



# **OFF-SYSTEM SAFETY INITIATIVE PROJECT PROCEDURES MANUAL**

**05/01/2014**

Revised 7/17/2014

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## SECTION 1

## INTRODUCTION

The purpose of this manual is to provide directions and guidelines governing the development of Off-System Safety Improvement projects to be let to contract and constructed by Local Governments using Federal funds administered by the Georgia Department of Transportation.

## DEFINITIONS

- ***A POLICY ON THE GEOMETRIC DESIGN OF HIGHWAYS AND STREETS, 6<sup>TH</sup> EDITION, 2011*** -- Commonly referred to as the “Green Book,” contains the current design research and practices for highway and street geometric design.
- **Ball-Bank Indicator (Inclinometer)** -- A device used to determine the appropriate advisory speed for a single or a set of horizontal curves
- **Barrier Lines** – Solid yellow line beside yellow skip line showing where passing is allowed or prohibited
- **Federal Bid Document** – A document detailing the work to be done by an independent Contractor for a Local Government (Sponsor) and meeting guidelines for a Federal funded construction project
- **Centerline Flip-Flop** – Point in passing zone where the barrier lines meet and passing ends each direction
- **Clear Zone** -- The *AASHTO Roadside Design Guide* defines a clear zone as the total roadside border area, starting at the edge of the traveled way, available for safe use by errant vehicles. This area may consist of a shoulder, a recoverable slope, a nonrecoverable slope, and/or a clear run-out area. A recoverable slope is a slope on which a motorist may, to a greater or lesser extent, retain or regain control of a vehicle by slowing or stopping. A clear run-out area is the area at the toe of a non-recoverable slope available for safe use by errant vehicles. Slopes steeper than 1V:3H are not considered traversable and are not considered part of the clear zone.
- **Contract Agreement** – This is a contract for an Off-System Safety Project jointly signed and approved by both the Local Government (Sponsor) and the Georgia Department of Transportation.
- **DMI** – Electronic Distance Measuring Instrument
- ***GEORGIA DEPARTMENT OF TRANSPORTATION STANDARD SPECIFICATIONS, 2013*** – GDOT Guidelines that govern the design and construction of roads and streets
- **Intersection Sight Distance (ISD)** – The length of highway along the intersecting road that gives drivers approaching intersections a sufficient, unobstructed view of the intersection and approaches to safely permit control of all vehicles through the intersection. ISD can be affected by the horizontal and vertical geometry of the approaches to the intersection.

- **MUTCD (MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES)** – A Federal guideline governing the use of all Traffic Control Devices and adopted by GDOT
- **ROADSIDE DESIGN GUIDE** – A Federal Guideline -- The guide is intended to be used as a resource document from which individual highway agencies can develop standards and policies. It focuses on safety treatments that can minimize the likelihood of serious injuries when a motorist leaves the roadway.
- **Passing Sight Distance (PSD)** – The length of highway made available to drivers on two-lane highways to pass slower vehicles as detailed in the MUTCD and the Green Book.
- **Sponsor** – The Local Government that is administering the Federal Off-System Safety Project (may also be known as the LG)
- **Stopping Sight Distance (SSD)** – The length of highway required for a driver to perceive an object in the road and safely stop to avoid a collision.
- **Stop Line (Bar)** – White Thermoplastic line used to establish a stopping point on a side road approach to an intersecting road – placed 4 feet to 30 feet from edge of intersecting roadway and at the point that provides optimum intersection sight distance.
- **Superelevation** – Banking of horizontal curve to maintain established speed design
- **Work Plan** – An attachment to the bid document that includes the details and plans developed from field studies that are needed for constructing an Off-System Safety Project

## REFERENCE GUIDES (Most Current)

- *MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES (MUTCD)* – Current Edition can be found at <http://mutcd.fhwa.dot.gov>
- *ROADSIDE DESIGN GUIDE* – Can be purchased from AASHTO at [https://bookstore.transportation.org/collection\\_detail.aspx?ID=105](https://bookstore.transportation.org/collection_detail.aspx?ID=105)
- *A POLICY ON THE GEOMETRIC DESIGN OF ROADS & STREETS, 6<sup>TH</sup> EDITION, 2011 (GREEN BOOK)* – Can be purchased from AASHTO at [https://bookstore.transportation.org/collection\\_detail.aspx?ID=105](https://bookstore.transportation.org/collection_detail.aspx?ID=105)
- *GDOT 2013 STANDARD SPECIFICATIONS* – Current Edition can be found at <http://www.dot.ga.gov/doingbusiness/TheSource/specs/DOT2013.pdf>
- *GDOT STANDARDS & DETAILS* – Current Edition can be found at [http://standarddetails.dot.ga.gov/stds\\_dtls/](http://standarddetails.dot.ga.gov/stds_dtls/)

## SECTION 2

## GENERAL INFORMATION

### I. Program Overview:

Over the past few years, off-system roads have accounted for over 40% of the fatalities in Georgia. Meeting Georgia's goals for fatality reduction in Georgia will require a significant investment in improving safety off the state route system. The program focuses on low-cost safety improvements that can be implemented within the existing rights of way of off-system routes that are likely to reduce the frequency and severity of crashes.

### II. Project/Route selection:

The program is intended to enhance off-system safety. It is not a grant program, and allocation of funds should not be based on even distribution among local jurisdictions or congressional districts. **Projects and routes should be selected based on safety need using a data-driven approach.** Crash summaries will be provided to each District annually to aid in project selection. Final roads selected for inclusion in Off-System Safety projects will flow through an established approval process.

### III. Eligible Contract Items:

- Raised Pavement Markers – Centerline (on roads with 22-foot minimum width)
- Rumble Strips
  - Shoulder
  - Centerline
  - Edge line
- Pavement Markings
- Edge lines (on roads with 20-foot minimum width)
- Centerlines (on roads with 18-foot minimum width)
- Stop bars
- Signing
- Chevrons
- Vegetation Removal
- Guardrail – excluding routine upgrades
- Guardrail delineation
- Traffic Signals if Crash Warrants are met and adequate turn lanes exist
- Advance post-mounted flashing beacons for intersections or school zones
- Pedestrian considerations such as wheelchair ramps if their installation is overly burdensome on the Sponsor and only if no additional right-of-way is required

**NOTE:** Off-System Safety funds may not be used to purchase additional right-of-way, install turn lanes or additional pavement, relocate utilities, or to do any work outside of the limits of the existing certified right-of-way.

