on highways, roads and streets.

MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES

The Florida Department of Transportation has adopted the "Manual on Uniform Traffic Control Devices for Streets and Highways" (MUTCD) and subsequent revisions and addenda, as published by the U.S. Department of Transportation, Federal Highway Administration, for mandatory use on the State Maintained Highway System whenever there exists the need for construction, maintenance operations or utility work.

ABBREVIATIONS

Abbreviations assigned to the 600 series Roadway Design Standards and applicable to traffic control plans, unless otherwise identified in the plans, are as follows:

TCP Traffic control plan(s)
MUTCD 'Manual on Uniform Traffic Control Devices for Streets and Highways'
TCZ Traffic control through work zones
L Taper length, buffer length or taper length plus buffer space
W Width of taper transition in feet, i.e., lateral offset
S Posted speed or off-peak 95 percentile speed
RPM Raised reflectorized pavement marker
TMA Truck mounted attenuator
TCW Traffic Control Standards Committee

SYMBOLS

The symbols shown are found in the Traffic Control Zone Cell Library (TCZ Cell) on the CAD system.

Symbols assigned to the 600 series Roadway Design Standards and applicable to traffic control plans, unless otherwise identified in the plans, are as follows:

- Work Area, Hazard Or Work Phase (Any pattern within a boundary)
- Sign With 8" x 8" (Min.) Orange Flag And Type B Light
- Drum
- Type I Or Type II Barricade Or Drum
- Type I Or Type II Barricade Or Drum (With Flashing Light At Night Only)
- Type I Or Type II Barricade Or Drum (With Steady Burning Light At Night Only), Cones May Be Used During Daylight Only
- Type I Or Type II Barricade, Cone Or Drum
- Cone Or Tubular Delineator
- Type I, Type II Or Type III Barricade Or Drum
- Type I, Type II Or Type III Barricade Or Drum (With Flashing Light)
- Type I, Type II Or Type III Barricade Or Drum (With Steady Burning Light)
- Type I Barricade
- Type III Barricade (With Flashing Light)
- Type III Barricade (With Steady Burning Light)
- Work Zone Sign
- Flagger
- Traffic Signal
- Advance Warning Arrow Panel
- Portable Signal
- Crash Cushion
- Stop Bar
- Work Vehicle With Flashing Beacon
- Shadow (S) Or Advance Warning (AW) Vehicle With Advance Warning Arrow Panel And Warning Sign.
- Truck Mounted Attenuator (TMA)
- Orange Flag For TCZ Signs
- Type B Light For TCZ Signs
DEFINITIONS

Regulatory Speed (in Work Zones)

The maximum permitted travel speed posted for the work zone as indicated by the regulatory speed limit signs. The work zone speed must be shown or noted in the plans. This speed should be used as a design speed to determine runout lengths, deceleration rates, flare rates, lengths of need, clear widths, taper lengths, crash cushion requirements, marker spacing, superelevation and other similar features.

Advisory Speed

The maximum recommended travel speed through a curve or a hazardous area.

Travel Way

The intended path for vehicular traffic through or around obstructions in construction, maintenance, utility and other work zones on highways, roads and streets. For traffic control through work zones, travel way includes auxiliary lanes, shoulders and any other permanent or temporary surface intended for the path of vehicular traffic.

Detour

A temporary travel way that branches from the direct or regular route of travel, to bypass a section of the route which is closed or blocked by construction, major maintenance, roadway damage or a traffic emergency and that rejoins the direct or regular route beyond that section.

Above-Ground Hazard

An above ground hazard is any object, material or equipment other than traffic control devices that encroaches upon the roadway or that is located within the clear zone which does not meet the Department’s safety criteria, i.e., anything that is greater than 4' in height and is firm and unyielding or doesn’t meet breakaway requirements.

REGULATORY SPEEDS IN WORK ZONES

Traffic Control Plans (TCP) for all projects must include specific regulatory speeds for each phase of work. This can either be the posted speed or a reduced speed. The speed shall be noted in the TCP. This includes indicating the existing speed if no reduction is to be made. Regulatory speeds are to be uniformly established through each phase.

In general, the regulatory speed should be established to route vehicles safely through the work zone as close to normal conditions as possible. The regulatory speed should not be reduced more than 20 MPH below the posted speed and never below the minimum statutory speed for the class of facility. This reduction is to be done in 10 MPH per 5000 increments.

Temporary regulatory speed signs shall be removed as soon as the conditions requiring the reduced speed no longer exist. Once the work zone requirements are removed, the regulatory speed existing prior to construction will automatically go back into effect unless new speed limit signing is provided for in the plans.

On projects with intersected work activities speed reductions should be located to prioritize those activities which will result in a reduced speed, and not "blanketed" for the entire project. At the departure of such activities, the normal highway speed should be posted to give the motorist notice that normal speed can be resumed. If the existing regulatory speed is to be used, consideration should be given to supplementing the existing signs when the construction work zone is between existing regulatory speed signs. For projects where the reduced conditions exist for greater than one mile in rural areas non-interstate, additional regulatory speed signs are to be placed at no more than one mile intervals. Engineering judgment should be used in placement of the additional signs. Locating these signs beyond ramp entrances and beyond major intersections are examples of proper placement. For urban situations (non-interstate), additional speed signs are to be placed at a maximum of 1000 feet apart.

When field conditions warrant speed reductions greater than those shown in the TCP the contractor may submit to the project engineer for approval by the Department, a signed and sealed study to justify the need for further reducing the posted speed, or the engineer may request the District Traffic Operations Engineer (DTOE) to investigate the need, it will not be necessary for the DTOE to issue regulations for regulatory speed changes until it has been determined that the TCP is necessary. When processing a request to change the regulatory speed specified in the plans when deemed necessary, Advisory speed plates cannot be used alone but must be placed below the construction warning sign for which the advisory speed is required.

"Regulatory Speed" and "Reduce Speed Ahead" signs are to be paid for under the contract unit price for Temporary Regulatory Signs (Post Mounted) 1, ED, Pay Item No. 102-96.

For additional information refer to the FDOT Roadway Plans Preparation Manual, Volume 1, Chapter 10.

ADJOINING AND/OR OVERLAPPING WORK ZONE SIGNING

Adjoining work zones may not have sufficient spacing for standard placement of signs and other traffic control devices in their advance warning areas or in some cases other areas within their control zones. Where such constraints or conflicts occur or are likely to occur, one of the following methods will be employed to avoid conflicts and prevent conditions that could lead to misunderstandings on the part of the traveling public as to the intended travel way by the traffic control procedure described:

(a) For scheduled projects, the engineer in responsible charge of project design will receive a request that work zone conflicts be discussed early during the development of the project traffic control plan. This may entail revision of plans on preceding projects and coordination of plans on concurrent projects.

(b) Unanticipated conflicts arising between adjoining in progress highway construction projects can be resolved by the Resident Engineer for projects under his responsibility, and by the District Construction Engineer for in progress projects under adjoining jurisdictions.

(c) The District Maintenance Engineer will resolve anticipated and occurring conflicts under the following work zone conditions.

1. Within scheduled maintenance operations.
2. Between scheduled maintenance operations, maintenance construction, permitted works and/or in progress highway construction projects.

(d) The Unit Maintenance Engineer will resolve conflicts that occur within routine maintenance work, unscheduled work and/or permitted work, and between unit controlled maintenance works and highway construction projects.

INTERSECTING ROAD SIGNING AND SIGNALS

Signage for the control of traffic entering and leaving work zones by way of intersecting highways, roads and streets shall be adequately to make drivers aware of work zone conditions. Under no condition will Intersecting Way Sign be less than a ROAD CONSTRUCTION AHEAD sign, including light and flag, for approaching vehicles and a END CONSTRUCTION sign for departure vehicles.

Existing traffic signal operations that require modification in order to carry out work zone traffic control shall be included in the TCP and be approved by the District Traffic Operations Engineer. The need for temporary signal loops or other methods of operation shall be determined by the District Traffic Operations Engineer and the designer and included in the TCP.
CHANNELIZING AND LIGHTING DEVICES

Channelizing and lighting devices for work zone traffic control shall be as prescribed in Part II of the MUTCD, subject to supplemental revision and certification by the office of the State Traffic Engineer. Primary work zone traffic control devices are shown on Sheet 5 of B for the purpose of ready identification. Specifications for the devices are under the authority of the State Traffic Engineer.

DROPOFFS IN WORK ZONES

Acceptable warning and barrier devices for traffic control at dropoffs in work areas are detailed on Sheet 5 of B.

WARNING LIGHTS

Warning lights shall be in accordance with Section 6E-5 of the MUTCD except for the application limitations and methods of payment stipulated below.

Flashing
Type A Low Intensity Flashing Warning Lights are to be mounted on barricades, drums, vertical panels, or advance warning signs to the left of the traveled lane to which they are approaching or proceeding in a hazardous area. Flashing lights shall not be used to delineate the intended path of travel, and not placed with spacing that will form a continuous line to the drivers eye. The Type A light will be used to mark obstructions that are located adjacent to or in the intended travel way. Type A lights shall not be used in a trafficway that requires a first advance warning sign or the second such sign when used.

Type B High Intensity Flashing Warning Lights shall be mounted on the first advanced warning sign and on the first and second advanced warning sign where two or more signs are used, this applies to all approaches to any work zone.

Steady-Burn
Type C Steady-Burn Lights are to be mounted on barricades, drums, concrete barrier walls, or vertical panels and used in combination with those devices to delineate the travel way, lane closures, lane changes, & other similar conditions. Steady-burn lights are intended to be placed in a line to delineate the traveled way through and around obstructions in the transition, work, and stoppage areas of the traffic control zone. Their intended purpose is for warning drivers that they are approaching or proceeding through a hazardous area.

Payment
The cost for Type A Low Intensity Flashing Warning Lights and Type C Steady-Burn Lights shall not be paid for separately but shall be included in the cost for the traffic control device on which they are mounted.

Type B High Intensity Flashing Warning Lights shall be paid for under the contract unit price for High Intensity Flashing Lights (Temporary).

SIGHT DISTANCE TO DELINEATION DEVICES

Transitionappers should be obvious to drivers, if restricted sight distance is a problem e.g., a sharp vertical or horizontal curve, the taper should begin well in advance of the view obstruction. The beginning of tapers should not be hidden behind curves.

PEDESTRIANS AND BICYCLISTS

When an existing pedestrian way or bicycle lane is located within a traffic control work zone, accommodation must be maintained.

IGHTIME FLAGGING

Nighttime flagging will require proper illumination of the flagger. A well lighted flagging station and/or a reflectorized pad or reflectorized flag, plus a flashlight, lantern or other lighted signal that will display a red warning light shall be used.

Lights, reflectorized paddles, reflectorized flags and reflectorized vests, shirts or jackets approved by the Department must be used to flag traffic at night. The STOP face of paddles shall be reflectorized red with white reflectorized letters and border, and the SLOW face shall be reflectorized orange with black letters and border. Flagger vests, shirts or jackets shall be reflectorized orange.

The flagger must be clearly visible to approaching traffic for a distance sufficient to permit proper response by the motorist to the flagging instructions, and to permit traffic to reduce speed or to stop as required before entering the work site. Flaggers shall be positioned to maintain maximum color contrast between the flagger's reflective garments and equipment and the work area background.

REJECTORIZED RAISED PAVEMENT MARKERS

Temporary RPM's shall be installed on the centerlines of all transitions, crossovers and deadlocks and on the edges of gore areas within the work zone. The spacing shall be 40 feet on tangent sections and 20 feet on transitions, curves and deadlocks or missing RPM's on a daily basis. This cost shall be included in the cost of the temporary RPM's.

SIGN COVERING AND INTERMITTENT WORK STOPPAGE SIGNING

Traffic control signs that require covers when no work is being performed in a work area shall be fully covered with a durable opaque sheet material. Plastic film and woven fabrics including burlap will not be permitted. Covers designed to cover when folded and sign blanks will be permitted.

Covers, blankets, hinged panels and intermittent work stoppage shields and plaques are incidental to work operation signs and are not to be paid for separately.

REMOVING PAVEMENT MARKINGS

Existing pavement markings that conflict with temporary work zone delineation shall be removed by any method approved by the Engineer, where operations exceed one daylight period, however, painting over existing pavement markings will not be permitted. Full pavement width overlays of either asphalt concrete Type III, FC-1 for FC-4 is a positive means to achieve obliteration.

SUPERELEVATION

Horizontal curves constructed in conjunction with work zone traffic control should have the required super elevation applied to the design radius. Under conditions where normal crown slope controls curvature, the minimum radius that can be applied are listed in the table below.

<table>
<thead>
<tr>
<th>MINIMUM RADIUS</th>
<th></th>
<th>MINIMUM VELOCITY</th>
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<tbody>
<tr>
<td>HEAD INFECTION</td>
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SUPERELEVATION when Smaller Radius Used

LANE WIDTHS

Lane widths of through roadways should be maintained through work zone travel ways wherever practical. The minimum widths for work zone travel lanes shall be as follows: If for Interstate and other truck network highways, with at least one 12' lane provided each direction, unless formally excepted by the Federal Highway Administration, for other freeways and, for all other facilities.

LENGTH OF CONSTRUCTION SIGN

The length of construction sign 1020-1 bearing the legend ROAD CONSTRUCTION NEXT MILES. 15 required for all projects of more than 2 miles in length. The sign shall be located at beginning construction point.

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION
TRAFFIC CONTROL THROUGH WORK ZONES
GENERAL INFORMATION FOR TRAFFIC CONTROL THROUGH WORK ZONES

DEPARTMENT OF HIGHWAY SAFETY AND REGULATION

3/4/0
END CONSTRUCTION SIGNS

The END CONSTRUCTION sign (G3-2) should be erected approximately 500 feet beyond the end of a construction or maintenance project, unless other distance called for in the plans. Where other Construction or Maintenance Operations occur within one (1) mile, this sign should be omitted and signing coordinated in accordance with Index 600, DESIGNING AND/OR OVERLAPPING WORK ZONE SIGNING.

DETOURS

Detours can be located either within the direct or regular route boundary or over highways, roads or streets outside the direct or regular route boundary. Engineering judgement should be used to determine when detour signing is required for minor shift to the direct or regular route.

VARIABLE MESSAGE SIGNS (VMS)

The VMS can be used to:
1. Supplement standard signing in construction/maintenance work zones.
2. Reinforce static advance warning messages.
3. Provide motorists with updated guidance information.

The message should be visible and legible at a minimum distance of 900 feet. All messages should be cycled so that two message cycles are displayed to a driver while approaching the sign from 900 feet at 55 mph.

VMS should be placed approximately 500 to 800 ft. in advance of the work zone conflicts or 1/2 to 2 miles in advance of complex traffic control schemes which require new and/or unusual traffic maneuvers.

For additional information refer to the FDOT roadway Plans Preparation Manual, Volume I, Chapter 10.

ROADSIDE BARRIERS

When connecting temporary concrete barrier wall to guardrail the connection shall be made in accordance with Index No. 45.

ABOVE GROUND HAZARD

Above ground hazards (see definitions) are to be considered work areas during working hours and treated with appropriate work zone traffic control procedures. During non-working hours, all objects, materials and equipment that constitute an above ground hazard must be stored/placed outside the travelway and clear zone or be shielded by a barrier or crash cushion.

For above ground hazards within a work zone the clear zone required should be based on the regulatory speed posted during construction. The minimum clear zone widths shown on Index No. 700 are acceptable for work zones.
CHANNELIZING AND LIGHTING DEVICE NOTES

1. Only approved traffic control devices may be used on public highways, roads, and streets.

2. The FDOT approval number shall be engraved on the device at a convenient and readily visible location. Where engraving is not practical, a water-resistant type label may be used.

3. The details shown on this sheet are for the following purposes: a) For ease of identification and b) To provide information that supplements or supersedes that provided by certification and the MUTCD.

4. The Type III Barricade shall have a unit length of 6 feet only. When barricades of greater lengths are required, those lengths shall be in multiples of the 6' unit. Payment shall be based on the number of 6' units in use per day, and paid for under the contract unit price for barricade (Temporary I Type III) 6', ED. Pay Item No. K02-74-2.