#### **IV. GENERAL PROCESS STEPS:**

1. The Office of Traffic Operations shall develop and provide to the Local Grants Office an annual Safety Report Card for each District detailing the counties within each District with the greatest safety needs based on available crash data. The annual report will be forwarded to each District Engineer and respective State Aid Coordinator (SAC) for review and use in developing Off-System Safety (OSS) projects in counties/cities identified as having the greatest needs. Once a preliminary list has been developed and at the direction of the District Engineer, the SAC will approach the identified Local Governments (LG) also known as the Sponsor, to discuss the development of projects in their county/city and to solicit their involvement in administering the Off-System Safety project. Items included in the discussion will center around:
  - The County's Safety Report Card and identified high crash corridors
  - Other possible local road corridors identified by the LG as having problems (LG may be requested to provide crash data and crash history of roads)
  - Pavement condition on identified corridors
  - Possible needed prep work (patching/resurfacing) needed on the identified corridors prior to Off-System Safety project striping
  - Options for coordinating any needed improvements.
  - LG responsibilities

After the project list of roads has been completed by the LG (Sponsor) and the District, the SAC shall develop a prioritized Project List of roads (See Project Forms in Appendix A) for each selected LG. The Road Information List should include the Priority, Road Name, State Inventory Number, beginning and ending termini, work to be done (centerline, edgeline, stop lines, signage, or other allowable safety items), length of road, established speed limit, and total right-of-way (ROW) with the LG providing as much of this information as possible. The final list is then forwarded to the Local Grants Office for review. The Local Grants Engineer submits the package to the Approval Committee (Local Grants Administrator, State Traffic Engineer, and the Deputy Commissioner) for review and final approval.

2. The SAC shall work with the Sponsor to finalize the list of roads based on the following criteria:
  - a. Safety Improvement Potential
  - b. Existing pavement condition
  - c. Upcoming resurfacing schedules
3. The SAC and/or LG (Sponsor) shall analyze available Crash Data (provided by the Office of Traffic Operations and/or from GEARS) for each road segment included in the project prior to field work beginning to determine type of crashes occurring in the study section.
4. The SAC and/or LG (Sponsor) shall develop maps for each listed road from GDOT County Road Maps.

5. The SAC and/or LG (Sponsor) shall prepare Preliminary Estimates for each project using the “estimated” general prices shown below:
  - a. \$6000.00 per mile (includes one lane each direction) for roads that will receive signage and pavement markings
  - b. \$4000.00 per mile (includes one lane each direction) for roads that will receive pavement markings only.

*Note:* The above estimated prices are for projects using Highbuild Standard traffic paint. Prices should be adjusted for roads with more than two travel lanes and/or if Thermoplastic long lines are used. Prices should also be adjusted based on past similar projects in the District

6. Upon route selection and project approval, the **LG shall be responsible** for:
  - a. Certifying the ROW
  - b. Project Administration including:
    - Contract letting and contractor selection
    - Project Inspection
  - c. Removal of signs that may be replaced or relocated
  - d. Submitting for **reimbursement** as the work is completed. (It is important that the LG understands that this is not a grant program). A check is **not** provided up front, and the contract is for items of work rather than a dollar amount)
  - e. Repairing the road surface if needed prior to contractor beginning work
  - f. Possible roadway data collection may be required for contract preparation
  - g. A letter from LG on their letterhead stating there are no Utility/Railroad conflicts and if any are found, they will be resolved at the Sponsor’s expense prior to the completion of the project
  - h. If there are existing ADA conflicts and the Sponsor is agreeable to do the work needed to resolve the conflicts, the Sponsor shall provide a letter on their letterhead stating the conflicts will be resolved by the completion of the project and at their expense. (Any work done on GDOT ROW requires a Special Encroachment Permit prior to work beginning.)

*Note:* While Local Administered Project (LAP) Certification is not required to receive OSS funds, GDOT strongly recommends that LG remain informed about the GDOT’s processes and procedures regarding project delivery

7. The SAC shall prepare and send a request for project programming & PI Number to the Local Grants Engineer.

The following information should be submitted with the programming requests for each project.

- Description of proposed improvements
- County
- Municipality (if applicable)
- Congressional District(s) – note % if split
- Preliminary Engineering Cost Estimate (if applicable)
- Construction Cost Estimate
- Preliminary List of Routes



- Estimated total mileage
  - Statement of need (specific to the county, city, routes selected and the proposed counter-measures)
8. The SAC and/or LG (Sponsor) shall begin the field work creating an inventory of all pertinent data on each project road (See Project Field Guide section of this document).
  9. The SAC and/or LG (Sponsor) completes field data collection and then begins developing signing and special marking inventories, and striping quantities. The SAC then completes the Summary of Quantities for the project. (See Project Forms in Appendix A).
  10. Using the Summary of Quantities and pay item prices obtained from previous projects and/or the Item Mean Summary, the SAC prepares a final project estimate adding 20% contingency. If the final estimate is higher than the funding amount originally set up, request the Office of Financial Management to increase the project funding to accommodate the new estimate.
  11. The SAC then forwards a request to the Local Grants Engineer to have a Management Let Date established for the project. This let date is required for the Environmental and Right-of-Way, and Utility offices to schedule work on the certifications for the project. The project schedule is established by the State Scheduling Engineer in the Office of Program Control.
  12. The SAC shall prepare the certification packages:
    - a. Environmental Certification Request – Forward a request letter to the Local Grants Office for Environmental Certification. Include in the letter the type work to be done, if any earthwork is required, and if any of the project roads are adjacent to National Forest lands, Corp of Engineers property, or any historic/cultural properties. Include the Safety Action Project Road Information List and project maps in the request.
    - b. Right-of-Way (ROW) Certification Request – The SAC can either prepare and deliver the ROW certification document to the Sponsor or send the Safety Action Project Road Information List to the District Local Government ROW Coordinator for preparation and action. Make sure the ROW is shown for each road on the Road Information List. Once the document has been properly signed by the Sponsor and returned to the District, the SAC shall forward a copy to the Local Grants Office for further processing and final certification.
    - c. Utility/Railroad Certification Request –
      1. The SAC shall secure a letter from the Sponsor on their letterhead stating there are no Utility/Railroad conflicts and if any are found, they will be resolved at the Sponsor’s expense prior to the completion of the project.
      2. The SAC shall forward the Sponsor’s letter along with a request letter and the Safety Action Project Road Information List to the District Utilities Office requesting Utility/Railroad Certification for the project.

If there are existing ADA conflicts, the SAC should review the conflicts in the field and then discuss with the Local Grants Administrator. The Local Grants Administrator shall decide if the SAC will move forward to contact the Sponsor to see if they are willing to consider resolving the conflicts and if sufficient ROW is available for the upgrades. (Keep in mind, any work done on GDOT ROW requires a Special Encroachment Permit prior to work beginning.) If the Sponsor is contacted and agreeable to do the work needed to resolve the conflicts, the SAC shall proceed with obtaining a letter from the Sponsor stating the conflicts will be resolved by the completion of the project and at their expense. The Sponsor's letter should be attached to the letter from the SAC that states the plans have been reviewed and the project is ready for construction. The SAC should track the progress and completion of ADA upgrades by the Sponsor to ensure compliance by completion of the Off-System Safety project.

13. Certification Process: Local let projects follow the GDOT letting schedule for processing projects. All certifications are due 11 weeks prior to the letting. The 1625 should have been requested around 13 weeks. The request package for authorization, including the plans reviewed and ADA letters or statements should also be submitted to the Office of Engineering Services at 11 weeks.

Prior to authorization of the project, environmental certifications are only good for six (6) months. For example: If the project is in the June letting (let date of 6/20/14), the environmental certification must be dated 12/20/13 or later. The date of the certification is the important date, not the date of the document. These dates can be, but are not always the same.