5. During hours of darkness, warning lights shall be used.

6. Ballast shall not be placed on top rails or any striped rails or higher than 13 inches above the driving surface.

7. Twenty-eight inches shall be the minimum height for cones used on freeways and other high-speed roadways.

8. For rails less than 3 feet long, 4-inch stripes shall be used.

PASS LEFT  PASS RIGHT  WARNING

PASS EITHER SIDE

ADVANCE WARNING ARROW PANELS MODES

CHANNELIZING AND LIGHTING DEVICES
**Barrier and Transition Located on Paved or Unpaved Shoulders**

Plan Shown for Right Lane - Inverted Plan for Left Lane

**Rural Divided or Undivided - Two or More Lanes Each Way**

Lane Drop • Plan Shown for Right Lane Merge Left - Inverted Plan for Left Lane Merge Right

**Rural Divided - Two or More Lanes One-Way**

Lane Drop and Lane Shifts - Plan Shown for Right Lane Merge Left - Inverted Plan for Left Lane Merge Right

**Transition Notes**

1. Barrier wall within the transition area shall have reflective markers mounted on the travel side of the wall, 8" below the top and 60' centers.
2. Arrows denote direction of traffic only and do not reflect pavement markings.
3. For signing information see the Plans, Specifications, MUTCD and other FGZ Standards.

**Transitions for Temporary Concrete Barrier Wall on Rural Facilities**
COMMONLY USED WARNING AND REGULATORY SIGNS IN WORK ZONES

COLOR CODES
Legend and/or Symbol/Background
Orange (Reflectorized)
Black (Non-Reflectorized)
White (Reflectorized)
Red (Reflectorized)
Yellow (Reflectorized)
Green (Reflectorized)

Note: The sign shields, symbols, and messages contained on this sheet are provided for ready reference to those signs used in the development of the CADD System roadway design Standards and are commonly used in the development of traffic control plans.

For additional signs and sign signal information refer to the STANDARD HIGHWAY SIGNS MANUAL as specified in the MUTCD. Special signs for traffic control plans will be developed and approved by the State Traffic Plans Engineer.

The sign codes shown on this sheet are for the purpose of identifying street names found in the Traffic Control Cell Library (TCCCL) on the CADD system. The STANDARD HIGHWAY SIGNS MANUAL should be referenced for the official sign codes for use in the development of traffic control plans.
GENERAL NOTES

1. If the work operation requires that two or more work vehicles cross the 15' zone in any one hour, traffic control will be in conformance with Index No. 602.

2. No special signing is required.

3. Arrows denote direction of traffic only and do not reflect pavement markings.

4. When a side road intersects the highway on which work is being performed, additional traffic control devices shall be erected in accordance with other applicable TCZ indexes.

5. For general TCZ requirements and additional information refer to Index No. 600.

SYMBOLS

Work Area

TYPICAL APPLICATIONS

Landscaping Work

Utility Work

Fencing Work

Cleaning Drainage Structures

Reworking Ditches

CONDITIONS

WHERE ANY VEHICLE, EQUIPMENT, WORKERS AND THEIR ACTIVITIES ARE MORE THAN 15' FROM THE EDGE OF PAVEMENT

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION

TWO-LANE, TWO-WAY, RURAL

DAY OR NIGHT OPERATIONS

1 of 1
GENERAL NOTES

1. All vehicles, equipment, workers (except flaggers) and their activities are restricted at all times to one side of the roadway.

2. If the work operation does not exceed 60 minutes, traffic control will be in accordance with Index No. 607.

3. If the work operation encompasses the through traffic lanes or when four or more work vehicles enter the through traffic lanes in a one hour period a flagger shall be provided and the advanced FLAGGER sign shall be substituted for the WORKERS sign. For location of flaggers and FLAGGER signs see Index No. 603.

4. The first two signs shall have a 18" x 18" (Min.) orange flag and a Type B light attached and operating at all times.

5. The WORKERS legend sign may be substituted for the symbol sign.

6. All signs shall be placed outward if the closure time exceeds 12 hours.

7. \( L \) (Min.) is \( \frac{W}{5} \) for speeds \( \leq 45 \text{ mph} \)

\[ \text{Where:} \]
\[ W = \text{Width of shoulder in feet, B minimum} \]
\[ S = \text{Posted speed limit (MPH) prior to work operation.} \]

8. Barricades, cones and drums shall not be intermixed in the lateral transition.

9. Arrows denote direction of traffic only and do not reflect pavement markings.

10. Longitudinal dimensions are to be adjusted to fit field conditions. See Index No. 600.

11. WORKERS sign to be removed or fully covered when no work is being performed.

12. END CONSTRUCTION signs required only when work exceeds one daylight period.

13. When a side road intersects the highway on which work is being performed additional traffic control devices shall be erected in accordance with other applicable TCC indexes.

14. For general TCC requirements and additional information refer to Index No. 600.

SYMBOLS

- Work Area
- Sign With 18" x 18" (Min.) Orange Flag And Type B Light
- Type I Or Type II Barricade Or Drum (With Steady Burning Light At Night Only). Cones May Be Used During Daylight Only
- Work Zone Sign

TYPICAL APPLICATIONS

- Utility Work
- Culvert Extensions
- Side Slope Work
- Guardrail Work
- Landscaping Work
- Cleaning Drainage Structures
- Reworking Ditches
- Sign Installation And Maintenance
- Shoulder Repair

CONDITIONS

WHERE ANY VEHICLE, EQUIPMENT, WORKERS OR THEIR ACTIVITIES ENTRAP THE AREA CLOSER THAN 15' BUT NOT CLOSER THAN 2' TO THE EDGE OF PAVEMENT

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION

Traffic Control Through Work Zones
Two-Lane, Two-Way • Rural
Day Or Night Operations
GENERAL NOTES

1. Work operations shall be confined to one traffic lane, leaving the opposite lane open to traffic.

2. All vehicles, equipment, workers (except flaggers) and their activities are restricted at all times to one side of the pavement.

3. If the work operation does not exceed 60 minutes, traffic control will be in conformance with index No. 607.

4. Additional one-way control may be effected by the following means:
   (1) Flag-carrying vehicle
   (2) Official vehicle
   (3) Pilot vehicles
   (4) Traffic signals

When flaggers are the sole means of one-way control the flaggers shall be in sight of each other or in direct communication of all lanes.

5. The first two warning signs shall have a 18" x 18" (min.) orange flag and a Type B light affixed and operating at all times.

6. Work signs may be used for maintenance and utility operations; Type B lights and orange flags are not required.

7. The FLAGGER legend sign may be substituted for the symbol sign.

TYPICAL APPLICATIONS

Pavement Resurfacing
Pavement Repair
Utility Work
Bridge Repair
Guardrail Work

CONDITIONS

WHERE ANY VEHICLE, EQUIPMENT, WORKERS OR THEIR ACTIVITIES ENCROACH THE AREA BETWEEN THE CENTERLINE AND A LINE 24" OUTSIDE THE EDGE OF PAVEMENT

SYMBOLS

Work Area

Sign With 18" x 18" (Min.) Orange Flag And Type B Light

Type I, Type II Or Type III Barricade, Or Drum

Type I Or Type II Barricade, Cone Or Drum

Work Zone Sign

Flagger

8. L (min) = \( \frac{WS}{2} \) for speeds \( \leq 45 \text{ mph} \)
   \[ \frac{WS}{3} \] for speeds \( > 40 \text{ mph} \)

Where:

- WS = Width of lateral transition in feet
- S = Posted speed limit (MPH) prior to work operation.

9. Barricades, cones and drums shall not be intermixed in the lateral transition.

10. THE ONE LANE ROAD signs are to be fully covered and the FLAGGER signs either removed or fully covered when no work is being performed and the highway is open to two-way traffic.

11. Arrows denote direction of traffic only and do not reflect pavement markings.

12. Longitudinal dimensions are to be adjusted to fit field conditions. See Index No. 600.

13. When a side road intersects the highway on which work is being performed additional traffic control devices shall be erected in accordance with other applicable TCZ indexes.

14. For general TCZ requirements and additional information refer to Index No. 600.
GENERAL NOTES

1. Construction operations shall be confined to one traffic lane, leaving the opposite lane open to traffic.
2. All vehicles, equipment, workers, (except flaggers) and their activities are restricted at all times to one side of the pavement.
3. Additional one-way control may be effected by the following means:
   a. 1 Flag-carrying vehicle
   b. Official vehicle
   c. Pilot vehicles
   d. Traffic signals
   When flaggers are the sole means of one-way control the flaggers shall be in sight of each other in direct communication at all times.
4. The first two warning signs shall have a 18" x 18" (min.) orange flag and a Type B light attached and operating at all times.
5. The FLAGGER legend sign shall be substituted for the symbol sign.
6. All signs shall be posted mounted if the closure time exceeds 42 hours.

7. L (min.) = W x 45 mph
   = W x 40 mph
   Where:
   W = Width of lateral transition in feet.
   S = Posted speed limit (MPH) prior to work operation.
8. Barricades, cones and drums shall not be intermixed in the lateral transition.
9. The ONE LANE ROAD signs are to be fully covered and the FLAGGER signs either removed or fully covered when no work is being performed and the highway is open to two-way traffic.
10. Arrows denote direction of traffic only and do not reflect pavement markings.
11. Longitudinal dimensions are to be adjusted to fit field conditions. See Index No. 605.
12. When a side road intersects the highway on which work is being performed additional traffic control devices shall be erected in accordance with other applicable TCC regulations.
13. For general TCC requirements and additional information refer to Index No. 605.

SYMBOLS
 □ Work Area

Type I, Type II or Type III Barricade or Drum (With Steady Burning Light At Night Only)

Type I, Type II or Type III Barricade or Drum (With Flashing Light)

Work Zone Sign

Flagger

TYPICAL APPLICATIONS

Pavement Repair

Culvert Construction

Utility Work

Bridge Repair

CONDITIONS

WHERE ANY VEHICLE, EQUIPMENT WORKERS OR THEIR ACTIVITIES ENCROACH THE AREA BETWEEN THE CENTERLINES AND A LINE 2' OUTSIDE THE EDGE OF PAVEMENT

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION
REGULATIONS

TWO LANE, TWO WAY - RURAL

NIGHT OPERATIONS OR OPERATIONS EXCEEDING ONE DAYLIGHT PERIOD

TRAFFIC CONTROL THROUGH WORK ZONES

City, Town, or Village

1 of 1
GENERAL NOTES

4. All vehicles, equipment, workers (except flaggers) and their activities are restricted at all times to one side of the roadway.

2. If the work operation does not exceed 60 minutes, traffic control will be in conformance with Index No. 607.

3. If the work operation encompasses on the through traffic lanes or when four or more work vehicles enter the through traffic lanes in a one hour period flaggers shall be provided and the advance flagging sign shall be substituted for the WORKERS sign. For location of flaggers and flagging signs see Index No. 603.

4. The first two signs shall have a 18" x 18" (min.) orange flag and a Type B light affixed and operating at all times. Mesh signs may be used for maintenance and utility operations; Type B lights and orange flags are not required.

5. The WORKERS legend sign may be substituted for the symbol sign.

6. L (min.) $\frac{\text{W}^2}{S}$ for speeds $\geq 45$ mph

$\frac{\text{W}^2}{100}$ for speeds $> 40$ mph

Where:

W = Width of shoulder in feet, 8’ minimum.

S = Posted speed limit (MPH) prior to work operation.

TYPICAL APPLICATIONS

Shoulder and slope work

Utility work

Guardrail work

Landscape work

Delineator installation and maintenance

CONDITIONS

WHERE ANY VEHICLE, EQUIPMENT, WORKERS OR THEIR ACTIVITIES REQUIRE AN INTERRUPTED OR CONTINUOUS MOVING OPERATION ON THE SHOULDER OR SHOULDER AND SLOPES

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION

TWO-LANE, TWO-WAY RURAL MOVING OPERATIONS—DAYLIGHT ONLY

DESIGNER No. 6020P

DESIGNER No. 605P

605
GENERAL NOTES

1. All vehicles, equipment, workers (except flaggers) and their activities are restricted at all times to one side of the pavement.

2. Minimum length of work area is 200 feet. Minimum length to be determined by the Engineer, but in no case to exceed the length of one-half (½) days operation or two miles whichever is less.

3. If the work operation does not exceed 60 minutes, traffic control will be in accordance with Index No. 600.

4. Additional one way control may be effected by the following means:
   - Flag-carrying vehicle
   - Official vehicle
   - Pilot vehicle
   - Traffic signals

   When flaggers are the only means of one-way control the flaggers shall be in sight of each other or in direct communication at all times.

5. The first two warning signs shall have a 18” x 18” (min.) orange flag and a Type B light attached and operating at all times.

6. Flash lights may be used for maintenance and utility operations. Type B lights and orange flags are not required.

7. The FLASHER legend sign may be substituted for the symbol sign.

8. The ONE LANE ROAD AHEAD and FLASHER signs are to be removed or fully covered when no work is being performed and the highway is open to two-way traffic.

9. Arrows denote direction of traffic only and do not reflect pavement markings.

10. Longitudinal dimensions are to be adjusted to fit field conditions. See Index No. 600.

11. When a single work operation on one side of the highway extends across the horizontal center line, the recommended longitiudinal dimension shall be reduced by one half.

12. For general TCC requirements and additional information refer to Index No. 600.

SYMBOLS

- Work Area
- Sign With 18” x 18” (min.) Orange Flag And Type B Light
- Type I or Type II Barricade, Cone Or Drum
- Work Zone Sign
- Flagger

TYPICAL APPLICATIONS

Pavement Repair
Pavement Surfacing
Utility Work
Delimited Maintenance
Crack Sealing
Core Boring

CONDITIONS

WHERE ANY VEHICLE, EQUIPMENT, WORKERS OR THEIR ACTIVITIES REQUIRE AN INTERMITTENT OR CONTINUOUS MOVING OPERATION ON THE PAVEMENT WHERE THE AVERAGE SPEED OF MOVEMENT IS LESS THAN FOUR MILES PER HOUR

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION
ROAD DESIGN

MOVING OPERATIONS • RURAL

TWO-LANE TWO-WAY DAYLIGHT ONLY

606
CONDITIONS

FOR ANY OPERATION THAT IS 2' OR MORE OUTSIDE THE EDGE OF THE PAVEMENT FOR A PERIOD OF LESS THAN 60 MINUTES.

CONDITIONS

FOR ANY OPERATION THAT ENCROACHES IN THE AREA BETWEEN THE CENTERLINE AND A LINE 2' OUTSIDE THE EDGE OF THE PAVEMENT FOR A PERIOD OF 15 MINUTES OR LESS

CONDITIONS

FOR ANY OPERATION THAT ENCROACHES IN THE AREA BETWEEN THE CENTERLINE AND A LINE 2' OUTSIDE THE EDGE OF THE PAVEMENT FOR A PERIOD IN EXCESS OF 15 MINUTES BUT LESS THAN 60 MINUTES.

GENERAL NOTES

1. The maximum length of work area to be determined by the Engineer, but in no case to exceed the length of one half (1/2) days operation or two miles whichever is less.

2. All vehicles, equipment, workers (except flaggers) and their activities are restricted at all times to one side of the pavement.

3. Additional one-way control may be effected by the following means:
   (1) Flag-carrying vehicle (2) Official vehicle (3) Pilot vehicles (4) Traffic signals
   When flaggers are the sole means of one-way control the flaggers shall be in sight of each other or in direct communication at all times.

4. Signs shall have an 18'' x 18'' (min.) orange flag and a Type B Light attached and operating at all times.
   Mesh signs may be used for maintenance and utility operations (daylight only). Type B lights and orange flags are not required.

5. The FLAGGER legend sign may be substituted for the symbol sign.

6. Arrows denote direction of traffic only and do not reflect pavement markings.

7. Longitudinal dimensions are to be adjusted to fit field conditions. See Index No. 600.

8. When a side road intersects the highway on which work is being performed additional traffic control devices shall be erected in accordance with other applicable TC2 indexes.

9. For general TC2 requirements and additional information refer to Index No. 600.

SYMBOLS

- Work Area
- Sign With 18'' x 18'' (Min.) Orange Flag And Type B Light
- Type II Or Type III Barricade Or Drum (With Steady Burning Light At Night Only), Cones May Be Used During Daylight Only
- Work Zone Sign
- Flagger

TYPICAL APPLICATIONS

- Working Patches
- Field Patches
- String Line
- Utility Work
- Cleaning Up Debris On Pavement
- Pavement Caring And Straight Edging
GENERAL NOTES

1. Work operations shall be confined to one traffic lane, except for grade crossing, leaving the opposite lane open to traffic.

2. All vehicles, equipment, workers (except flaggers) and their activities are restricted to one side of the pavement, except for grade crossings.

3. The installation and timing of signals shall be approved by the District Traffic Operations Engineer prior to signals being placed in operation.

4. Where sight distance to the signal is limited, the signals may be mounted on appurtenant wire at the discretion of the Engineer.

5. The maximum distance between portable traffic signals (receiver/controllers) shall be 4 miles, however, in no case shall the distance exceed the maximum distance at which the remote operator/transmitter can positively and safely operate both portable signals.

6. All signs shall be post-mounted if the closure time exceeds 12 hours.

7. Barricades, cones and drums shall not be intermixed in the lateral transition.

8. SIGNAL AHEAD and EQUIPMENT CROSSING AHEAD signs are to be removed or fully covered when the work is being performed and the highway is open to two-way traffic. Type III barricades shall be in place to block foot (or pedestrian) access when the highway is not in operation and a flagger's signal operator is not on duty, except when the highway is an existing property-maintained road.

9. Arrows denote direction of traffic only and do not reflect pavement markings.

10. Longitudinal dimensions are to be adjusted to fit field conditions. See Index No. 660.

11. When a single road intersects the highway on which work is being performed, additional traffic control devices shall be erected in accordance with other applicable TCO indexes.

12. For general TCO requirements and additional information refer to Index No. 660.

SYMBOLS

Work Area

Sign With 18" x 18" (Min.) Orange Flag And Type B Light

Traffic Signal

Type III Barricade

Stop Bar

Flagger

Portable Signal

TYPICAL APPLICATION

Pavement Repair

Shoulder & Roadside Work

Bridle Work

Bridge Work

Box Culvert Work

Drainage Work

Utility Work

Haul Road Crossing

CONDITIONS

WHERE ANY VEHICLE, EQUIPMENT, WORKERS OR THEIR ACTIVITIES WILL ENCROACH ON ONE LANE OR MOMENTARILY ENCROACH ON BOTH LANES OF A TWO-LANE TWO-WAY ROADWAY AND TRAFFIC SIGNALS ARE NEEDED.
SINGLE LANE CLOSURE • ROADWAY AND BRIDGES ALL LENGTHS

SINGLE LANE CLOSURE • SHORT BRIDGES
MOMENTARY ROADWAY CLOSURE • HAUL ROUTE CROSSING
Detour Connection To Existing Pavement To Be Constructed Under TC2 Plan of Index No. 601 Or 604. (Same For Opposite Connection)

White ReflectORIZED Pavement Markings
Double Yellow ReflectORIZED Pavement Markings

Required Only When Construction Zone
Speed Reduced Below Existing Paved Speed Prior To Construction

GENERAL NOTES

1. The first two warning signs shall have an 18" x 18" "Slow" orange flag and a Type B light attached and operating at all times.
2. For speed sign applications see Index No. 600.
3. Barricades, cones and drums shall not be installed within the curved alignment or within the tangent alignment. Where the tangent distance (T) exceeds 600 feet, spacing between cones may be increased to 50 feet or spacing between Type I or Type II barricades or drums may be increased to 600 feet within limits of the tangent, or post mounted delineators of 50 foot centers may be substituted for the barricades or drums.
4. On the existing pavement all existing markings within the realignment which conflict with the revised traffic pattern are to be removed and removable pavement markings used for marking a new centerline and edge lines.
5. Where the tangent distance (T) exceeds 600 feet and no passing or stopping sight distance restrictions exist, the yellow reflectORIZED markings used to indicate the centerline of the traveled way may be replaced with yellow reflectORIZED marking in a broken pattern.

TYPICAL APPLICATIONS
Bridge Construction
Subgrade Restoration
Culvert Repair or Construction

CONDITIONS
WHERE ANY VEHICLE, EQUIPMENT, WORKERS OR THEIR ACTIVITIES REQUIRE THE CLOSURE OF BOTH LANES AND A TEMPORARY DETOUR IS CONSTRUCTED

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION
FREEWAY DETOUR
TWO-LANE, TWO-WAY • RURAL
TEMPORARY DETOUR
DAY OR NIGHT OPERATIONS

SYMBOLS

Work Area
Sign With 18" x 18" "Slow" Orange Flag and Type B Light
Type I or Type II Barricade or Drum (With Steady Burning Light at Night Only), Cones May Be Used During Daylight Only
Type III Barricade (With Flashing Light)
Work Zone Sign

CONTRA-REVERSED SPEED LIMIT
DETOUR
500' DETOUR
DETOUR
500' DETOUR
DETOUR
500' DETOUR
DETOUR
500' DETOUR
DETOUR
500' DETOUR

When other Construction or Maintenance Operations Occur Within One (1) Mile, Signs 1 to be Utilized And Signaling To Be Coordinated In Accordance With Index No. 600.
GENERAL NOTES

1. If the work operation requires that two or more work vehicles cross the 15 zone in any one hour, traffic control will be in accordance with Index No. 602.

2. No special signage is required.

3. This index also applies when work is being performed on a multilane undivided highway.

4. This index also applies to work performed in the median more than 15 ft. from edge of travel way, both roadways.

5. Arrows denote direction of traffic only and do not reflect pavement markings.

6. When a side road intersects the highway on which work is being performed additional traffic control devices shall be erected in accordance with other applicable TCZ indexes.

7. For general TCZ requirements and additional information refer to Index No. 602.

SYMBOLS

Work Area

TYPICAL APPLICATIONS

Landscaping Work
UTILITY Work
Fencing Work
Cleaning Drainage Structures
Reworking Ditches

CONDITIONS

WHERE ALL VEHICLES, EQUIPMENT, WORKERS AND THEIR ACTIVITIES ARE MORE THAN 15 FT FROM THE EDGE OF PAVEMENT
CONDITIONS
WHERE ANY VEHICLE, EQUIPMENT, WORKERS OR THEIR ACTIVITIES ENCROACH THE AREA CLOSER THAN 15' BUT NOT CLOSER THAN 2' TO THE EDGE OF PAVEMENT FOR A PERIOD OF LESS THAN 60 MINUTES

GENERAL NOTES
1. All vehicles, equipment, workers and their activities are restricted at all times to one side of the roadway.
2. If the work operation encroaches on the through traffic lanes or when four or more work vehicles enter the through traffic lanes in an hour period a flagger shall be provided and a FLAER sign shall be substituted for the WORKERS sign. The flagger shall be positioned at the point of vehicle entry or departure from the work area.
3. This TCZ plan also applies to work performed in the median more than 2 feet but less than 15 feet from the edge of either pavement.
4. The first two warning signs, each side, shall have a 18" x 18" (min.) orange flag and a Type B light attached and operating at all times. The final signs may be used for maintenance and utility operations. (daylight only) a Type B light and orange flags are required.
5. The WORKERS legend sign may be substituted for the symbol sign.
6. $s L_{(\text{mph})} = \frac{7}{30} v$ for speeds $\geq 45$ mph

SYMBOLS
- Work Area
- Sign With 18" x 18" (Min.) Orange Flag and Type B Light
- Type I Or Type II Barricade Or Drum (With Steady Burning Light At Night Only). Cones May Be Used During Daylight Only
- Work Zone Sign

TYPICAL APPLICATIONS
- Utility Work
- Culvert Extensions
- Side Slope Work
- Guardrail Work
- Landscaping Work
- Cleaning Drainage Structures
- Rebuilding Ditches
- Sign Installation And Maintenance
- Shoulder Repair
CONCLUSIONS
WHERE ANY VEHICLE, EQUIPMENT, WORKERS OR THEIR ACTIVITIES ENCROACH ON THE LANE ADJACENT TO EITHER SHOULDER AND THE AREA 2' OUTSIDE THE EDGE OF PAVEMENT FOR A PERIOD OF 15 MINUTES OR LESS

CONDITIONS
WHERE ANY VEHICLE, EQUIPMENT, WORKERS OR THEIR ACTIVITIES ENCROACH ON THE LANE ADJACENT TO EITHER SHOULDER AND THE AREA 2' OUTSIDE THE EDGE OF PAVEMENT FOR A PERIOD OF MORE THAN 15 MINUTES BUT LESS THAN 60 MINUTES

CONCLUSIONS
WHERE ANY VEHICLE, EQUIPMENT, WORKERS OR THEIR ACTIVITIES ENCROACH ON THE LANE ADJACENT TO EITHER SHOULDER AND THE AREA 2' OUTSIDE THE EDGE OF PAVEMENT FOR A PERIOD OF 60 MINUTES OR GREATER

CONE A 25' Centers And Type I Or Type II Barricades Or Drums At 50' Centers For 250', Thereafter Cones A 50' Centers And Type I Or Type II Barricades Or Drums At 100' Centers.

Maximum Spacing Between Devices (F.t.) To Be Equal To The Speed Limit (MPH) But Not Greater Than 25' For Cones Or 50' For Type I Or Type II Barricades Or Drums.

GENERAL NOTES
1. Work operations shall be confined to one traffic lane, leaving the adjacent lane open to traffic.
2. All vehicles, equipment, workers, and their activities are restricted at times to one side of the pavement.
3. The first two warning signs, each sign shall have an 8" x 8" (min.) orange flag and Type B light attached and operating at all times.
4. Mesh signs may be used for maintenance and utility operations; Type B lights and orange flags are not required.
5. On undivided highways the median signs as shown are to be omitted.
6. When work is performed in the median lane on divided highways the warning sign is inverted and left lane closed and lane reduction signs substituted for the right lane closed and lane reduction signs. The same applies to undivided highways with the following exceptions: (a) Work shall be confined within one median lane. (b) Additional additional signs, cones, or drums shall be placed along the shoulder of the highway and across the shoulder to the work area. When work on undivided highways occurs across the centerline, so as to encroach on both median lanes, the inverted plan is applied to the approach of both roadways.
7. The RIGHT (LEFT) LANE CLOSED signs are to be removed or fully covered when no work is being performed and the highway is open to traffic.
8. L (min.) = Length of taper in feet
   (m) = Speed above 45 mph
   (s) = Speed 40 mph to 45 mph
   (w) = Speed 30 mph to 40 mph
9. When work is being performed on a multilane undivided roadway the signs normally mounted in the median as shown shall be omitted.
10. Barricades, cones and drums shall not be intermixed in the lateral transition.
11. Arrows denote direction of traffic only and do not reflect pavement markings.
12. Longitudinal dimensions are to be adjusted to fit field conditions. See index No. 600.
13. This TC2 plan does not apply when work is being performed in the middle of one lane of a divided highway. See index No. 600.
14. When a side road intersects the highway on which work is being performed additional traffic control devices shall be erected in accordance with other applicable TC2 Indexes.
15. For general TC2 requirements and additional information refer to Index No. 600.

SYMBOLS
Work Area
Sign With 8"x 8" (Min.) Orange Flag And Type B Light
Type I Or Type II Barricade, Cone Or Drum
Work Zone Sign
Flagger
Advance Warning Arrow Panel

TYPICAL APPLICATIONS
Pavement Resurfacing
Pavement Repair
Utility Work
Bridge Repair
Guardrail Work
Pavement Curing And Straight Edging

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAY DEVELOPMENT AND RESEARCH
MULTILANE, DIVIDED AND UNDIVIDED RURAL OPERATIONS ONE DAYLIGHT PERIOD OR LESS

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GENERAL NOTES

1. Work operations shall be confined to one traffic lane, leaving the adjacent lane open to traffic.

2. All vehicles, equipment, workers, and their activities are restricted to all times to one side of the pavement.

3. The first two warning signs, each side, shall have a 15" x 15" (Min) orange flag and a Type A light attached and operating at all times.

4. All signs shall be mounted if the closure time exceeds 20 minutes.

5. If undivided highways the median signs as shown are to be omitted.

6. When work is performed in the median lane on divided highways the barrier placing is inverted and left center closing and lane reduction signs substituted for the right lane closed and lane reduction signs applicable for the right lane closed and lane reduction signs applicable for the right lane closed.

7. Signs and traffic control devices are to be modified in accordance with intermittent work storage using the first two hours (7:00 - 9:00) when work is being performed and the highway is open to traffic.

TYPICAL APPLICATIONS

- Pavement Resurfacing
- Pavement Repair
- Utility Work
- Bridge Repair
- Guardrail Work

CONDITIONS

Where any vehicle, equipment, workers or their activities encroach on the lane adjacent to either shoulder and the area 2' outside the edge of pavement.
INTERMITTENT WORK STOPPAGE • RIGHT LANE REOPENED TO TRAFFIC • DAYTIME OR NIGHTTIME
DETAIL OF TEMPORARY ASPHALT SEPARATOR

GENERAL NOTES

1. All vehicles, equipment, workers and their activities are restricted to one side of the highway.
2. The two warning signs, each side, shall have a 18" x 18" (min.) orange flagging and a Type B light attached and operating at all times.
3. All signs shall be post mounted.
4. Two-way traffic signs shall be repeated every one-quarter mile, in each direction, throughout the tangent distance (T).
5. L (min.) = W ÷ where:

Where

1. All existing pavement markings within the realignment which conflict with the revised traffic pattern are to be removed and replaceable pavement markings used for marking new edge lines.
2. Arrows denote direction of traffic only and do not reflect pavement markings.
3. Longitudinal dimensions are to be adjusted to fit field conditions. See Index No. 600.
4. When side roads, ovals or interchanges are located within the limits for work zone traffic control equipment, traffic control devices shall be erected in accordance with other applicable TCI indexes.
5. For general TCI requirements and additional information, refer to Index No. 600.

SYMBOLS

- Work Area
- Sign With 18" x 18" (Min.) Orange Flag And Type B Light
- Type I Or Type II Barricade Or Drum (With Steady Burning Light At Night Only). Cones May Be Used During Daylight Only
- Work Zone Sign
- Advance Warning Arrow Panel

APPLICATIONS

Scheme 1: Restricted Construction Limits
Scheme 2: Unrestricted Construction Limits And Light To Moderate Traffic
Scheme 3: Unrestricted Construction Limits And Moderate To Heavy Traffic

Where:

1. Outward Beginning Or Ending Of Lane Reductions

Where:

1. Unless A Specific Scheme Is Cited For In The Plans, Scheme Selection Shall Be At The Contractors Option And As Approved By The Engineer

CONDITIONS

1. Where ANY VEHICLE, EQUIPMENT, WORKERS OR THEIR ACTIVITIES REQUIRE THE CLOSURE OF ONE ROADWAY AND THE OPPOSING ROADWAY IS CONVERTED TO TEMPORARY TWO-WAY TRAVEL BY WAY OF CROSSOVERS

MULTILINE DIVIDED • RURAL DAY OR NIGHT OPERATIONS

STATE OF COLORADO DEPARTMENT OF TRANSPORTATION

TRAFFIC CONTROL THROUGH WORK ZONES

MULTILINE DIVIDED • RURAL DAY OR NIGHT OPERATIONS

STATE OF COLORADO DEPARTMENT OF TRANSPORTATION

TRAFFIC CONTROL THROUGH WORK ZONES
GENERAL NOTES

1. All vehicles, equipment, workers and their activities are restricted at all times to one side of the pavement.

2. The first two warning signs shall have a 18" x 18" (min.) orange flag and a Type B Light attached and operating at all times.

3. All signs, except those required in paved areas, shall be post mounted if the closure line exceeds 1200 feet.

4. Two-Way Traffic Signs shall be repeated every one quarter mile, in each direction, through the tangent distance (T).

5. L (min.) = W S for speeds ≤ 45 mph
   = 6.6 S for speeds > 40 mph

   Where:
   - W = Width of lateral transition in feet
   - S = Paved speed limit (MPH) prior to work operation

6. Barricades, cones, and drums shall not be installed within the lateral transitions, or within the tangent alignment.

7. This index does not apply when work is being performed in the middle lanes of a six or more lane highway. Special maintenance or traffic details will be required.