Another example: If the document was approved on 11/30/13 and the certification was done on 12/20/13, then the certification is good for the June letting. In this example, if the certification had been done on the same day the document was approved, it would not be good for the June letting.

NOTE: ROW and Utility certifications don't expire.

Once the funds are authorized, no updated certifications are needed. It is expected that the Sponsors will let the projects soon after authorization.

14. The Office of Financial Management (OFM) F.I.R.E. Unit has recently mentioned that FHWA will be pulling back money from projects that have been authorized for a year but show no work or charges. This puts the project funding in danger of being "de-obligated". Once authorized, every effort should be made to guide the Sponsor through the Bid Document development and advertisement process as quickly as possible.
15. The Local Grants Engineer shall submit a 1625 request at the appropriate time during the Certification process or earlier. Funds should show up on the Project Financial Report (PFR) when all certifications and the 1625 funding request are approved.

16. The SAC shall prepare the Contract Agreement using the boiler plate contract provided.
17. The SAC shall, when project authorization is confirmed, prepare a transmittal letter from the District Engineer to be delivered with four (4) copies of the Contract Agreement to the Sponsor for approval. Please note in the transmittal letter that all four (4) copies of the Contract Agreement must be returned to the SAC (still intact & stapled).
18. The SAC shall finalize a generic sample Federal Bid Document and the project Work Plan (See procedures below) using documents developed from the field work, other project information, and the Bid Document Checklist (See Appendix) while awaiting approval of the Contract Agreement by the Sponsor
19. Once the Contract Agreements have been returned to the District Office and signed by the District Engineer, the SAC will forward three (3) of the signed Agreements to the Local Grants Office for processing. The fourth copy is to be filed in the District OSS project file.
20. The Local Grants Office shall review the submitted Contract Agreements and then route the contract package for signatures as follows:
  - a. Enter the contract into the Contract Authorization Tracking System (CATS) and prepare a CATS cover sheet.
  - b. Include a Project Financial Report (PFR) that reflects available funds in CST phase (authorized and “allotted”)
  - c. Place contract budget coding information on the first page of each contract.
  - d. Use the following information for FY-2014 contract coding. This information is subject to change each fiscal year.

FY-2014

City Contracts:

Account Code – 707001

Class – 315

Dept. ID – 4840470001

Program – 4180601

County Contracts:

Account Code – 707002

Class – 315

Dept. ID – 4840470001

Program – 4180601

- e. status of the approval can be tracked in CATS

21. The Local Grants Office shall forward two (2) copies of the fully approved Contract Agreement to the District when it has been executed by the Department.

22. The SAC shall deliver one (1) copy of the fully approved Contract Agreement to the Sponsor along with a Notice to Proceed letter from the District Engineer, the sample Federal Bid Document, and project Work Plan. The second copy of the approved Contract Agreement is to be filed in the District OSS project file.
23. The Sponsor is responsible for final development of the Bid Document in accordance with guidelines for Federal funded projects, State guidelines, and local requirements. The Department reserves the right to review the bid document prior to the bid advertisement.
24. The SAC shall review and approve the final Bid Document prior to official advertisement beginning.
25. The Sponsor shall advertise the project for no less than four (4) weeks with the ad being included in the Sponsor's (County's) legal organ for four consecutive weeks. The project may also be advertised on the Sponsor's web site in conjunction with the legal organ advertisement.
26. The Sponsor, after opening bids and the "Apparent Low Bidder" is announced, shall forward a copy of the Bid Tab and Bid Packages to the SAC for review and approval.
27. The Sponsor shall award the project to the most reliable and responsible low bidder that meets the requirements of the Bid Document.
28. The Sponsor may issue a Notice to Proceed to the selected Contractor once the necessary Payment and Performance bonds are in hand.
29. The Sponsor can schedule the required Pre-Construction Conference and work may begin.
30. The Local Grants Engineer shall send the low bid information to the OFM Project Programming Manager, Windy Bickers the project is awarded.
31. Work Begins – The SAC shall document the date the Contractor begins work
32. The Sponsor is responsible for shoulder clipping and old sign removals.
33. The Contractor is responsible for all utility locates and bagging all signs that are to be removed.
34. The Contractor may submit monthly invoices to the Sponsor. The Sponsor shall pay the Contractor following inspection of the work (The Sponsor is responsible for all inspections of the project). Once the Contractor is paid, the Sponsor may submit an invoice to the SAC for reimbursement.
35. The SAC should monitor the work periodically for conformance with specifications and standards. The Sponsor is responsible for day-to-day contract oversight, measurement, and payment.
36. Work Ends – The SAC shall document the date the work stops and is complete on the project.
37. PROJECT CLOSE-OUT – Before a federally funded Off-System Safety project can be closed out, the Sponsor and their Contractor must ensure several steps are completed as listed below:

- The Contractor shall provide the Sponsor:
  1. Documentation of completed punch list work
  2. The date work was completed on the project
  3. The necessary materials certifications
  4. Copies of Contractor payrolls for compliance with Davis-Bacon Wage Act guidelines
  5. Completed final certified retro-reflectivity test results for all project roads
  6. A final invoice broken down by road requesting final payment
  
- The Sponsor shall, upon receiving the request for final payment:
  1. Complete project inspection along with a final project review to ensure all accomplished work complies with the *Manual on Uniform Traffic Control Devices (current ed.)*, *Georgia Department of Transportation Standard Specifications (2013 ed.)*, and project plans
  2. Ensure all required project documentation (including Project Diary) are in hand and in order for future auditing by the FHWA
  3. Make the final payment to the Contractor including any retained funds for the project  
Note: The Sponsor is responsible for any expenditures over the federally allotted funds as established for the project by the Department
  4. Forward the Sponsor's Final Invoice to the Department for final reimbursement along with:
    - a. A copy of the Contractor's Final Invoice
    - b. A Certification of Final Acceptance form that states the Sponsor has accepted the work and maintenance on the roads included in the project signed by the Sponsor's Project Manager, County Manager, Commission Chairman, or other Sponsor designee
    - c. The Off-System Safety Improvement Project Statement of Final Project Expenditures
    - d. A Materials Certification letter on the Sponsor's letterhead and signed by the Sponsor's designee
    - e. The date work was completed on the project
  
- The SAC shall, upon receiving the Sponsor's request for final payment:
  1. Complete a review of the submitted project reimbursement requests
  2. Complete any cursory field reviews deemed necessary
  3. Forward the Sponsor's Request for Final Reimbursement to the Local Grants Office for action
  4. Copy Windy Bickers, Project Programming Manager in OFM with the final invoice.

**(Close-out document samples are included in the Appendix)**

38. The Local Grants Engineer shall email the Project Programming Manager, Windy Bickers with the final acceptance date for the project.