8. Arrows denote direction of traffic only and do not reflect pavement markings.

9. Longitudinal dimensions are to be adjusted to fit field conditions. See Index No. 600.

10. When a side road intersects the highway on which work is being performed, additional traffic control devices shall be erected in accordance with other applicable TCZ manuals.

11. For general TCZ requirements and additional information refer to Index No. 600.

CONDITIONS

WHERE ANY VEHICLE, EQUIPMENT WORKERS OR THEIR ACTIVITIES REQUIRE THE CLOSURE OF THE LANES IN ONE DIRECTION AND A DETOUR IS PROVIDED BY UTILIZING ONE LANE OF THE OPPOSING TRAFFIC LANE.
CONDITION NOTES

1. Mesh signs may be used for maintenance and utility operations 1 day/night only. Type B lights and orange flags are not required.
2. Barricades, cones, and drums shall not be uninterrupted laterally.
3. The RIGHT LANE CLOSED and one reduction sign are to be removed or covered.
4. When the lane closure exceeds a continuous 24-hour period, all existing pavement markings within the realignment, which conflict with the revised traffic pattern, are to be removed and replaced by pavement marking used for new edge lines and centerline.
5. All vehicles, equipment, workers, and their activities are restricted at all times to one side of the highway.

TYPICAL APPLICATIONS

Pavement Resurfacing
Pavement Repair

CONDITIONS

WHERE ANY VEHICLE, EQUIPMENT, WORKERS OR THEIR ACTIVITIES ENCROACH ON ANY PORTION OF A CENTER LANE OF A MULTILANE HIGHWAY, AND TWO DRIVING LANES ARE MAINTAINED ON THE TRAVEL WAY.

MULTILANE DIVIDED • RURAL
**EXISTING POSTED SPEED** | **PROPOSED WORK ZONE SPEED** | **REMARKS**
---|---|---
45 | 35 | The Proposed Work Zone Speeds are recommended speeds for the traffic control plan detailed below. However, where the Engineer deems other speeds are appropriate, the applicable speeds are to be shown on the Plans.

**SYMBOLS**
- **Work Area**
  - **Sign With (8x8) or (8x1) M'n, Orange**
  - **Fog And Type B Light**
  - **Type I Or Type II Barricades or Drums (With Steady Burning Light At Night Only) - Cones May Be Used During Daylight Only**
  - **Work Zone Signs**
  - **Advance Warning Arrow Panel**
  - **Cone Or Tubular Delineator (Except At Night Use Vertical Panels)**

**CONDITIONS**

1. See General Notes, Sheet 1 of 2.
2. Maximum spacing between devices (ft.) to be equal to the speed limit (mph) but not greater than 25 for cones or tubular delineators or 50 for Type I or Type II barricades or drums. Barricades or drums shall be used to delineate the edge lines of the transition areas (i.e., 1.5 and 2.0). Beyond the transition area, any of the above noted devices may be used to delineate the edge lines.
3. Cones or tubular delineators shall be used to delineate the center line.
4. The RIGHT LANE CLOSED, lane reduction and reverse curve signs are to be removed or fully covered when no work is being performed and the roadway is open to traffic.
5. Barricades, cones and drums along each lane line shall not be intersected within the lateral transitions.
6. When the lane closure extends a continuous 24 hour period, all existing pavement markings within the realignment which conflict with the revised traffic pattern are to be removed and temporary pavement markings used for marking new edge lines and centerline.
7. For general TCR requirements and additional information refer to Index No. 600.

**TYPICAL APPLICATIONS**
- Pavement Resurfacing
- Pavement Repair
- Where any vehicle, equipment, workers or their activities encroach on any portion of a center lane of a multilane highway, and two driving lanes are maintained, and, the outside shoulder pavement is temporarily used as a travel lane.
WORK ZONE CONSTRUCTION

SYMBOLES

Work Area
- Sign With 18" x 18" (Min.) Orange Flag And Type B Light
- Type I Or Type II Barricades Or Drums (With Steady Burning Light at Night Only). Cones May Be Used During Daylight Only
- Work Zone Sign
- Advance Warning Arrow Panel

GENERAL NOTES

1. All vehicles, equipment, workers and their activities are restricted at all times to one side of the highway.

2. The first two warning signs, each side, shall have a 18" x 18" (Min.) orange flag and a Type B light attached and operating at all times.

3. Mesh signs may be used for maintenance and utility operations during daylight only; Type B lights and orange flags are not required.

4. All signs shall be posted 1000 ft. (Min.) in advance of the work area.

5. L (Min.) = WS for speeds < 45 mph
   = WS² for speeds ≥ 40 mph

6. Barricades, cones and drums shall not be intermixed in the lateral transition.

7. The LEFT LANE CLOSED and lane reduction signs are to be removed or fully covered when no work is being performed and the inside lane is open to traffic.

8. Advance warning arrow panels are required for both day and night operations. Either the right flashing arrow or the right sequential arrow modes may be used; the caution mode shall not be used.

9. Arrows denote direction of traffic only and do not reflect pavement marking.

10. Longitudinal dimensions are to be adjusted to fit field conditions. See index No. 600.

11. When a side road intersects the highway on which work is being performed additional traffic control devices shall be erected in accordance with other applicable TCC indexes.

12. For work performed in the outside lane refer to indexes Nos. 612 and 643.

13. For general TCC requirements and additional information refer to index No. 600.
SYMBOLS

Work Area

Sign With 18" x 18" (Min.) Orange Flag And Type B Light
Type I Or Type II Barricade Or Drum (With Steady Burning Light At Night Only). Cones may Be Used During Daylight Only
Type I Or Type II Barricade Or Drum (With Flashing Light At Night Only)
Work Zone Sign
Flagger
Stop Bar

UN.Signalized

1. All vehicles, equipment, workers except flaggers and their activities are forbidden in lane and intersection areas reserved for traffic.
2. The first two warning signs shall be 18" x 18" (Min.) orange flag and a Type B light attached and operating at all times.
3. Mesh signs may be used for maintenance and utility operations. Cones are required only if Type I. signs and orange flags are not required.
4. The FLASHERS legend sign may be substituted for the symbol sign.
5. All signs shall be post mounted if closure time exceeds 12 hours.
6. When vehicles in a parking zone block the line of sight to TCZ signs or when TCZ signs are obstructed by a vehicle, the signs shall be post mounted and spaced in accordance with Index No. 17002.

SIGNALIZED

1. Barricades, cones and drums shall not be interchanged within lateral transitions, or within the tangential/intersection.
2. Maximum spacing between devices shall be not greater than 25'.
3. Arrows denote direction of traffic only and do not reflect pavement markings.
4. Longitudinal dimensions are to be adjusted to fit field conditions. See Index No. 600.
5. Temporary sign spacing modifications are to be approved by the District Traffic Operations Engineer prior to the beginning of work.
6. Work performed for a period of 60 minutes or less is to be conducted in accordance with Index No. 600 or emergency condition procedures as described in Index No. 600, whichever applies.
7. For general TCZ requirements and additional information refer to Index No. 600.

GENERAL

NOTES

TYPICAL APPLICATIONS

Utility Work
Pavement Repair

CONDITIONS

WHERE ANY VEHICLE, EQUIPMENT, WORKERS OR THEIR ACTIVITIES ENCROACH ON THE PAVEMENT REQUIRING THE CLOSURE OF A PORTION OF ONE OR MORE TRAFFIC LANES IN AN INTERSECTION FOR A PERIOD OF MORE THAN 60 MINUTES

TWO-LANE, TWO-WAY • URBAN
DAY OR NIGHT OPERATIONS
CONDITIONS
WHERE ANY VEHICLE, EQUIPMENT, WORKERS
OR THEIR ACTIVITIES ENCROACH ON THE
PAVEMENT REQUIRING THE CLOSURE OF ONE
TRAFFIC LANE, FOR WORK AREA LESS THAN
200' DOWNSTREAM FROM INTERSECTION, FOR
A PERIOD OF MORE THAN 60 MINUTES.

GENERAL NOTES
1. Work operations shall be confined to one travel lane, leaving the opposing travel lane open to traffic.
2. All vehicles, equipment, workers (except flaggers) and their activities are restricted at all times to one side of the roadway.
3. For work operations of 60 minutes or less see Index No. 607
4. When vehicles in a parking zone block the line of sight to TCZ signs or when TCZ signs encroach on a normal pedestrian walkway, the signs shall be posted mounted and located in accordance with Index No. 70302.
5. If work area is confined to an outside influence lane the work area shall be barricaded and the FLAGGER signs replaced by ROAD CONSTRUCTION AHEAD signs, flaggers are not required.
6. Flaggers shall be in sight of each other or in direct communication at all times.
7. The ROAD CONSTRUCTION AHEAD and FLAGGER signs shall have a 18" x 18" white--orange flag and a Type B right attached and operating at all times.
8. Mesh signs may be used for maintenance and utility operations (daylight only) Type B right and orange flags are not required.
9. The FLAGGER legend sign may be substituted for the symbol sign.
10. All signs shall be post mounted if the closure time exceeds 2 hours.
11. The maximum spacing between devices shall not be greater than 25'.
12. Arrows denote direction of traffic and do not reflect pavement markings.
13. Longitudinal dimensions are to be adjusted to fit field conditions. See Index No. 500.
14. For general TCZ requirements and additional information refer to Index No. 600.

SYMBOLS
- Work Area
- Sign With 18" x 18" Min. 1 Orange Flag And Type B Light
- Type I Or Type II Barricades Or Drum (With Steady Burning Light At Night Only). Cones May Be Used During Daylight Only
- Type I Or Type II Barricades Or Drum (With Flashing Light At Night Only)
- Work Zone Sign
- Flagger

TYPICAL APPLICATIONS
Utility Work
Pavement Repair
Structure Adjustments
GENERAL NOTES

1. All vehicles, equipment, workers (except flaggers) and their activities are forbidden in lane and intersection areas reserved for traffic.

2. For work operations of 60 minutes or less see Index No. 607.

3. The first two warning signs shall have a 18" x 18" (50 x 50 cm) orange flag and a Type B light attached and operating at all times. Mesh signs may be used for maintenance and utility operations (daylight only); Type B lights and orange flags are not required.

4. All signs shall be posted if closure time exceeds 6 hours.

5. The WORKER sign may be substituted for the symbol sign.

6. Dual signs are required for divided roadways.

7. Arrows denote direction of traffic only and do not reflect pavement markings.

8. Barricades, cones and drums shall not be intermixed within lateral transitions, or within the transition alignment.

9. Maximum spacing between devices shall be not greater than 25'.

10. Temporary signal placing modifications are to be approved by the District Traffic Operations Engineer prior to the beginning of work.

11. Work performed for a period of 60 minutes or less is to be conducted in accordance with Index No. 607 or emergency condition procedures as described in Index No. 660, whichever applies.

12. Longitudinal dimensions are to be adjusted to fit field conditions. See Index No. 660.

TYPICAL APPLICATIONS

Utility Work
Pavement Repair
Structure Adjustments

CONDITIONS

WHERE ANY VEHICLE, EQUIPMENT, WORKERS OR THEIR ACTIVITIES ENCROACH ON THE PAVEMENT REQUIRING THE CLOSURE OF AT LEAST ONE MEDIAN TRAFFIC LANE FOR A PERIOD OF MORE THAN 60 MINUTES.
GENERAL NOTES

1. All vehicles, equipment, workers (except flaggers) and their activities are restricted at all times to one side of the roadway.

2. Work operations shall be confined to either one lane or lane combinations as follows:
   (a) Outside travel lane
   (b) Inside auxiliary lane
   (c) Outside travel lane and adjoining auxiliary lane
   (d) Inside travel lane and adjoining auxiliary lane
   * See Sheet 2 of 2

3. For work operations of 60 minutes or less see Index No 612.

4. When vehicles in a parking zone block the line of sight to TCZ signs or when TCZ signs are obscured on a normal pedestrian walkway, the signs shall be posted and located in accordance with Index No. 7140.

5. The first two warning signs shall have a 18" x 18" (Min.) orange flag and a Type B. light attached and operating at all times.

6. Mesh signs may be used for maintenance and utility operations (daylight only). Type B signs and orange flags are not required.

7. Dual signs are required for divided roadways.

(Continued)

SYMBOLS

- Work Area
- Signs With 18" x 18" (Min.) Orange Flag And Type B. Light
- Type I Or Type II Barricade Or Drum (With Steady Burning Light At Night Only). Cones May Be Used During Daylight Only
- Type I Or Type II Barricade Or Drum (With Flashing Light At Night Only)
- Work Zone Sign
- Advance Warning Arrow Panel

TYPICAL APPLICATIONS

Utility Work
Pavement Repairs
Structure Adjustments

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION
MULTILANE, TWO-WAY ♦ URBAN DIVIDED OR UNDIVIDED DAY OR NIGHT OPERATIONS

623
GENERAL NOTES (CONT.)

8. The maximum spacing between devices (ft.) within lateral transitions shall be equal to the speed limit (MPH) but no greater than 25 for cones or 50 for Type I or Type II barricades or drums.

Spacing for devices parallel to the travel lanes shall be 22-center for cones and 50-centers for Type I or Type II barricades or drums for 250'; thereafter cones at 50-centers and Type I or Type II barricades or drums at 100-centers.

9. Barricades, cones and drums shall not be intermixed in lateral transitions.

10. Arrows denote direction of traffic only and do not reflect pavement markings.

11. Longitudinal dimensions are to be adjusted to fit field conditions.

12. For general TC2 requirements and additional information refer to Index No. 600.

TYPICAL APPLICATIONS

Utility Work
Pavement Repairs
Structure Adjustments

SYMBOLS

Work Area

Sign With 18" x 18" (Min.) Orange Flag And Type B Light

Type I Or Type II Barricade Or Drum (With Steady Burning Light At Night Only). Cones May Be Used During Daylight Only

Type I Or Type II Barricade Or Drum (With Flashing Light At Night Only)

Type III Barricade

Work Zone Sign

Advance Warning Arrow Panel
**GENERAL NOTES**

1. All vehicles, equipment, workers and their activities are restricted at all times to one side of the pavement.

2. For work operations of 60 minutes or less (daylight only) see index No. 607.

3. When vehicles in a parking zone block the line of sight to TCZ signs or when TCZ signs encroach on a normal pedestrian walkway, the signs shall be post-mounted and located in accordance with Index No. 17302.

4. The first two warning signs shall have a 48" x 48" (min.) orange flag and a Type B light attached and operating at all times.

5. All signs shall be post mounted if the closure time exceeds 12 hours.

6. Dual signs are required for divided roadways.

7. Channelizing devices are to be spaced with cones at 15' centers and Type I or Type II barricades and drums at 50' centers, except in tangent work areas spacing may be increased to 50' centers for cones and 100' for barricades after the first 250' when approved by the Engineer.

8. Barricades, cones and drums shall not be interned within lateral transitions, or within the taper alignment.

9. Removable reflectorized pavement markings shall be used when closure time exceeds one daylight period.

10. Arrows denote direction of traffic only and do not reflect pavement markings.

11. Longitudinal dimensions are to be adjusted to fit field conditions, see Index No. 600.

12. For general TCZ requirements and additional information refer to Index No. 600.

**SYMBOLS**

- Work Area
- Sign With 18" x 18" (Min.) Orange Flag And Type B Light
- Type I Or Type II Barricade Or Drum (With Steady Burning Light At Night Only), Cones May Be Used During Daylight Only
- Type III Barricade (With Flashing Light)
- Work Zone Sign
- Advance Warning Arrow Panel
- Stop Bar

**TYPICAL APPLICATIONS**

- Utility Work
- Pavement Repair
- Structure Adjustments

**CONDITIONS**

**WHERE ANY VEHICLE, EQUIPMENT, WORKERS OR THEIR ACTIVITIES ENCROACH ON THE PAVEMENT REQUIRING THE CLOSURE OF TRAFFIC LANES IN ONE DIRECTION AND THE USE OF ONE OPPOSING TRAFFIC LANE TO MAINTAIN TWO-WAY TRAFFIC, FOR WORK AREA LESS THAN 200' FROM INTERSECTION, FOR A PERIOD OF MORE THAN 60 MINUTES.**

**WHERE ANY VEHICLE, EQUIPMENT, WORKERS OR THEIR ACTIVITIES ENCROACH ON THE PAVEMENT REQUIRING THE CLOSURE OF TRAFFIC LANES IN ONE DIRECTION AND THE USE OF ONE OPPOSING TRAFFIC LANE TO MAINTAIN TWO-WAY TRAFFIC, FOR WORK AREA 200' OR MORE FROM INTERSECTION, FOR A PERIOD OF MORE THAN 60 MINUTES.**
SYMBOLS

- **Work Area**
- **Sign With 18" x 18" (Min.) Orange Flag And Type B Light**
- **Type I Or Type II Barricade Or Drum (With Steady Burning Light At Night Only). Cones May Be Used During Daylight Only**
- **Work Zone Sign**
- **Advance Warning Arrow Panel**
- **Stop Bar**

GENERAL NOTES

1. All vehicles, equipment, workers, and their activities are restricted at all times to one side of the roadway.
2. Work operations shall be confined to either one lane or a combination of lanes as follows:
   - (a) Outside travel lane and outside auxiliary lane
   - (b) Outside travel lane and adjoining auxiliary lane
   - (c) Outside travel lane and adjoining center lane
   - (d) Median travel lane and adjoining auxiliary lane
   - (e) Median travel lane and adjoining center lane
   - (f) Median travel lane and adjoining center lane
   - (g) Median travel lane and adjoining auxiliary and center lanes
   - (h) Median travel lane and adjoining auxiliary and center lanes

3. For work operations that require a single lane closure only, at 60 minutes or less see Index No. 62.
4. When vehicles in a parking zone block the line of sight to TCZ signs or when TCZ signs encroach on a normal pedestrian walkway, the signs shall be posted mounted and located in accordance with Index No. 1302.
5. When work is performed in the median lane of the median and adjoining center lanes the barriod lanes are reversed and the LEFT LANE CLOSED AHEAD and merge right symbol signs shall be substituted for the RIGHT LANE CLOSED AHEAD and merge left symbol signs.
6. If work is confined to the median auxiliary lane the work area shall be barricaded and the LEFT LANE CLOSED AHEAD sign replaced by the ROAD CONSTRUCTION AHEAD signs and the merge right symbol signs eliminated.
7. The first two warning signs, each side, shall have a 18" x 18" (min.) orange flag and a Type B right angle and operating at all times.

TYPICAL APPLICATIONS

Utility Work
Pavement Repairs
Structure Adjustments

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION
MULTILANE ONE WAY OR MULTILANE DIVIDED WITH NON-TRAVERSABLE MEDIAN URBAN DAY OR NIGHT OPERATIONS

(Continued)
GENERAL NOTES (CONT.)

7. All signs shall be post-mounted if closure time exceeds 12 hours.

8. The maximum spacing between devices (ft.) within lateral transitions shall be equal to the speed limit (MPH) but not greater than 25' for cones or 50' Type I or Type II barricades or drums.

Spacing for devices parallel to the travel lanes shall be 25' centers for cones and 50' centers for Type I or Type II barricades or drums for the first 250'. Thereafter, centers of 50' centers and Type I or Type II barricades or drums at 500' centers.

9. Barricades, cones and drums shall not be intermixed in lateral transitions.

10. Arrows denote direction of traffic only and do not reflect pavement markings.

11. Longitudinal dimensions are to be adjusted to fit field conditions. See Index No. 600.

12. For general TC2 requirements and additional information refer to Index No. 600.

TYPICAL APPLICATIONS

Utility Work
Pavement Repair
Structure Adjustments
GENERAL NOTES

1. All vehicles, equipment, workers and their activities are prohibited at all times from the lane areas reserved for traffic.

2. Work operations shall be confined to one center travel lane, heading the adjacent travel lanes open to traffic.

3. For work operations of 60 minutes or less see Index No. 602.

4. When vehicles in a parking zone block the line of sight to TCZ signs or when TCZ signs approach on a normal pedestrian walkway, the signs shall be posted and located in accordance with Index No. 7502.

5. The first two warning signs, each side, shall have a 18" x 18" (Min.) orange flag and a Type B light attached and operating at all times. Warnings may be used for maintenance and utility operations (daylight only); Type B lights and orange flags are not required.

6. All signs shall be post mounted if the closure time exceeds 12 hours.

7. Advance warning arrow panel is required for both day and night operations.

8. Channelizing devices are to be spaced with cones at 20 centers and Type 1 or Type II berillades and drums of 50 centers for the first 250, thereafter cones at 50 centers and Type 1 or Type II berillades or drums of 100 centers.

9. Arrows denote direction of traffic only and do not reflect pavement markings.

10. Longitudinal dimensions are to be adjusted to fit field conditions. See Index No. 600.

11. For general TCZ requirements and additional information refer to Index No. 600.

TYPICAL APPLICATIONS

- Utility Work
- Pavement Repair
- Structure Adjustments

CONDITIONS

WHERE ANY VEHICLE, EQUIPMENT, WORKERS OR THEIR ACTIVITIES ENTRAP ON THE PAVEMENT REQUIRING THE CLOSURE OF THE CENTER LANE.
GENERAL NOTES

1. These illustrations are representative of general conditions. Conditions differing from those shown shall be treated as directed by the Engineer.

2. The intensity of light and the position of panels shall be as specified in Index No. 600.

3. The Advance Warning Vehicle (Optional) may be used at the direction of the Engineer. If an Advance Warning Vehicle is operated within the travel way, an approved Truck Mounted Attenuator will be required on the Advance Warning Vehicle but not required on the Shadow Vehicle. The Advance Warning Arrow Panel and Warning Sign are required on both the Advance Warning and Shadow Vehicles.

4. For general TCI requirements and additional information refer to Index No. 600.

SYMBOLS

[Diagrams and symbols are shown, including:
- Work Vehicle With Flashing Beacon
- Shadow (S) Or Advance Warning (AW) Vehicle
- Truck Mounted Attenuator (TMA)
- Lane Identification And Direction Of Traffic]

TYPICAL APPLICATIONS

- Striping
- RPM Placement
- Vegetation Control

CONDITIONS

MOVING OPERATION

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION
RESEARCH PARK

MOVING OPERATIONS
**CONDITION A**

*When the paving train is in lane 1, the U-turning vehicle shall cautiously turn into lane 2 and proceed in lane 2 to the front of the train.*

**CONDITION B**

*When the paving train is in lane 2, the U-turning vehicle shall cautiously turn into lane 1 and proceed in lane 1 to the front of the paving train.*

**CONDITION A & B**

*The advance warning arrow panels are required, under no circumstances will the traffic transition be located within the limits of the crossover.*

---

**SYMBOLS**

- **Work Area**
  - Type I or Type II Barricade Or Drum (With Steady Burning Light At Night Only) L Cones May Be Used During Daylight Only
  - Type I or Type II Barricade, Cone Or Drum

- **Work Zone Sign**
  - Advance Warning Arrow Panel

- **Work Vehicle**

- **Lane Number**

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**TRAFFIC TRANSITION AREA UPSTREAM FROM CROSSESVER**

**CASE I**

**GENERAL NOTES**

1. When crossovers do not exist, the contractor will construct temporary crossovers in accordance with Index No. 507.

2. **Length of taper in feet**
   - 6 for speeds 40 mph or below
   - 900 for speeds 40 mph or above

   Where:
   - \( W \) = Width of lateral transition in feet
   - \( S \) = Posted speed limit (MPH) prior to work operation

3. The maximum spacing between devices (ft) within the lateral transitions shall be equal to the speed limit (MPH) but not greater than 25 for cones or 50 for Type I or Type II barricades or drums.

4. Arrows denote direction of traffic only and do not reflect pavement markings.

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**STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION**

**ROAD DESIGN**

**TEMPORARY CROSSESVER FOR PAVING TRAIN OPERATIONS • RURAL**

**TEMPORARY CROSSESVER FOR PAVING TRAIN OPERATIONS • RURAL**

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**SIGN NO. 1**

**SIGN NO. 2**

**SIGN NO. 3**

**SIGN NO. 4**

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**ADVANCE WARNING ARROW PANEL**

**FLASHING OR SEGMENTARY MODE**

(See Index No. 507) To Be Triangular Mounted and Actuated By Flagger Upon Approach Of The Work Vehicle.)

**60' X 60'**

**MERGE RIGHT ON FLASHING ARROW**

**TRUCKS ENTERING HIGHWAY**

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**STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION**

**ROAD DESIGN**

**TEMPORARY CROSSESVER FOR PAVING TRAIN OPERATIONS • RURAL**
CONDITION A

WHEN THE PAVING TRAIN IS IN LANE 1 THE U-TURNING VEHICLE SHALL CAUTIOUSLY TURN INTO LANE 2 AND PROCEED IN LANE 2 TO THE FRONT OF THE TRAIN.

CONDITION B

WHEN THE PAVING TRAIN IS IN LANE 2 THE U-TURNING VEHICLE SHALL TURN INTO LANE 3, CAUTIOUSLY MERGE INTO LANE 1 AND PROCEED TO THE FRONT OF THE PAVING TRAIN.

CONDITION A & B

THE ADVANCE WARNING ARROW PANEL IS REQUIRED. UNDER NO CIRCUMSTANCES WILL THE TRAFFIC TRANSITION BE LOCATED WITHIN THE LIMITS OF THE CROSSED.

CASE II

TRAFFIC TRANSITION AREA DOWNSTREAM FROM CROSSED

Note: See Sheet 1 of 2 for general notes, Sign No. details, and conditions.
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 indexes No. 601, 602, 607. 

2. Construct shoulder pavement to provide two-lane two-way traffic over shoulder and existing pavement during Phase I roadway construction. For lane width requirements see Index 600. Signage as shown, with the near 1500' zone modified in accordance with Index 604, to be in place prior to shoulder pavement construction.

LEGEND

**SYMBOLS**

- **\(\text{\#}^\) Sign With 18" x 18" (Min.) Orange Flag And Type B Light
- **\(\text{\#}^\) Type I Or Type II Barricade Or Drum (With Steady Burning Light) At Night Only. Cones May Be Used During Daylight Only
- **\(\text{\#}^\) Work Zone Sign

**STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION**

**TRAFFIC CONTROL PARAMETER WORK ZONES**

**CONVERTING TWO Lanes TO FOUR Lanes DIVIDED - RURAL**

**NOTES:**

- See Sheet 2 of 2 for General Notes.
**SYMBOLS**

- **Road Closed**
- **Construction Meters**
- **Detour**
- **Sign With 18" x 18" (Min.) Orange Flag and Type B Light**
- **Type I Or Type II Barricade Or Drum (With Steady Burning Light At Night Only). Cones May Be Used During Daylight Only**
- **Type III Barricade (With Flashing Light)**
- **Work Zone Sign**

**GENERAL NOTES**

1. The first two warning signs shall have a 18" x 18" (Min.) orange flag and a Type B light affixed and operating at all times.

2. Existing signs and pavement markings that conflict with construction signing and marking shall be obliterated or removed.

3. Lane widths for multi-lane two-way traffic should preferably be equal to lane widths of the existing facility, but lanes shall not be less than 12 feet in width. Where one lane one way operations are necessary, a minimum width of 12 feet shall be maintained and traffic controlled in accordance with minimum AASHTO 600, 600, 600, 600, and 600. Minimum width for the temporary shoulders is 6 feet.

4. The maximum spacing between warning devices within clear zones (1 ft) to be equal to the speed limit in mph but not greater than 25 for cones or 50 ft for Type I or Type II barricades or drums. Barricades, cones, and drums shall not be interspersed in speed transitions. The minimum spacing between warning devices used for delineation between the travel way and construction area shall be 25 ft for cones and 50 ft for Type I or Type II barricades or drums.

5. Barricades shall be in accordance with "Protection Requirement for Dotted Lines" in AASHTO 600.

6. For speed limit applications see Index No. 600.

7. Where directional reflective extensions raised pavement markers shall be placed on the objectives and spaced 40 ft on centers on tangent roadway and 20 ft on centers on curves.

8. Additional barricades, signing, lighting or other traffic control devices shall be installed for limited work areas in accordance with other applicable TCC criteria.

9. Arrows guide direction of traffic only and do not reflect pavement markings.

10. Longitudinal dimensions are to be adjusted to fit field conditions. See Index No. 600.

11. When a side road intersects the highway on which work is being performed additional traffic control devices shall be erected in accordance with other applicable TCC criteria.

12. Provisions approved by the Engineer shall be made for the removal of storm water from the roadway(s) during construction.

13. For general TCC requirements and additional information refer to Index No. 600.
**GENERAL NOTES**

1. All signing, pavement marking, barricades and warning lights necessary for maintenance of traffic shall conform to Index No. 600.

2. The first two warning signs shall have a 9" x 18" (MIN.) orange flag and a Type B light attached and operating at all times.

3. Lane widths for maintenance of two-way traffic should desirably be equal to lane widths of the existing facility, but lanes shall not be less than 10 feet in width. Where lane one-way operations are necessary, a minimum width of 12 feet should be maintained and traffic controlled in accordance with Index Nos. 620, 623 or 624.

4. All signals for intersections, signals shall be directed or relocated as required to the center of realigned lanes.

5. No additional right-of-way shall be opened along the center of realigned areas of the realignment area shall be in accordance with local, local, state, county or other appropriate TCO, indices as conditions warrant in each phase.

6. Provision prepared by the Engineer was made for the removal of storm water from the roadway in the construction.

7. Arrives designated area of traffic control and no area of right-of-way markings.

8. Longitudinal dimensions are to be adjusted to fit field conditions. See Index No. 600.

9. For general TCO requirements and additional information refer to Index No. 600.

**SYMBOLS**

- **Sign With 9" x 18" (MIN.) Orange Flag And Type B Light**
- **Type I Or Type II Barricade Or Drum With Steady Burning Light At Night Only. Cones May Be Used During Daylight Only**
- **Type III Barricade (With Flashing Light)**
- **Work Zone Sign**
- **Stop Bar**

**LEGEND**

- **Phase I**
- **Phase II**
- **Phase III**

**STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION**

CONVERTING TWO LANES TO FOUR LANES DIVIDED • URBAN

**CONTRACTOR’S RECORD**

- **Owner:**
- **Contractor:**
- **Job No.**
- **Contractor’s No.:**
- **Net Pay:**
- **October:**
- **Month:**
- **Year:**
- **Signature:**
- **Print Name:**
- **Title:**
**SYMBOLS**

- **Diamond**: Sign with 18" x 18" (Min) Orange Flag and Type B Light
- **Circle**: Type I or Type II Barricade or Drum (With Steady Burning Light At Night Only), Cones May Be Used During Daylight Only
- **Square**: Type III Barricade (With Flashing Light)
- **Square with Diagonal Line**: Work Zone Sign
- **Square with Diagonal Line**: Crash Cushion

**PHASE I**

1. Maintain two-lane, two-way traffic over existing facility.
2. Construct temporary structure, approaches, guardrail, and crash cushions.
3. The signing shown in the Phase I diagram is required whenever equipment or workers are within 15 feet of the existing pavement edge.

**PHASE II**

1. Re-sign and mark as shown in Phase II plan.
2. Route traffic to detour and maintain two-way traffic on detour, install Type II barricades.
3. Construct proposed structure and reconstruct or resurface existing approaches.