## **V. DEVELOPING PROJECT INVENTORIES, ITEM SUMMARY, AND PROJECT ESTIMATE**

1. Using the sample Sign Inventory (Excel) table (see PROJECT FORMS in Appendix A) and the information gathered on a particular section of road, begin building a Sign Inventory for each road. Info gathered in the field along with measured sight distance and advisory speed info will determine what type signs are needed along the study section.
2. Using the sample Special Pavement Marking Inventory (Excel) table (see PROJECT FORMS in Appendix A) and the information gathered on a particular section of road, begin building a Special Pavement Marking inventory for each road.
3. Once quantities have been determined for all potential pay items, use the Item Summary sheet (see PROJECT FORMS in Appendix A) to finalize the project quantities
4. Using the project quantities and estimated unit prices, prepare the Project Estimate

# PROJECT FIELD GUIDE

## SECTION 3

## PROJECT FIELD GUIDE

### I. DATA DOCUMENTATION

The necessary data collection and documentation will vary depending on the scope of the project. Below you will find a list of typical information that may be required to establish justification for Off-System Safety Project improvements.

### II. ROADWAY GEOMETRICS

1. Road width checked at least at every mile
2. Pavement surface type and condition
3. Beginning and ending of each horizontal curve noting if the curve is slight/sharp, if the entire curve is visible from end to end, and the type and direction of the curve.  
Example: A reverse curve might be documented as: 2.03 -- begin curve right; 2.14 -- curve right to left; 2.26 -- end curve left
4. Design Speed of individual and/or sets of horizontal curves
5. Degree and Superelevation of horizontal curves if needed
6. Hillcrests and Sags
7. Steep Grade Sections (Measure the grade at the steepest point and length of section)
8. Public Side Roads (usually only County/City maintained roads/streets), their name & county road / city street number if posted.
9. Major private drives with extreme sight distance restrictions
10. Hazards in the clear zone and their locations along the road such as trees, utility poles, culvert headwalls, narrow shoulders, major drainage structures, steep and deep front slopes, embankments, etc. – Include the distance from the near edge of pavement to the near edge of the hazard
11. Beginning and end of existing Guardrail along with the presence or lack of Delineators; potential Guardrail locations, why warranted, and shoulder & front slope description
12. Existing bridge structures, general condition, deck width and type, length, type of handrails, advance signage, and presence or need of guardrail, and existing delineators.
13. Curb & Gutter sections
14. Existing ADA ramps and existing sidewalk (width) along with existing crosswalks (note type)
15. Round-a-bouts and associated markings and signage



### **III. SIGNS**

1. Existing Traffic Control Signs, their location, direction they are facing, their type, legend, size, sheeting type, general condition, number of posts or structure type, and need
2. Type 2 and Type 3 Object Markers and all existing Delineators (especially at bridges/culverts)
3. Potential locations needing chevrons or single headed arrows
4. Special signs not included in the MUTCD but critical to driver expectation, and safe and efficient flow of traffic
5. Existing advance flashers for intersections or schools; the need for adding flashers based on crash history and/or the presence of restricted sight distance or public school facilities
6. Existing or the need for active radar signs

### **IV. PAVEMENT MARKINGS**

1. Long Lines – Double Yellow Centerline, beginning of Passing each direction, ends of Barrier Lines, Flip-Flops of the Centerline, and sections of Single Skip Lines, passing lane markings
2. Turn lane markings and tapers
3. Need for Edgelines
4. Existing Special Pavement Markings (Stop Lines, lane arrows, words on the pavement, rumble strips, R/R markings & symbols, crosswalks, school zones, etc.) – Their location, lane location, direction, type (thermoplastic or paint), beginning and ending milelogs, length, and condition
5. Length and location of missing Stop Lines
6. Existing bike lanes – beginning and end; location of pavement marking symbols
7. Railroad Markings
8. Raised Pavement Markers

### **V. OTHER ITEMS TO DOCUMENT**

1. Road-side Memorials – Check crash data for inclusion
2. Severely deteriorated sections of the road – Describe the condition
3. Severe shoulder drop-offs
4. Live stream crossings

### **VI. FIELD EQUIPMENT NEEDED FOR DATA COLLECTION**

- Electronic Distance Measuring Instrument (DMI)

- Ball Bank Indicator
- Calculator
- Orange Traffic Cone (at least 24 inches tall)
- Rod marked in one-foot increments with special marking at 3.5 feet
- 30-foot retractable carpenter's tape measure
- 100-foot steel measuring tape
- 4-foot carpenter's level (or 4-foot Smart Level)
- Measuring wheel
- Emergency Equipment – Flashing Amber light, reflective safety vest, etc.

## **VII. DATA COLLECTION**

1. Prepare Field Sheets including Field Notes Sheets, Curve Study Sheets, and Sight Distance Study Sheets (see PROJECT FORMS in Appendix A).
2. Check the cold tire pressure and make sure all four tires are equal in pressure. Vehicle must be sitting in flat and level area.
3. Set up the DMI (and calibrate if necessary) and level the Ball-Bank Indicator.
4. Set the DMI to show vehicle speed and then drive through the study section at posted or statutory speed limit noting severe curves, steep grades, sub-standard sight distance locations, narrow shoulder areas, road-side memorials, narrow and/or un-delineated bridges, and any other special outstanding features that may require traffic control devices. Random checks of the ball-bank indicator will give a general idea of the approximate speed design of the road.
5. Set the DMI to 0.000 and set up data collection sheets for the study section.
6. Begin data collection in the field starting at the same end shown in the Department's Transportation Data Inventory (if possible).
7. Turn on available Safety Equipment (flashing amber lights mounted on top of vehicle, emergency flashers, etc.).
8. When safe, start the DMI at the edge of the intersecting road at the beginning end of the study section and proceed, stopping as necessary to document various items along the roadway.
9. After documentation is complete, compute the distances between the curves to set up Safe Curve Speed Sheets (see PROJECT FORMS in Appendix A) for speed checks to determine the type advance curve signs needed and the need for advisory speed plates.
10. Drive through the set-up curve sections each direction at least three (3) times using a Ball-Bank Indicator until the speed is determined that fits the guidelines used for determining advisory speeds (as found in the Green Book and/or MUTCD) – Document the speeds driven and the Ball-Bank Indicator readings on each run each direction on the Safe Curve Speed Sheets for future reference.
11. Set up the Sight Distance Study Sheets (see PROJECT FORMS in Appendix A) listing each publicly maintained side road in the study section. Check the Intersection Sight Distance for each side or cross road to determine the need for advance warning signs. This is done using a 2-foot traffic cone and a rod marked at 3.5 feet. Set the traffic cone 14.5 feet back into the

mouth of the side road from the edge of the study-road. Drive on each approach to the side road carefully watching until the top of the cone is visible from the driver's position. Then get out of the vehicle walking toward the side road until you can see the 2-foot mark on the cone from the 3.5-foot mark (eye point) on the rod when standing in the middle of the approach lane. Using the vehicle DMI (or measuring wheel) to measure from the eye point location to the cone. Round the distance down considering any curvature in the road. Record the measurements on the Sight Distance Study Sheets and what is restricting the sight distance that is shorter than the distance shown for the posted speed limit on the Sight Distance chart included in the Appendix. Compare the measured distance to the Sight Distance chart to determine the need for advance warning signs.

If there are two side roads that are off-set by a short distance but one can be seen from the other, count the two as a single crossroad. Check the sight distance on each approach to the nearest of the two roads.