**PHASE III** (See Sheet 2 of 2)

**GENERAL NOTES** (See Sheet 2 of 2)
PHASE II

1. Reroute traffic to exiting alignment and maintain two-way traffic.
2. Remove all temporary construction items.

GENERAL NOTES

1. All signing, pavement marking, barricades and warning lights necessary for maintenance of traffic shall conform to Index No. 600.
2. The first two warning signs shall have a 18" x 18" min. I orange flag and a Type B light attached and operating at all times.
3. For speed sign applications see Index No. 600.
4. For lane width requirements see Index No. 600. When one way one lane operations are necessary, a minimum width of 12 feet shall be maintained and traffic controlled in accordance with Indexes Nos. 603, 604, 606, 607 or 608. Minimum width for the detour shoulders is 6 feet.
5. Method of attaching temporary guardrail to the detour structure to be approved by the Engineer.
6. Provisions approved by the Engineer shall be made for the removal of storm water from the roadway s1 during construction.
7. Temporary crash cushions shall be the inlet type in accordance with Index No. 415 or others as called for in the plans.
8. Arrows denote direction of traffic only and do not reflect pavement markings.
9. Longitudinal dimensions are to be adjusted to fit field conditions. See Index No. 600.
10. Where the temporary structure is not required the detour may be constructed in accordance with Index No. 609, unless otherwise specified in the plans.
11. Mono-directional reflective colorless raised pavement markers shall be placed on the edge lines and spaced 40' on centers on tangent roadway and 20' on centers on curves.
12. For general TCZ requirements and additional information refer to Index No. 600.
### Clear Zone of Curved Alignment (CZc), Feet

<table>
<thead>
<tr>
<th>D</th>
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<th>Design Speed (Vmph) and Clear Zone (CZ, Feet)</th>
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**Step 1:** Select CZc value from chart on sheet 2.

**Step 2:** On sheet 2 of 2 tables, select the "Design Speed" and "Tangent" CZc values that match the speed and CZc value from Step 1.

**Step 3:** Move down the "D" column to the degree of curve under consideration, then across the table to the column found under Step 2 to find the CZc value.
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- 7505 External Lighting For Signs (2 Sheets)
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- 9565 Bridge Span Truss For Overhead Signs, Assembly Details For Type A B Or C Truss
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- 17727 Signal Cable And Span Wire Installation Details
- 17733 Aerial Interconnected
- 17736 Electric Power Service
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- 17791 Cabinet Installation Details
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<td>Added Note 6, added reference to Breakaway Feature on Index 17501, added THWN conductors.</td>
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<td>Added the use of THWN conductors to Note 15.</td>
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<td>Revised note to show Shop Drawings going to the Engineer of Record.</td>
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<td>Added note referring to Section B-630-3.3, removed the grout between the base plate and foundation.</td>
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<td>Added the use of THWN conductors, revised to show pull boxes nested in 12&quot; of pearock.</td>
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<td>Revised to show P.E. Control located 8' above ground, revised service specifications.</td>
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<td>Updated pay item numbers.</td>
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<td>Revised Direction of Travel arrows.</td>
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<td>1 of 6</td>
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<td>Revised speed distance chart, removed asterisk and Notes A and B, revised sign numbers, added school crosswalk minimum note.</td>
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<td>Removed RPM's from Detail A and B, removed Detail B and changed detail C to Detail B, modified notes.</td>
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<td>Revised notes, deleted Detail D, added reference to Detail A Index 1 of 4.</td>
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<td>Deleted detail Placement of Edgelines and deleted Detail E, revised notes.</td>
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<td>Added note placement of Wrong Way Arrows, deleted detail for delineator support.</td>
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<td>17346</td>
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<td>Rearranged details, added ceramic marker detail, modified notes, added Placement of Edgeline Detail, modified pavement markings.</td>
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<td>Rearranged details and revised notes.</td>
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<td>Deleted Detail A and rearranged details, add notes on crosswalk.</td>
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<td>Removed Detail A, removed RPM's from detail, deleted details for Beginning And Ending Divided Highway, added details for One-Way Signs For Divided Highway, deleted detail for improper pavement marking.</td>
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<td>Rearranged charts, revised details showing sign numbers W9-1 and W9-2, deleted pavement width transition note, deleted Edge of Pavement Marking Detail and added Typical Transition Marking Detail, revised transition distances in L1 Table and added formulas, added detail on sign W9-1 and W9-2.</td>
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<td>Added Detail Dual Left Turn Termination at R.R., rearranged details, deleted Detail Placement Of Edge Line, combined speed charts into one.</td>
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<td>Revised detail for wheel chair ramp and added note all crosswalk markings white.</td>
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<td>Rearranged sheet, revised R.R. crossings to 8&quot;.</td>
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<td>Rearranged sheet, added notes.</td>
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<td>Rearranged notes and added Note 5.</td>
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<td>Rearranged sheet, added Note 5.</td>
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<td>Rearranged sheet, deleted Nose Marking Detail and Island Marking Detail, deleted notes.</td>
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<td>Deleted all details and added new details.</td>
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<td>Revised sign FTP-911, added Detail A, added Sign MOT-1, MOT-2 and MOT-3, added Note 5.</td>
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<td>Revised Type B Arrow to Type III on Sign FTP-27.</td>
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<td>Removed Drop Pipe Details. Added Notes 6 and 7, added material specifications to detail of opposing signs, added Adjustable Hanger Detail.</td>
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<td>Added dimensions to Sign FTP-41.</td>
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<td>Added Handicapped Pavement Symbol, added details of placement of lines, revised handicapped parking space to 12' min. Revised crosswalk width to 6' min. 10' std., added Note 6.</td>
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<td>Revised sweep of conduit into pull boxes. Added note to use 12&quot; of pearly rock under pull boxes, added note to seal ends of conduit.</td>
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<td>Revised drop pipe to adjustable hangers, removed detail in circle and gave contractor an option to use drip loop or coil.</td>
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<td>17736</td>
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<td>Added note about mounting of lightning arrestor.</td>
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<tr>
<td>17781</td>
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<td>Revised general notes.</td>
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<td>Revised Type G Arrangement and added notes.</td>
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<td>17784</td>
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<td>Added sidewalks to details and dimensions from pole to sidewalk.</td>
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<td>Added notes to Pole Mounted Cabinet Detail.</td>
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<td>11860</td>
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<td>Revised notes, disallowed single post installation for some signs.</td>
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<td>Revised notes, revised designs, deleted some designs.</td>
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<td>11863</td>
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<td>11864</td>
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<tr>
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<td>New index.</td>
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1. Ground rods 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 rods connected in parallel shall be used. Conductors shall have minimum test equipment 25 bare copper conductor wire should be used. Conductors shall have minimum test equipment 25 bare copper conductor wire should be used. Pair conductors shall be installed for any underground work. The conductor wires shall be identified with the utility company. The utility company shall provide all necessary bonding of the ground rods to the utility system.

2. Contactors shall be responsible for contacting all utility companies prior to any underground work. The utility company shall provide all necessary bonding of the ground rods to the utility system.

3. Contactors shall determine the service required for the power company transformer. Inspections shall be held at the pre-construction conference.

4. The power company reserves the right to insist on the installation of the necessary equipment on the power company's premises. The contactor shall provide all necessary bonding of the ground rods to the utility system.

5. Any damaged portion of a grounded steel pipe and equipment shall be bonded to the system with section 582 of the Standard Specifications.

6. Poles and brackets shall be designed in accordance with the design criteria specified in the plan and the approved or specifications. The contactor shall provide all necessary bonding of the ground rods to the utility system.

7. The label shall be placed on the pole, with the design criteria specified in the plan and the approved or specifications. The contactor shall provide all necessary bonding of the ground rods to the utility system.

8. Before final acceptance, contactors shall provide 2 sets of full-size drawings to the specification agency.

9. Contactors shall provide 2 sets of full-size drawings to the specification agency.

10. Pole and bracket specifications may be adjusted, as required, by the Engineer, to prevent outages with the utility company's specifications. The contactor shall provide all necessary bonding of the ground rods to the utility system.

11. Where a pole is constructed, the poles shall be placed a minimum of 5 feet from the face of the pole.

12. Poles shall be positioned to provide sufficient clearance for adequate access to the pole. All necessary bonding of the ground rods to the utility system shall be provided.
SCREW TYPE FOUNDATION SPECIFICATIONS

1. The foundation shaft and base plate shall be ASTM A-36 structural steel, or better.
2. The anchor bolts shall be ASTM A-325, or better.
3. All bolts shall be sufficient to withstand 6,000 lb.- ft. of torque, applied above the shaft of the foundation.
4. The foundation shall have a tendon in the base plate at least 6" in diameter.
5. The tendons shall be bored to indicate the orientation of the foundation.
6. The encasement shall be provided in the form of the foundation by means of an opening of at least 3 square inches.
7. The foundation shall be designed for installation using a right-hand turning sequence with a slight down pressure.
8. The minimum installation force shall be at least 6,000 lb.- ft. or be less than 3,000 lb.- ft.
9. The base plate shall be not only grounded after fabrication to ASTM A-123.

SCREW TYPE FOUNDATION DETAIL

CONCRETE PULL BOX DETAIL

1. Pull boxes shall be concrete with cast iron cover or approved equal.
2. The pull box shall be designed and tested to meet AASHTO H-40 loading 90,000 lb. single axle load over any 10' x 10' area cover to be free of steel threads.
3. Boxes may be needed for deep conduit and for more working room.

PULL BOX WIRING DETAIL

1. Pull box shall be surrounded with concrete or approved equal.
2. Ground wire shall be connected to the concrete with ground clamp.
3. Pull box shall be connected to the approved ground clamp.
DETAIL "A"
AERIAL FEED

Notes:
1. Photoelectric control as required.
2. All neutral wires to leave white insulation, do not use white or green insulated wire for ungrounded conductors.
3. A pull box is required at each service point.

DETAIL "B"
UNDERGROUND FEED

1. The enclosure shall be NEMA 3R, pole mounted, non-rigid.
2. The enclosure door shall be lockable by padlock and four keys provided to the maintaining agency. The door shall have a minimum of three hinges and be unbreakable. No screws to be used to attach door.
3. 460 V minimum rating bolt-in type breakers shall be used.
4. Busbar to be copper coated and have a minimum rating of 100 amperes. When each breaker exceeds 100 amp, busbar to match breaker ampereage.
5. Lighting contactor, transformer, and H.O.A. switch inside enclosure. The enclosure to be sized to accommodate as many breakers as called for and all other service equipment.
6. The enclosure to be rigidly attached to the pole face.
7. A 600 V lightning protector shall be wired inside the enclosure.
8. A main breaker is required in all service panels with 2 or more feeder breakers.
9. All service equipment shall be U.L. approved.
SIGN LIGHTING INSTALLATION

The roadway lighting contractor shall provide a means for sign lighting entry into a pole base or a pull-out base installed in the lighting circuit, and loop 2 of lighting circuit connectors for connection by sign contractor.

The sign contractor shall furnish and install luminaires, wiring, wire, conduit, junction boxes, and all other electrical equipment necessary for connection to roadway lighting circuit as provided by the roadway lighting contractor.

When roadway lighting circuits are not available the designer shall include pull-out boxes in the plans to furnish and install conduit, conductor, pull-box, and service point equipment.

Compression type connectors properly taped and waterproof shall be used.

See Roadway Lighting Plans for sign service locations.

PLACEMENT OF SIGN LIGHTS

1. Luminaires shall be located so that the lamp center is 4" - 0" in front of the sign face.
2. Luminaires shall be located so that the back of the fixture is placed 4" - 0" below the bottom edge of the sign face.
3. Luminaires from manufacturers who recommend that their fixture be tilted shall be mounted on a bracket which provides the recommended tilt.
4. Reference date for mercury vapor luminaires prepared for sign lighting shall be submitted for approval to the Lighting Engineer, Florida Department of Transportation.

PLAN

OVERHEAD POWER SUPPLY

For details of Luminaire Mounting Bracket See Index 17025 1 2 of 2

IPT's Mercury Vapor Luminaire With Deluxe White Lamp Luminaire To Be Fixed With A 10 Amp FMC Fuse

Conduit To Enter Up Down And Along Sides Sign Can To Junction Boxes See Other Details This Sheet

Luminaires Housing & Ballast Compartment Will Be Enclosed With Drum Plugs. Drum Plugs Will Be Resecured And Screened Against Insects Upon Installation.

Note 36 Waterproof Enclosure Luminaire With A 30 Amp Breaker, Mounted On Sign Structure Away From Traffic.

GROUND LUG ATTACHED TO METAL SIGN STRUCTURE

Splices To Be Made With Compression Sleeves Then Properly Insulated & Waterproofed.

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION

EXTERNAL LIGHTING FOR SIGN ( MERCURY VAPOR )

CONTRACT NO.

DEPS-7548

REVISIONS

17505 1 of 2
### HIGHWAY LIGHTING PAY ITEMS

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<th>Description</th>
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<td>Luminaire and Bracket Arm - Each</td>
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- Operation To Be Performed  
- Material Type  
- Size  
- Type  
- Number Not Used  
- Strengthening Existing Foundation |
| 715-6-xb | Luminaire - Each |  
- Operation To Be Performed  
- Material Type  
- Number Of Arms  
- Type  
- Mounting Height (in feet) |
| 715-7-xb | Load Center - Each |  
- Operation To Be Performed  
- Material Type  
- Size  
- Type  
- Secondary Voltage  
- Primary Voltage  
- Number Not Used  
- Repair |
| 715-9a-abb | High Most Lighting Pole Complete - Each |  
- Operation To Be Performed  
- Material Type  
- Size  
- Type  
- Number Not Used  
- Strengthening Existing Foundation  
- Repair |
| 715-10-xxa | Light Pole Foundation - Each |  
- Operation To Be Performed  
- Number Not Used  
- Repair |
| 715-11-abb | Luminaire - Each |  
- Operation To Be Performed  
- Material Type  
- Number Of Arms  
- Type  
- Classification  
- Mounting Height (in feet) |
| 715-14-xb | Pull Box - Each |  
- Operation To Be Performed  
- Material Type  
- Size  
- Type  
- Number Not Used  
- Repair |
| 715-15-abb | High Most Parts - Each |  
- Operation To Be Performed  
- Material Type  
- Size  
- Type  
- Number Not Used  
- Repair |
| 715-36-xb | Frangible Base For Light Pole - Each |  
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- Material Type  
- Size  
- Type  
- Classification  
- Mounting Height (in feet) |
| 715-37-xxa | Photo-Electric Control Assembly - Each |  
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- Material Type  
- Number Of Arms  
- Type  
- Classification  
- Mounting Height (in feet) |
| 715-38-xxa | Pre-Fab Pileaster - Each |  
- Operation To Be Performed  
- Material Type  
- Size  
- Type  
- Mounting Height (in feet) |

**Notes:**  
- Identifies Items Normally Requiring Shop Drawings - Contractor Shall Determine Other Items Requiring Shop Drawings.
### Footing Dimensions

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<th>SPACING</th>
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### Bill of Varying Reinforcing

### Bill of Constant Reinforcing

### Footings for Overhead Sign Trusses

- **NOTES:**
  1. All reinforcing steel shall be of Grade 60.
  2. All exposed areas shall be sealed.
  3. All concrete shall be Class B. The minimum specified compressive strength of 28 days FCD shall be 3,000 PSF.
  4. If contractor elects to furnish a cast base in lieu of D.T.E. standard details, he shall furnish an order book spacing plan for such use.
## Footing Design

### Footing Dimension

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### Bill of Constant Reinforcement

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**NOTES:**

1. All reinforcing steel shall have a 3' minimum of concrete cover and shall be of Grade 60.
2. All required edges to be shotcreed unless otherwise shown.
3. All concrete shall be C-40 per Section 10.2.3 of the Florida Building Code.
4. Compression strength of 40 ksi to 41 ksi shall be 1,400 psi.
5. All joints at the top surface shall be 1" in diameter.
6. All bars shall be furnished with an Anchor Bolt Spacing Plan for each unit.