## **VIII. DATA VERIFICATION**

1. Compare ending mileage measurement with Systems Inventory length. If off more than 0.10 mile in 10 miles (1 percent per mile), rerun to find discrepancy and/or to make adjustments as necessary. The mileage can also be verified by comparing the documented milelogs of publicly maintained side roads to the milelogs shown in the Systems Inventory. Doing this may identify the area that needs to be checked.
2. After developing the Signing and Special Pavement Markings Inventories, print out a copy of both documents and re-ride each road to verify recommended installation locations re-delineating any changes. When complete, revise the official inventories to accommodate the changes before including in the Work Plan.

# **APPENDIX A**

# **PROJECT FORMS**



**PROJECT LIST  
ELBERT COUNTY**

**PROJECT # 00XXXXX**

**P.I. NO. 00XXXXX**

Priority	County Road Name	State Road Number	From:	To:	Centerline	Edgelines	Stop Bars	Signs	Speed Limit (mph)	Total Right-of-Way	Total Pymt. Width	Total Length (miles)	COMMENTS
1	ABC Road	CR 85	XYZ Road	123 Road	X	X	X	X	55	80	20	1.78	
2	DEF Road	CR 39	123 Road	PPPPP	X	X	X	X	50	50	20	3.06	
3	YYYYY Road	CR 19	End of Pavement	EFG Road	X		X	X	55	60	18	3.56	
4	XXXXX Road	CR 7	State Park Road	SR 23	X		X	X	55	60	19	2.03	
5													
6													
7													
8													
9													
10													
11													
12													
13													
14													
15													
16													
17													
18													
19													
20													
												10.43	

**ROADWAY PROJECT SUMMARY SHEET  
OFF-SYSTEM  
SIGN INVENTORY**

**PROJECT NO. 00XXXXX**

**XXXXXXXXX COUNTY**

Priority	Road Name	Beg. Point Milelog 0.00	Location Milelog	Road Side	Sign Faces (Direction)	Sign Code	Size	Qty	Action	Tp 3 Sheeting Sq. Ft.	Tp 9 Sheeting Sq. Ft.
1	ABC Road	XYZ Road	0.00	LT	W	R1-1	30 X 30	1	REPLACE		5.5
	Traveling Westbound		0.03	RT	E	R2-1(55)	24 X 30	1	ADD	5.0	
			0.28	RT	E	W1-2R	30 X 30	1	ADD		6.5
			0.48	LT	W	W1-2L	30 X 30	1	ADD		6.5
			0.76	RT	E	OM-3R	12 X 36	1	ADD @ STREAM X-ING		
			0.77	LT	W	OM-3R	12 X 36	1	ADD @ STREAM X-ING		
			0.88	RT	E	W1-2L	30 X 30	1	ADD		6.5
			1.12	LT	W	W1-2R	30 X 30	1	ADD		6.5
			1.35	RT	E	W1-2R	30 X 30	1	ADD		6.5
			1.56	LT	W	W1-2L	30 X 30	1	ADD		6.5
			1.56	RT	E	W1-2L	30 X 30	1	ADD		6.5
			1.75	LT	W	W1-2R	30 X 30	1	ADD		6.5
			1.77	LT	W	R2-1(55)	24 X 30	1	ADD	5.0	
			1.78	RT	E	R1-1	30 X 30	1	REPLACE		5.5
			1.78						END @ NOP ROAD		
2	DEF Road	123 Road	0.00	LT	N	R1-1	30 X 30	1	REPLACE		5.5
	Traveling Northbound		0.02	RT	S	R2-1(50)	24 X 30	1	ADD	5.0	
			0.04	RT	S	W1-2L	30 X 30	1	ADD		6.5
									<b>PAGE TOTALS</b>	15.0	75.0
<b>NOTE: ALL SIGN LOCATIONS ARE APPROXIMATE AND SUBJECT TO CHANGE BASED ON FIELD CONDITIONS, THE MUTCD, AND/OR THE SPONSOR ENGINEER'S DISCRETION</b>											

Priority	Road Name	Beg. Point Milelog 0.00	Location Milelog	Road Side	Sign Faces (Direction)	Sign Code	Size	Qty	Action	Tp 3 Sheeting Sq. Ft.	Tp 9 Sheeting Sq. Ft.
2	DEF Road	123 Road	0.09	LT	N	W3-1	30 X 30	1	REPLACE		6.5
	Traveling Northbound		0.10	RT	S	R2-1(45)	18 X 24	1	BAG FOR REMOVAL		
	(Cont.)		0.23	LT	N	W1-2R	30 X 30	1	ADD		6.5
			0.53	RT	S	W1-4L	30 X 30	1	ADD		6.5
			0.90	LT	N	W1-4L	30 X 30	1	ADD		6.5
			0.91	RT	S	OM-3R	12 X 36	1	ADD @ STREAM X-ING		
			0.92	LT	N	OM-3R	12 X 36	1	ADD @ STREAM X-ING		
			1.18	LT					ROAD		
			1.55	RT	S	OM-3R	12 X 36	1	ADD @ STREAM X-ING		
			1.56	LT	N	OM-3R	12 X 36	1	ADD @ STREAM X-ING		
			1.65	RT	S	W1-4R	30 X 30	1	ADD		6.5
			1.98	LT	N	W1-4R	30 X 30	1	ADD		6.5
			2.03	RT	S	OM-3R	12 X 36	1	ADD @ STREAM X-ING		
			2.03	LT	S	OM-3L	12 X 36	1	ADD @ STREAM X-ING		
			2.05	LT	N	OM-3R	12 X 36	1	ADD @ STREAM X-ING		
			2.05	RT	N	OM-3L	12 X 36	1	ADD @ STREAM X-ING		
			2.11	RT	S	W1-2L	30 X 30	1	ADD		6.5
			2.26	LT	N	W1-2R	30 X 30	1	ADD		6.5
			2.51	RT	S	W1-2L	30 X 30	1	ADD		6.5
			2.56	RT					ROAD		
			2.64	LT	N	W1-2R	30 X 30	1	ADD		6.5
			2.73	RT	S	W1-2L	30 X 30	1	ADD		6.5
			2.86	LT	N	W1-2R	30 X 30	1	ADD		6.5
			2.95	RT	S	W3-1	30 X 30	1	REPLACE		6.5
			3.04	LT	N	R2-1(50)	24 X 30	1	ADD	5.0	
			3.06	RT	S	R1-1	30 X 30	1	REPLACE		5.5
			3.06						END @ XXXXX ROAD		
									<b>PAGE TOTALS</b>	5.0	90.0

**NOTE: ALL SIGN LOCATIONS ARE APPROXIMATE AND SUBJECT TO CHANGE BASED ON FIELD CONDITIONS, THE MUTCD, AND/OR THE SPONSOR ENGINEER'S DISCRETION**