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**OVERHEAD CANTILEVER TRUSSES**

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION
STRUCTURAL DESIGN

**FOOTING FOR OVERHEAD SIGN TRUSSES**
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</tbody>
</table>

**NOTES**

1. This drawing shows a typical arrangement of the column sizes and heights. The dimensions are approximate and should be verified with the original specifications.
2. The column sizes and heights are designed to meet specific load-bearing requirements. Ensure that the calculations and design considerations are in accordance with the relevant standards and codes.
3. The column footings are designed to provide adequate support and prevent settlement issues. Verify the details with the structural engineer.
4. The column sizes and footings are subject to change based on the final engineering assessment and site conditions.
5. This drawing is intended for reference only and should not be used for construction purposes without the approval of the project owner and design team.
6. In case of any discrepancies, please contact the project manager for clarification.
## Single Column Ground Signs

### Column Size, Column Height & Column Footings

### State of Florida Department of Transportation

#### Structures Division

---

### Single Column Ground Signs

<table>
<thead>
<tr>
<th>Height (ft)</th>
<th>Column Size</th>
<th>Column Height</th>
<th>Column Footing</th>
</tr>
</thead>
<tbody>
<tr>
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</tbody>
</table>

---

### Slip Base Details

**Note:** Slip base details are not included in this view. See Elevations C-9 and C-30 for slip base details.

---

### Sleeve & Base Plate Details

**Note:** Sleeve & base plate details are not included in this view. See Elevations C-9 and C-30 for sleeve & base plate details.

---

### Column Details

**Note:** Column details are not included in this view. See Elevations C-9 and C-30 for column details.

---

### Single Column Ground Signs

**Note:** Single column ground signs are not included in this view. See Elevations C-9 and C-30 for single column ground signs.

---

### Column Details

**Note:** Column details are not included in this view. See Elevations C-9 and C-30 for column details.

---

### Sleeve & Base Plate Details

**Note:** Sleeve & base plate details are not included in this view. See Elevations C-9 and C-30 for sleeve & base plate details.

---

### Column Details

**Note:** Column details are not included in this view. See Elevations C-9 and C-30 for column details.

---

### Single Column Ground Signs

**Note:** Single column ground signs are not included in this view. See Elevations C-9 and C-30 for single column ground signs.
### Notes

1. This standard is used for the design and construction of water-based and land-based footings. The design criteria are based on the following factors:
   - The load capacity of the footing is determined based on the type of soil and the estimated load on the footing.
   - The size of the footing is determined based on the type of soil and the estimated load on the footing.
   - The footing is designed to be able to support the load without failure.

2. The design criteria are based on the following factors:
   - The load capacity of the footing is determined based on the type of soil and the estimated load on the footing.
   - The size of the footing is determined based on the type of soil and the estimated load on the footing.
   - The footing is designed to be able to support the load without failure.

3. The design criteria are based on the following factors:
   - The load capacity of the footing is determined based on the type of soil and the estimated load on the footing.
   - The size of the footing is determined based on the type of soil and the estimated load on the footing.
   - The footing is designed to be able to support the load without failure.

4. The design criteria are based on the following factors:
   - The load capacity of the footing is determined based on the type of soil and the estimated load on the footing.
   - The size of the footing is determined based on the type of soil and the estimated load on the footing.
   - The footing is designed to be able to support the load without failure.

5. The design criteria are based on the following factors:
   - The load capacity of the footing is determined based on the type of soil and the estimated load on the footing.
   - The size of the footing is determined based on the type of soil and the estimated load on the footing.
   - The footing is designed to be able to support the load without failure.

6. The design criteria are based on the following factors:
   - The load capacity of the footing is determined based on the type of soil and the estimated load on the footing.
   - The size of the footing is determined based on the type of soil and the estimated load on the footing.
   - The footing is designed to be able to support the load without failure.

7. The design criteria are based on the following factors:
   - The load capacity of the footing is determined based on the type of soil and the estimated load on the footing.
   - The size of the footing is determined based on the type of soil and the estimated load on the footing.
   - The footing is designed to be able to support the load without failure.

### Table: Steel Flanged Anchor Post Footings

<table>
<thead>
<tr>
<th>Height (FT.)</th>
<th>Steel Flanged Anchor Post Footings</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
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### Diagram: Steel Flanged Anchor Post Footings

- **Diagram Description:**
  - The diagram shows the cross-sectional view of a steel flanged anchor post footing.
  - The footing consists of a flange and a shaft.
  - The flange is used to distribute the load over a larger area.
  - The shaft is used to transfer the load to the soil.

### Single Column Ground Signs

- **Column Size:** 4 x 4 inches
- **Column Height:** 10 feet
- **Column Footings:**
  - State of Florida Department of Transportation
  - Design Criteria

### Column Size, Column Height & Column Footings

- **Column Size:** 4 x 4 inches
- **Column Height:** 10 feet
- **Column Footings:**
  - State of Florida Department of Transportation
  - Design Criteria

### Single Column Ground Signs

- **Column Size:** 4 x 4 inches
- **Column Height:** 10 feet
- **Column Footings:**
  - State of Florida Department of Transportation
  - Design Criteria
### Specifications

**ELEVATION**

- **Material:** The material used shall meet the requirements of the American Society for Testing and Materials (ASTM) Specification A-307 for hot-dip galvanized structural shapes.

**SECTION AA**

- **Flush Washer:** The flush washer shall not protrude more than 1/8" beyond the surface of the bolt.
- **Nuts:** The nuts shall be applied to the bolts from the inside of the structure.

**NOTES:**

- **Threaded Rods:** The threaded rods shall meet the requirements of the American Society for Testing and Materials (ASTM) Specification A-325.
- **Bolt Holes:** The bolt holes shall be drilled to accommodate the bolts.
- **Welds:** The welds shall be full penetration welds.

**Aluminum Bases for Column Supports**

- **Bases:** The bases shall be fabricated from aluminum alloy 6061-T6.
- **Mounting:** The bases shall be mounted to the columns using anchor bolts.

**BASES FOR OVERHEAD BRIDGE TRUSS 4 POST CANTILEVER TRUSS SINGLE POST CANTILEVER STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION STRUCTURAL DESIGN**

**Aluminum Bases for Column Supports**

- **Bases:** The bases shall be fabricated from aluminum alloy 6061-T6.
- **Mounting:** The bases shall be mounted to the columns using anchor bolts.

**NOTE:** For column sizes not shown, use larger diameter and wall thickness as required.
ELEVATION

Mounting of Exit Numbering Panels To Highway Signs

NOTE: Exit numbering panel shall be located to the right side for right exit and to the left for left exit.

GENERAL NOTES


SHEETS AND PLATES: Material used shall meet the requirements of Aluminum Association Alloy 6061-T6 and ASTM Specification B - 209. Sheets are to be degreased, etched, neutralised and treated with Aluminum 2024/T851 or - 1111. Bonding T701 or 751. No sheeting permitted on sheets.

MATERIALS: All aluminum members shall meet the requirements of the Aluminum Association Alloy 6061 - T6 and also the following ASTM specifications for the following: Sheet and Plate B - 209; Extruded Shapes B - 2211; and Standard Structural Shapes B - 209.

ALUMINUM BELTS, NUTS & LOCKWASHERS: Aluminum belts shall meet the requirements of the Aluminum Association Alloy 2014 - T4 or 6061 - T61; ASTM spec. G - 201. The belts shall have an overall coating of at least 0.0125 inch and be chrome plated. Lockwashers shall meet the requirement of Aluminum Association Alloy 6061 - T6 or 6063 - T6.

SKEW FACE: All sign face corners shall be rounded. See sign layout sheet for dimension "L" and sign face details.

MATERIAL STRESSES: Allowable stresses are in accordance with standard specifications for structural supports for highway signs, teacher's and traffic signals, A.A.S.H.O.1.2.2005, for all materials shown in the plans.

FOR MOUNTING DETAILS REFER TO DRAWING NO. 105, INDEX NO.

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION
ENGINEERING MANUAL

DETAIL FOR MOUNTING EXIT NUMBERING PANELS TO HIGHWAY SIGNS
**FOR FREEWAY USE**

**FOR OTHER THAN FREEWAY USE**

Note:
- All signs to have Green Reflective Background with Reflective White Legend and Border. Except signs no. FTP-4 & FTP-8 which shall have Reflective White Background with Black Legend and Border.
- All dimensions shown are in inches and angles.
- All signs to have Series E Legend.

Sign No. FTP-3
- 8" x 6" x 6" x 6"
- 2" Border - 6" Radius.

Sign No. FTP-4
- 6" x 5" x 5" x 5"
- 2" Border - 6" Radius.

Sign No. FTP-5
- 5" x 3" x 3" x 3"
- 2" Border - 6" Radius.

Sign No. FTP-6
- 4" x 4" x 4" x 4"
- 2" Border - 6" Radius.

Note:
- Sign No. FTP-4 to be used with sign no. FTP-5 & 50.
WEIGH STATION
AGRICULTURAL
INSPECTION
1 MILE

Sign No. FTP-13
0° - 0° x 9° - 6°
2" Border - 9° Radius.

ALL TRUCKS - TRAILERS
PICKUPS - VANS
NEXT RIGHT

Sign No. FTP-14A
9° - 0° x 7° - 0°
2° Border - 9° Radius.

WEIGH STATION
AGRICULTURAL
INSPECTION
NEXT RIGHT

Sign No. FTP-15A
9° - 0° x 7° - 0°
2° Border - 9° Radius.

TRUCKS - TRAILERS
PICKUPS - VANS

NOTE:
FIP-15A - Right Arrow
FIP-16 - Left Arrow

NEXT LEFT

Sign No. FTP-14B
0° - 0° x 7° - 6°
2° Border - 9° Radius.

NEXT LEFT

Sign No. FTP-15B
0° - 0° x 7° - 0°
2° Border - 9° Radius.

NOTE:
All signs shall have green reflectorized background with reflective white legend and border, except signs FTP-14A & 14B which shall have a reflective white background with black legend and border.

All dimensions shown are in inches and eights.

All guide sign corner radius shall be the outside corner of sign face cut square with border, Border to be mounted tangent to side of sign.

On Interstate Stations, deviates, Pickups-Vans, and reduce sign height accordingly.

All signs to have Series E legend.

STATE OF FLORIDA
DEPARTMENT OF TRANSPORTATION
HIGHWAY DESIGN

TYPICAL SIGNING FOR
TRUCK WEIGHT AND INSPECTION STATIONS

DRAFT DATED 10/24/73
DRAFTED BY

SCALE: 1" = 10'-0" FINAL DRAFT

DESIGNER

CHECKED BY

APPROVED BY

MIXED PORTION

SPECIALTY MASONRY
1. Traffic Control Devices for a School Cross-Walk
2. Traffic Control Devices for a School Cross-Walk at a STC
   AT A SIGNALIZED INTERSECTION

Note: Special speed restrictions are not normally applicable to these two cases.
3. Traffic control devices with flashing beacon for reduced speed zone at a school crosswalk
(2 lanes - 2 way traffic)
(Midblock or on thru street at an intersection)

4. Traffic control devices for a reduced speed zone at a school crosswalk (no flashing beacon)
(2 lanes - 2 way traffic)
(Midblock or on thru street at an intersection)

5. Traffic control devices for a reduced speed zone at a school crosswalk with overhead flashing beacon speed limit signs
(4 lanes undivided - 2 way traffic)
(Midblock or on thru street at an intersection)
6. TRAFFIC CONTROL DEVICES FOR A SCHOOL CROSS-WALK
WITHOUT A SPEED REDUCTION
(2 LAKES - 2 WAY TRAFFIC)

<table>
<thead>
<tr>
<th>Approach Speed MPH</th>
<th>Suggested Distance in Feet</th>
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<tbody>
<tr>
<td>25 to 35</td>
<td>200 A 50 B</td>
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<tr>
<td>35 to 50</td>
<td>350 A 65 B</td>
</tr>
<tr>
<td>40 to 55</td>
<td>500 A 80 B</td>
</tr>
</tbody>
</table>

7. TRAFFIC CONTROL DEVICES FOR A REDUCED SPEED ZONE AT A SCHOOL CROSS-WALK
WITH OVERHEAD FLASHING BEACON SPEED LIMIT SIGNS
(4 LANES DIVIDED - 2 WAY TRAFFIC)

8. TRAFFIC CONTROL DEVICES FOR SIGNALIZED WIDEBLOCK
SCHOOL CROSS-WALK

SCHOOL SIGNS & MARKINGS
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 visible to the driver, 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

SCHOOL SIGNS & MARKINGS

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION
TRAFFIC DESIGN

SCHOOL BUS STOP AHEAD

HORIZONTAL CURVE

VERTICAL CURVE

SCHOOL BUS STOP

24" x 24" W5-1
24" x 24" W5-2
30" x 30" F1P-36
3000 X 3000 X 3000 X 3000
3M02 10000 0000

END SCHOOL ZONE

Note

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 visible to a distance of 500 ft. in advance. A minimum of 50 ft. is recommended and should be located between the posted speed limit and the location where ever a school bus stops to pick up or discharge passengers. These signs are intended for use only where terrains and roadway features limit the approach sight distance and where there is no opportunity to relocate the stop to another location with adequate visibility.
PARALLEL ACCELERATION AND DECELERATION LANE

WON'T WAY ARROW
PLACEMENT OF REFLECTIVE PAVEMENT MARKERS AND DELINEATOR POSTS FOR LOOP RAMPS

PLACEMENT OF REFLECTIVE PAVEMENT MARKERS AND DELINEATOR POSTS FOR ENTRANCE AND EXIT RAMPS
PAINTED LEFT TURN STORAGE LANE(S) DETAILS
FOR STOP CONTROLLED OR SIGNALIZED INTERSECTIONS

NOTE:
Yellow left turn edge marking may be used adjacent to divided curb or grass median if stone use will
be allowed to drivers approaching a left turn storage lane.
With each additional 50%, of turn lane add one arrow.

TYPICAL CROSSWALK MARKINGS FOR CURB CUT RAMPS
REFER TO INDEX NO. 21358
FIGURE 1
MEDIAN WIDTHS UNDER 30 FEET
ONE-WAY SIGNS ON DIVIDED HIGHWAY INTERSECTIONS

FIGURE 2
MEDIAN WIDTHS 30 FEET AND GREATER

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

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

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION

SPECIAL MARKING AREAS

[Table with specifications]
RAILROAD CROSSING AT 2-LANE ROADWAY

RAILROAD CROSSING AT 4-LANE ROADWAY

NOTES:
1. When computing pavement messages, quantities do not include transverse lines.
2. When dynamic devices are not posted or are to be installed, the crossing shall be located at the future location of the R1 gate or signal and gate in accordance with notes (R1B).
3. Placement of signs R1-B in a residential or business district, where slow speeds are prevalent, the R1-1 sign may be placed a minimum distance of 60 feet from the crossing, where street intersections occur between the R1-1 pavement message and the tracks an additional R1-1 sign & additional pavement message should be used.
4. Recommended location for FTP-35 sign, X300, urban & X300H, rural.

Pavement Markings For Termination Of Two Way Left Turn At R/R Crossings.

TYPICAL PAVEMENT MARKINGS FOR R/R CROSSING

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION TRAFFIC DESIGN

SPECIAL MARKING AREAS

*Does not include 2 bars.
GENERAL NOTES:
1. For traffic and pedestrian signal indication, see Standard Indicators 222 through 226.
2. For herding law is set. See roadway design. Standard indicators 204 sheets 4 of 1 or 2.
3. For pavement markings and sign indication, see Traffic Design Standard Indicators 222 through 226.

SPECIAL EMPHASIS CROSS-WALK
Midblock - Signalized

<table>
<thead>
<tr>
<th>APPROACH SPEED M.P.H.</th>
<th>A&quot; SUGGESTED DISTANCE IN FEET</th>
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</thead>
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<tr>
<td>25 to 35</td>
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<td>30 to 45</td>
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<td>40 to 55</td>
<td>500</td>
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</tbody>
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STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION
TRAFFIC DESIGN

SPECIAL MARKINGS

SPECIAL EMPHASIS CROSS-WALK
Signalized or Stop Sign Controlled Intersection
ONLY LANE BIKE

PAVEMENT MESSAGE DETAILS

*NOTE*
When used on a bike lane (adjacent to vehicle lane), markings shall be placed adjacent to markings for vehicles. RJP-1 sign shall be sized and placed for vehicles.

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION

BICYCLE SPECIAL MARKING AREAS & DETAILS

F.A.A., FDOT

8 of 8 1/346
CASE 1: Yellow Reflectors

CASE 2: Red Reflectors

CASE 6: Black Reflectors

CASE 5: Dead End

Supplemental sign with distance panel to be used as needed

NOTE: For pavement marking see Index No. P-16
No guardrail is required unless special field conditions require its use

1. THIS INDEX APPLICABLE TO RESIDENTIAL AND MINOR STREETS ONLY
2. "T" INTERSECTION - TWO-WAY ARROWS AND REFLECTORS ARE OPTIONAL

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION
TRAFFIC DESIGN

TRAFFIC CONTROLS FOR STREET TERMINATIONS

[Signature]

[Stamp]
**GENERAL NOTES**

1. Only those services meeting criteria established by the Department and approved by the State Traffic Operations Engineer for each interchange shall be shown. Symbol signs for Medical services shall always appear in the following order reading from left to right and top to bottom: Gas, Food, Lodging, Phone, Hospitals, Camping.

2. The phallic symbol shall not be shown whenever any Gas, Food, Lodging or Camping symbol appears.

3. Only motorist service signs to have White Reflective Legend and Border with Blue Reflective Background.

4. Full size drawings of symbol signs are available from Traffic Plans and Standards, Dept. of Transportation, Tallahassee, Fla.

5. For mounting details see Index 9535 for Type "A" brackets or Index 9536 for Type "C" Franjolene.

NOTE: When approved for attachment to the advisory guide signs, the following signs shall be used:

1. Signs to be mounted at beginning of exit lane.

2. Potential Guide Sign (For Interchanges With Two Exit Ramps)

3. Potential Supplementary Guide Sign

4. See Detail "A" (For Interchanges With Two Exit Ramps)
STATE OF FLORIDA
WELCOME CENTER
1 MILE

SIGN NO. FTP-22A
4' 6" x 12' 6"
3" BKD. 3" RVD.
BLUE REF. BACKGROUND
WHITE REF. LEGEND & BORDER

SIGN NO. FTP-19
4' 6" x 12' 6"
2" BKD. 3" RVD.
BLUE REF. BACKGROUND
WHITE REF. LEGEND & BORDER
ORANGE REF. STATE SILHOUETTE
WHITE REF. "WELCOME"
1 sign NO. FTP-19 TO BE PAID FOR BY THE DEPT. OF TOURISM.

SIGN NO. FTP-24
5' 6" x 12' 6"
2" BKD. 3" RVD.

Note:
One sign FTP-22A or 22B should be used depending on speed, roadside development & geometric conditions.

RTE:
Roadway not drawn to scale

Notes:
1.5 Signs and sign structures shall be erected in accordance with the details shown on Index 9535.
2.5 Sign FTP-20 shall be located on the Welcome Center grounds in proximity to the building and as far from the Main Line Roadway as possible. 2 signs back to back.
3.5 Design of Florida Highway available on request from Traffic Pools & Standards Office of D.O.T.
4.5 All signs to be Series E.
1. Reflective Pavement Markers shall be spaced at 60 feet on all skip line lines and skip center lines. This spacing may be reduced to 40 feet if specifically called for in the plans.

2. The spacing on solid lines and solid/skip combination lines shall be 40 feet.

3. All R.P.M.'s shall be offset from solid lines.

4. These spacings may be reduced if required for sharp curves.
RPM PLACEMENT FOR TRAFFIC CHANNELIZATION AT GORE
(TRAFFIC FLOWS IN SAME DIRECTION)

NOTE
Raised pavement markers (Bi-Directional Amber and Colorless) should be used in all gores of this type.

RPM PLACEMENT FOR TRAFFIC SEPARATION
(TRAFFIC FLOWS IN OPPOSITE DIRECTION)

PLACEMENT OF RPMS ON SHOULDER MARKINGS

Shoulder Markings For Left Side Of Roadway Shall Be Yellow.
For Placement of RPMS On Ramps See Index 1736.

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION
TRANSPORTATION GRrage 4 DIRECTION

TYPICAL PLACEMENT OF REFLECTIVE PAVEMENT MARKERS
FLORIDA'S TURNPIKE

NUMERICAL SIZE

- For 2 Digits: 6" Series "C" - 24" x 24"
- 3 Digits: 8" Series "C" - 24" x 24"
- 4 Digits: 8" Series "G" - 24" x 36"
- More Than 4 Digits: 8" Series "B" - 24" x 30"

Notes:
1. All state route markers and auxiliary signs have Black Outline Legend with White Reflective Background.
2. Stroke width of State outline to be 1".

FLORIDA SHIELD FOR GUIDE SIGN USE

Arrow Detail for Sign FTP-27
TYPICAL INSTALLATIONS FOR SIGN PANELS MOUNTED ON SPAN WIRE

DETAIL OF SIGN CLAMP

TYPICAL SPAN WIRE INSTALLATION

DETAIL OF OPPOSING SIGNS SPAN WIRE MOUNTED

ADJUSTABLE HANGER FOR SIGN MOUNTING

NOTE 1. Other methods for attachment of the sign to the adjustable hanger may be approved by Transportation Traffic Operations.

2. Bottom edge of signs shall be approximately at the same elevation.

3. Type A shall be used for the sign in the center of the span only.

4. Type A shall not have wind braces.

5. Type B & C shall have wind braces.


7. All bolts, nuts, and washers shall be possessed stainless steel, AISI 304 series, commercial grade, type 36.

In order to ease installation, sign face No. 2 should be marked after mounting to span wire.

# Stainless steel round head bolts with nuts and lock washers. Bolts shall be spaced on 12" centers min.
NOTES:

1. Bridges should be marked as narrow bridges under the following conditions:
   a. The width of the approach roadway including shoulders is less than the
      width of the bridge shoulder.
   b. 2. For approach roadways without
      shoulder when the bridge
      shoulder width is less than 2'.

2. No passing zone should be extended
   1000' in advance of narrow bridge.

3. The post required delimiters shall be
   installed on both sides of the
   roadway.
   a. White On Right, Yellow On Left.
   b. For a distance of 1000' in advance of a narrow
      bridge if the bridge or the approach
      is on a curve.

4. Delimiters on both sides of roadway
   and near traffic approaching bridge.
FIGURE A
FOR USE IN AREAS NOT EXPOSED TO VENOMAR TRAFFIC AND UNDER DRIVEN'S

May be adjusted in field due to field conditions upon approval of project engineer.

FIGURE B
FOR USE IN ASPHALT ROADWAY ADJACENT TO GUTTER WHEN PLACEMENT OUTSIDE OF THE PAVEMENT IS NOT FEASIBLE.

Note:
1. Trench not to be open more than 24" at a time when construction area is subject to movement of pedestrian traffic.
2. Aspalt to be placed and removed to have a neat finish on both sides of the 24" pavement cut.
3. See note 3 Figure C.

FIGURE C
FOR USE IN INSTALLING CONDUIT UNDER EXISTING ASPHALT PAVEMENT NOT ADJACENT TO GUTTER WHEN JACKING IS NOT FEASIBLE.

Note:
1. Right conduit must be used when jacking under existing pavement at 3 ft. minimum depth.
2. Aspalt to be smooth at the top of the trench.
3. The tapered end replacement of the additional pavement width 24" will not be required when the trench can be constructed without disturbing the aspalt surface on either side.

FIGURE D
FOR USE IN INSTALLING CONDUIT UNDER A NEW ROADWAY PRIOR TO INSTALLATION OF CURBS, BASE AND PAVEMENT.

Note:
1. Sidewalk joints to match existing joints.
2. Entire sidewalk slab must be replaced when specified in the plans.
3. Backfill and tamp against filler to allow for additional length of trench within the driveway gutter with Class 3 concrete.

FIGURE E
FOR USE IN INSTALLING CONDUIT UNDER SIDEWALK.

Note:
1. Sidewalk joints to match existing joints.
2. Entire sidewalk slab must be replaced when specified in the plans.
3. Backfill and tamp against filler to allow for additional length of trench within the driveway gutter with Class 3 concrete.
FIGURE A
PULL BOX ENTRY OF CONDUIT UNDER SIDEWALKS

Note:
Ends of conduit shall be seated in accordance with section B. 6.305: 3.3 of the Supplementary Specifications to the NRS Standard Specifications for Road and Bridges Construction.

FIGURE B
ROADWAY
PLAN

UNDERRoadWAY
SECTION
UNDER NON-TRAFFIC BEARING SURFACE

Note:
The run of conduit 1 between pull boxes 1 shall not contain more than 300° of bend including pull box bends.

FIGURE C
FOR USE UNDER RAILROADS

Note:
Conduit depth to be at R/R requirement but not less 4 ft.
After Jacking. Leave Right Conduit As a Sleeve Extending To R/R Right Of Way Limits.
Note:
1. The service head hole for joint use poles may be drilled by the utility company or an angle of 90° but not less than 45° to the face of the pole.
2. Splicing wire should normally be used for distances of 10 feet or greater.

STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION

SIGNAL CABLE & SPAN WIRE INSTALLATION DETAILS

DESIGNER B.A. Smith

SIGNAL CABLE & SPAN WIRE INSTALLATION DETAILS

DESIGNER B.A. Smith
FIGURE A
CABLE DROP AND TERMINATION DETAIL
AERIAL INTERCONNECT FIGURE "B"

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

FIGURE C
CABLE DROP DETAIL
AERIAL INTERCONNECT MESSANGER WIRE WITH CLAMPS

Notes:
1. The messenger wire of the Interconnect cables shall be grounded to the copper ground wire of the pole or to the external wire extending down the pole.
2. When utilizing the external ground wire to the pole, a piece of 3/8" PtP conduit shall extend up the pole externally to a point eight (8) feet above finish grade to protect the ground wire connecting the messenger wire to the ground rod.
3. Locking cable ties or locking wire when used shall be placed no further than one (1) foot apart except at the point of contact with intersections where one (1) shall be placed at least two (2) feet from the messenger wire and another placed four (4) feet from that tie, when using Figure "B" interconnect cables only the locking cable ties shall be used.
4. If accessible the Internal ground wire of the support pole may be used to ground the messenger wire.
5. Coating wire should normally be used for distances of 50 feet or greater.
FIGURE A
AERIAL FEED
(NO METER USED)

FIGURE B
AERIAL FEED
(METER USED)

FIGURE C
UNDERGROUND FEED
(NO METER USED)

FIGURE D
TYPE "B" UNDERGROUND FEED
(METER USED)

FIGURE E
UNDERGROUND CABINET MOUNTED
(METER USED)

NOTE: The lightning arrester can be located on the side or bottom of the main disconnect enclosure at the Contractor's option.
Notes:
1. As an option, the contractor will be allowed to mount pedestrian signals on concrete poles and
   pedestals with the use of road anchors. Two bolts same size per hub. In lieu of the standard steel
   bolts.
2. Holes drilled or purchased in pedestrian signal pedestal shall be thoroughly cleaned of debris
   and covered with two 1/2 coats of the finish coat. As specified in the standard specifications for
   road and bridge construction. Gravel or ballast shall be included in base.
3. Graveling to be in accordance with section 623 of the
   standard specifications.
FTP-49 9" X 9"

WHITE BACKGROUND WITH BLACK LEGEND AND BORDER
WALK PLAQUE - WHITE LEGEND ON BLACK BACKGROUND
DON'T WALK PLAQUE - ORANGE LEGEND ON BLACK BACKGROUND
THE INTERNATIONAL SYMBOLS MAY BE USED FOR WALK AND
DON'T WALK.

FTP-48
1" SERIES "D"

FTP-47
1" SERIES "D"

CASE I
POLE PARALLEL TO CURBLINE
ALTERNATE TO FIGURE F

CASE II
POLE DIAGONAL TO CURBLINE
POLE MOUNTED CABINET

- Metal Pole
- Concrete Pole
- Wood Pole

**Notes:**

1. The manufacturer, size, and orientation of conduit swag will vary according to site location or location. One spare 2" PVC conduit shall be provided at all bases. The spare shall be in the direction of the center rear of the cabinet base and is to be field installed with a cleanout cap or plug to avoid clogging of conduit. The spare conduit is to be cut to fit and shall be capped with a weatherproof fitting.

2. Drawing to be in accordance with section 315 of the National Electrical Code.
RAILROAD GATE ARM LIGHT SPACING

<table>
<thead>
<tr>
<th>Specified Length Of Gate Arm</th>
<th>Dimension 'A'</th>
<th>Dimension 'B'</th>
<th>Dimension 'C'</th>
</tr>
</thead>
<tbody>
<tr>
<td>14 Fl.</td>
<td>12'</td>
<td>36'</td>
<td>5'</td>
</tr>
<tr>
<td>15 Fl.</td>
<td>12'</td>
<td>36'</td>
<td>5'</td>
</tr>
<tr>
<td>16 - 19 Fl.</td>
<td>12'</td>
<td>36'</td>
<td>5'</td>
</tr>
<tr>
<td>20 - 23 Fl.</td>
<td>12'</td>
<td>36'</td>
<td>5'</td>
</tr>
<tr>
<td>24 - 28 Fl.</td>
<td>10'</td>
<td>36'</td>
<td>5'</td>
</tr>
<tr>
<td>29 - 32 Fl.</td>
<td>9'</td>
<td>36'</td>
<td>4'</td>
</tr>
<tr>
<td>33 - 35 Fl.</td>
<td>9'</td>
<td>36'</td>
<td>4'</td>
</tr>
<tr>
<td>36 Fl. And Over</td>
<td>9'</td>
<td>36'</td>
<td>4'</td>
</tr>
</tbody>
</table>

NOTE:

MEDIAN SECTION AT SIGNAL GATES

MEDIAN SIGNAL GATES FOR MULTI LANE UNDIVIDED URBAN SECTIONS
(Four or more driving lanes in one direction, 45 MPH or Less)
**TYPICAL BRIDGE MOUNTS**

*Flash conditions may require adjustment of this standard distance.*

**TYPE I**

- To be used where bridge operations are full time on a daily basis.

**SEQUENCE CHART**

<table>
<thead>
<tr>
<th>SIGNAL SWITCH</th>
<th>FLASHING BEACON</th>
<th>DRAINBRIDGE AHEAD SIGN (See Note 9)</th>
<th>STOP HERE ON RED SIGN (Type 1)</th>
<th>TRAFFIC SIGNALS (Type 1)</th>
</tr>
</thead>
<tbody>
<tr>
<td>OFF</td>
<td>BLANK</td>
<td>OFF</td>
<td>OFF</td>
<td>OFF</td>
</tr>
<tr>
<td>ON</td>
<td>FLASHER</td>
<td>OFF</td>
<td>OFF</td>
<td>ON</td>
</tr>
</tbody>
</table>

**LEGEND**

- TRAFFIC SIGNALS: 1. Mad ACH (Off Bridge)
- DRAINBRIDGE AHEAD SIGN: 2. Modular Signs Mounted (On Bridge)
- STOP HERE ON RED SIGN (Type 1): 3. Ground Mounted
- ENTRANCE GATE: 4. Exit Gate
- EXIT GATE: 5. Thermoplastic Stop Bar

**NOTES:**

1. A push switch shall be installed to override each timing interval in case of a malfunction.
2. "STOP HERE ON RED" sign is optional in Type I operation and "TRAFFIC SIGNALS" are optional in Type II operation.
3. The time between the beginning of flashing yellow or "DRAINBRIDGE AHEAD" sign and the clearance of traffic signal to red or beginning of flashing red signal, shall not be less than the travel time of a pedestrian or, from the sign location to the stop line, traveling at the 85 percentile approach speed.
4. Beginning of operation of drainbridge 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 operator.)
5. Time of gate lowering and raising is dependent upon gate type.
6. Time of bridge opening is determined by the bridge operator.
7. Each gate shall be operated by a separate switch.
8. On each approach or Type I, all four red signals shall be on the same two circuit flashers, with the two top signals on one circuit, and the two bottom signals on the alternate flashing circuit.
9. A drainbridge ahead sign is required for both types of signal operation; however, a flashing beacon shall be added to the sign when physical conditions preclude a driver viewing of the sign at approach time during continuous view of the flashing red.
10. Requirements on gate installation are outlined in Section 4E - 14 through 4E - 17 of the Manual on Uniform Traffic Control Devices as revised by the FHWA.