## ROADWAY PROJECT SUMMARY SHEET

### OFF-SYSTEM

**PROJECT NO. 00XXXXX**

**SPECIAL PAVEMENT MARKINGS**

**XXXXXXX COUNTY**

4/12/11

Priority	Road Name	Beg. Point Milelog 0.00	Location Milelog	Lane	Item Description	Qty	Action
1	ABC Road	XYZ Road	0.00	EB	STOP LINE	27 LF	INSTALL 10 FT BACK FROM XYZ ROAD
			0.00		CENTERLINE	50 LF	BEND LAST 50 FT TO 90 DEGREE APPROACH
			1.78	WB	STOP LINE	32 LF	INSTALL 14 FT BACK FROM NICKVILLE ROAD
			1.78		CENTERLINE	60 LF	BEND LAST 60 FT TO 90 DEGREE APPROACH
2	DEF Road	123 Road	0.00	SB	STOP LINE	20 LF	INSTALL 11 FT BACK FROM 123 ROAD
			3.06	NB	STOP LINE	21 LF	INSTALL 11 FT BACK FROM 789 ROAD
3	YYYYY Road	End of Pavement	1.05	SB	STOP LINE	27 LF	INSTALL 7 FT BACK FROM SR 23
			1.06	NB	STOP LINE	22 LF	INSTALL 7 FT BACK FROM SR 23
			3.56	SB	STOP LINE	20 LF	INSTALL 9 FT BACK FROM PPPP RD
4	XXXXX Road	State Park Road	0.00	EB	STOP LINE	32 LF	INSTALL 12 FT BACK FROM STATE PARK ROAD
			2.03	WB	STOP LINE	23 LF	INSTALL 10 FT BACK FROM SR 23

**SUMMARY OF QUANTITIES**  
**PROJECT # 00XXXXX**  
**XXXXXXX COUNTY OFF-SYSTEM**

Priority	Street Name	429-1000 Rumble Strips	636-1020 Tp 3 Sign Sheeting	636-1033 Tp 9 Sign Sheeting	636-2070 Tp 7 Posts	636-5030 Tp 3 Delineators	652-2501 5 In. Solid White Paint Stripe	652-2502 5 In. Solid Yellow Paint Stripe	652-3502 5 In. Skip Yellow Paint Stripe	653-0100 RR SYMBOL	653-0220 -- TP 2 WORD -- STOP	653-0240 -- TP 4 WORD -- AHEAD	653-1704 -- 24 In. Solid White Thermo	656-0240 -- Remove 24 In. Thermo Stripe	656-1004 -- Remove 4 In. Skip Stripe
		SF	SF	SF	LF	EA	LM	LM	GLM	EA	EA	EA	LF	LF	GLF
1	ABC Road		10.0	69.0	196	2	1.8	2.4	1.0				59		
2	DEF Road		10.0	126.0	364	8	6.2	4.6	1.6				41		1000
3	YYYYY Road		20.0	138.0	364	4		4.1	2.1				69		2200
4	XXXXX Road		10.0	103.0	266	4		3.7	0.4				55		550
5															
6															
7															
8															
9															
10															
11															
12															
13															
14															
15															
16															
17															
18		3													
19															
20															
21															
PAGE 1 TOTALS		3	50.0	436.0	1190	18	8.0	14.8	5.1	0	0	0	224	0	3750

Priority	Street Name	429-1000 Rumble Strips	636-1020 Tp 3 Sign Sheeting	636-1033 Tp 9 Sign Sheeting	636-2070 Tp 7 Posts	636-5030 Tp 3 Delineators	652-2501 5 In. Solid White Paint Stripe	652-2502 5 In. Solid Yellow Paint Stripe	652-3502 5 In. Skip Yellow Paint Stripe	653-0100 RR SYMBOL	653-0220 -- TP 2 WORD -- STOP	653-0240 -- TP 4 WORD -- AHEAD	653-1704 -- 24 In. Solid White Thermo	656-0240 -- Remove 24 In. Thermo Stripe	656-1004 -- Remove 4 In. Skip Stripe
		SF	SF	SF	LF	EA	LM	LM	GLM	EA	EA	EA	LF	LF	GLF
22															
23															
24															
25															
	PAGE 2 TOTALS	0	0.0	0.0	0	0	0.0	0.0	0.0	0	0	0	0	0	0
	PAGE 1 TOTALS	3	50	436	1190	18	8.0	14.8	5.1	0	0	0	224	0	3750
	PROJECT TOTALS	3	50.0	436.0	1190	18	8.0	14.8	5.1	0	0	0	224	0	3750

**XXXXXXXXXX COUNTY  
OFF-SYSTEM**

DATE: \_\_\_\_\_ PROJECT \_\_\_\_\_ PRIORITY: \_\_\_\_\_

STREET: \_\_\_\_\_ PROPOSAL: \_\_\_\_\_

LENGTH: \_\_\_\_\_ WIDTH: \_\_\_\_\_ SPEED LIMIT: \_\_\_\_\_

TYPE PAVEMENT \_\_\_\_\_ CONDITION \_\_\_\_\_

TYPE STRIPING \_\_\_\_\_ CONDITION \_\_\_\_\_

Mile Log	Description

### SAFE CURVE SPEED STUDY

LOCATION ID:								
COUNTY:								
POSTED SPEED (mph):			PAVEMENT CONDITION:			PAVEMENT TYPE:		
DATE:			OBSERVER(S):			WEATHER :		
REMARKS:								
DIRECTION OF TRAVEL	MILELOG		BALL-BANK INDICATOR DEGREE READINGS					
	BEGIN CURVE	END CURVE	SPEED #1	DEGREE #1	SPEED #2	DEGREE #2	SPEED #3	DEGREE #3

## SIGHT DISTANCE STUDIES

<b>LOCATION ID:</b>					
<b>COUNTY:</b>					
<b>POSTED SPEED (mph):</b>		<b>PAVEMENT TYPE.:</b>		<b>PAVEMENT COND.:</b>	
<b>DATE:</b>		<b>OBSERVERS:</b>		<b>WEATHER:</b>	
<b>REMARKS: Measured from 3.5 feet to 2.0 feet</b>					
MP	INTERSECTING ROAD	DIRECTION OF APPROACH		WHAT IS CAUSING SIGHT DISTANCE RESTRICTION?	WHAT IS CAUSING SIGHT DISTANCE RESTRICTION?
				BOUND	BOUND
		MEASURED DISTANCE (FT)			

**OFF-SYSTEM SAFETY IMPROVEMENT PROJECT  
MONTHLY INVOICE FOR FEDERAL REIMBURSEMENT**

SUBMITTED BY: \_\_\_\_\_

[SPONSOR]

SUBMITTED TO: **GEORGIA DEPARTMENT OF TRANSPORTATION**

DATE: \_\_\_\_\_

INVOICE #: \_\_\_\_\_

PROJECT NO: \_\_\_\_\_

PI NO: \_\_\_\_\_

COUNTY: \_\_\_\_\_

TOTAL PROJECT BUDGET: \$ \_\_\_\_\_

FEDERAL SHARE: \$ \_\_\_\_\_

LOCAL SHARE: \$0.00

**PROJECT PAYMENT PROGRESS**

Total Amt \$

PREVIOUS INVOICES SUBMITTED: \$ \_\_\_\_\_ \

CURRENT INVOICE AMOUNT: \$ \_\_\_\_\_

TOTAL SUBMITTED TO DATE: \$ \_\_\_\_\_

PERCENT SUBMITTED TO DATE: \_\_\_\_\_ %

By signature below, I hereby certify that the above amount, supported by the attached detail statement, is for work **completed** on the above project. Reimbursement for the federal share of this invoice is requested.

\_\_\_\_\_  
[SPONSOR PROJECT MANAGER]

\_\_\_\_\_  
DATE

APPROVED FOR PAYMENT: \_\_\_\_\_

[GDOT PROJECT MANAGER]

**APPENDIX B**

**PROJECT**

**CLOSE-OUT**

**DOCUMENTS**



**SPONSOR'S  
CERTIFICATION OF FINAL ACCEPTANCE**

**PROJECT NAME:** Off-System Safety Improvement Project

**PROJECT #:** \_\_\_\_\_ **PI#:** \_\_\_\_\_ **COUNTY:** \_\_\_\_\_

**GDOT CONTRACT ID # :** \_\_\_\_\_

I hereby certify that I, \_\_\_\_\_, am the \_\_\_\_\_ and duly authorized representative of \_\_\_\_\_ whose address is, \_\_\_\_\_ and it is also certified that:

- On behalf of the \_\_\_\_\_, I performed a final inspection of the PROJECT and certify all punch list work is satisfactorily completed and accepted.
- The \_\_\_\_\_ accepted the work from the CONTRACTOR on \_\_\_\_\_.
- The \_\_\_\_\_ hereby assumes full responsibility for the continued operation and maintenance of the PROJECT.

The \_\_\_\_\_ hereby certifies Sponsor's Final Acceptance of the PROJECT and respectfully submits:

Final Project Invoice

Materials Certification Statement

Other (please list) \_\_\_\_\_

\_\_\_\_\_  
\_\_\_\_\_

\_\_\_\_\_  
DATE

\_\_\_\_\_  
SIGNATURE

OFF-SYSTEM SAFETY IMPROVEMENT PROJECT  
STATEMENT OF FINAL PROJECT EXPENDITURES

SUBMITTED BY: \_\_\_\_\_  
[SPONSOR]

SUBMITTED TO: **GEORGIA DEPARTMENT OF TRANSPORTATION**

**FINAL INVOICE SUMMARY**

DATE: \_\_\_\_\_ INVOICE #: \_\_\_\_\_  
PROJECT NO: \_\_\_\_\_  
PI NO: \_\_\_\_\_  
COUNTY: \_\_\_\_\_  
TOTAL PROJECT BUDGET: \_\_\_\_\_  
FEDERAL SHARE: \_\_\_\_\_  
LOCAL SHARE: \$0.00

**PROJECT PAYMENT PROGRESS**

---

**PROJECT EXPENDITURES**

Construction Expenditures	\$
Total Project Expenditures	**\$

---

By signature below, I hereby certify that the above payments were made for work completed as shown on the attached detailed statement and supporting documents.

\_\_\_\_\_  
[SPONSOR PROJECT MANAGER]

\_\_\_\_\_  
DATE

APPROVED FOR PAYMENT: \_\_\_\_\_  
[GDOT PROJECT MANAGER]

**\*Please be sure to include all supporting invoices and documents. Invoice will not be processed without the required documents and sponsor signature.**

**\*\*Final payment – 100% of Total Project Expenditures not to exceed Federal Share.**

(Sponsor Letterhead)

(Date)

Mr. \_\_\_\_\_, District County Government Coordinator  
Georgia Department of Transportation  
(District Office Address)

RE: Materials Certification  
GDOT Project #00XXXXX  
XXXXXXX County

Dear Mr. \_\_\_\_\_:

This is to certify that the subject project was constructed in accordance with the Georgia Department of Transportation Standard Specifications & Supplemental Specifications, the Manual on Uniform Traffic Control Devices (current edition), the Davis-Bacon Wage Act, the approved Plans, and accepted engineering practices. The results of the tests on acceptance samples indicate the materials incorporated in the construction work and the construction operations controlled by sampling and testing were in conformance with the approved Plans and applicable Specifications.

**MATERIAL TESTING & SUPPLIERS**

SIGNS

Lyle Signs, Inc. – (assembly) – 200 Industrial Park; Desmet, SD 57231

Nichols Aluminum – (testing) – Decatur, AL

3M Brownwood Plant – (testing) – 4501 Hwy 377 South; Brownwood, TX 76801-5907

STRIPING

Swarco Industries – (glass beads & thermoplastic) – Columbia, TN

Safety Coatings, Inc. – (paint) – 20180 Safety Lane, P.O. Box 399; Foley, AL

Sherwin Williams – (paint) – 2325 Hollins Ferry Rd; Baltimore, MD 21230

**ON-SITE INSPECTION** – None Conducted

Should you have questions, please feel free to contact me at (706) 865-2235 or our Road Department at (706) 856-2510.

Sincerely,

\_\_\_\_\_, XXXXXXX County Manager

MJM:rkc

**APPENDIX C**

**ROADWAY**

**GEOMETRICS**

**INFO**

## **MEASURING THE DEGREE OF CURVATURE**

- **TOOLS NEEDED**

1. 100-foot Steel Measuring Tape
2. 30-foot retractable carpenter's Measuring Tape
3. Claw Hammer
4. Concrete Nails

- **PROCEDURE**

1. Walk along the shoulder to the mid-point of the curve – the most severe section of the curve.
2. When traffic allows and if an edge line is present on the outside of the curve, drive a concrete nail (leaving it sticking up) in the traffic edge of the line.
3. Attach the end of the 100-foot steel tape to the nail and pull out 62 feet (chord length) around the curve and lay the shoulder edge of the tape on the traffic side of the edgeline. Be sure to pull out a couple extra feet of tape to allow you to lay the hammer on the tape to hold it in place.
4. Walk back to the mid-point of the 62-foot chord (to the 31-foot mark) and, using the carpenter's tape, measure from the traffic side of the edgeline over to the shoulder side of the steel tape. The distance measured in inches is the approximate degree of curve. Example – 2.5 inches equals a 2 degree 30 minute curve.

## **MEASURING THE SUPERELEVATION OF A CURVE**

- **TOOLS NEEDED**

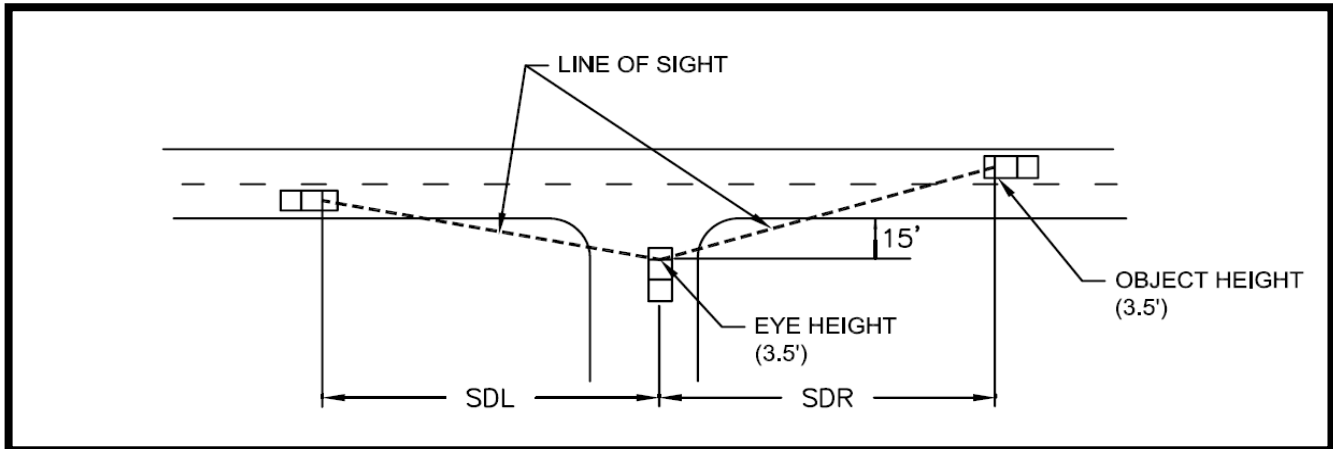
1. 4-foot carpenter's level
2. Retractable carpenter's tape or folding rule

- **PROCEDURE**

1. Find the midpoint of the curve.
2. After checking for traffic, lay the level transversely (perpendicular) to the lane
3. Raise the low end of the level until the middle bubble is centered
4. With the level bubble centered, using the retractable tape, measure from the bottom of the level down to the pavement.
5. To determine the superelevation divide the measurement (in inches) by the length of the level in feet (4 feet). Superelevation can be read as a slope rate. Example:  $1'' / 4'$  = slope rate of 0.25 inches/foot. This information is useful when using math to determine the proper advisory speed for a curve. (Due to the danger and difficulty associated with measuring the degree of a curve to determine the curve radius and the superelevation of the curve, The Ball-Bank Indicator method for determining advisory speeds is simpler, quicker, and safer). Measuring the superelevation can determine if reverse superelevation is present which can contribute to roadway departures crashes.

## MEASURING SIGHT DISTANCE -- WITHOUT MEDIANS

Minimum intersection sight distance criteria are provided in Table below. The line of sight establishes the boundary of a sight triangle within which there should be no sight obstruction.



ARTERIAL SPEED, MPH	SIGHT DISTANCE (FEET)						
	2 Lane	3 Lanes		4 Lanes		5 Lanes	
	SDL=SDR	SDL	SDR	SDL	SDR	SDL	SDR
15	170						
20	225						
25	280						
30	335	310	355	335	375	355	400
35	390	365	415	390	440	415	465
40	445	415	475	445	500	475	530
45	500	465	530	500	565	530	600
50	555	515	590	555	625	590	665
55	610	570	650	610	690	650	730
60	665	620	710	665	750	710	795

**INTERSECTION SIGHT DISTANCE REQUIREMENTS**

The sight distance criteria are based on the time required for a vehicle to make a left turn from a stop-controlled approach to the intersecting road (AASHTO Case B1). The time to execute the maneuver is based on recommendations contained in NCHRP Report 383, *Intersection Sight Distance*. The sight distances, for a two-lane road, are the distances traveled at the arterial speed during 7.5 seconds. The time is increased by 0.5 seconds for each additional lane to be crossed.

The sight distances given in the Table are for undivided highways. If the highway is divided, the effect of the median should be considered in determining the required sight distance. Based on the conditions, it may be feasible for the crossing maneuver to be done in two stages with a stop in the median. However, the intersection should only be treated in this manner if the signing and marking is accordingly provided. Otherwise, the sight distance requirements should be increased to account for the additional width that must be crossed. See ASSHTO Green Book, Chapter 9 Intersections, for adjustments due to grades greater than 3% and design vehicles other than passenger cars.

## **MEASURING THE GRADE OF A ROAD SECTION**

- **TOOLS NEEDED**

3. 4-foot carpenter's level
4. Retractable carpenter's tape or folding rule

- **PROCEDURE**

6. Find the midpoint of the grade section.
7. Lay the level longitudinally with the road and in the middle of the lane if possible, on the road edge if traffic is too heavy.
8. Raise the low end of the level until the middle bubble is centered
9. With the level bubble centered, using the retractable tape, measure from the bottom of the level down to the pavement.
10. To determine the grade divide the measurement (in inches) by the length of the level (48 inches). Move the decimal point two places to the right to gain the grade percentage. Example:  $2.5'' / 48'' = 0.052$  or 5.2% grade

## CLEAR ZONE REQUIREMENTS

Experience has shown that motorists occasionally run off the roadway and providing a traversable recovery area can lessen serious injury. AASHTO publishes a Roadside Design Guide that should be used as a reference when designing driveways.

Table 4-10 provides the clear zone distances as contained in the Roadside Design Guide. Driveways must be designed so that all areas within the Highway Right of Way have clear zones as defined in Table 4-10

(from AASHTO 2002 Roadside Design Guide)

DESIGN SPEED	DESIGN ADT	FILL SLOPES			CUT SLOPES		
		6:1 or Flatter	5:1 to 4:1	3:1	3:1	5:1 to 4:1	6:1 or Flatter
40 OR LESS	Under 750	7-10	7-10	**	7-10	7-10	7-10
	750 – 1500	10-12	12-14	**	10-12	10-12	10-12
	1500 – 6000	12-14	14-16	**	12-14	12-14	12-14
	Over 6000	14-16	16-18	**	14-16	14-16	14-16
45 – 50	Under 750	10-12	12-14	**	8-10	8-10	10-12
	750 – 1500	12-14	16-20	**	10-12	12-14	14-16
	1500 – 6000	16-18	20-26	**	12-14	14-16	16-18
	Over 6000	18-20	24-28	**	14-16	18-20	20-22
55	Under 750	12-14	14-18	**	8-10	10-12	10-12
	750 – 1500	16-18	20-24	**	10-12	14-16	16-18
	1500 – 6000	20-22	24-30	**	14-16	16-18	20-22
	Over 6000	22-24	26-32*	**	16-18	20-22	22-24
60	Under 750	16-18	20-24	**	10-12	12-14	14-16
	750 – 1500	20-24	26-32*	**	12-14	16-18	20-22
	1500 – 6000	26-30	32-40*	**	14-18	18-22	24-26
	Over 6000	30-32*	36-44*	**	20-22	24-26	26-28
65 - 70	Under 750	18-20	20-26	**	10-12	14-16	14-16
	750 – 1500	24-26	28-36*	**	12-16	18-20	20-22
	1500 – 6000	28-32*	34-42*	**	16-20	22-24	26-28
	Over 6000	30-34*	38-46*	**	22-24	26-30	28-30

**TABLE 4-10 CLEAR ZONE DISTANCES (IN FEET FROM EDGE OF TRAVELED WAY)**

- Notes:
- \* Clear zones may be limited to 30'
  - \*\* Fixed objects should not be present in the vicinity of the toe of these slopes. The width of the recovery zones should consider a number of factors including right of way availability, economic factors, safety needs, and accident history.

All areas located within the clear zones should remain clear of obstructions such as bridge abutments, poles, trees, etc. If obstructions are unavoidable, the design should include appropriate protection such as break-away design, guardrail installation, safety end treatments on culverts, etc. The Roadside Design Guide includes a table for horizontal curve adjustments, where the clear zone correction factor is applied to the outside of curves only. Curves flatter than a 2860 foot radius do not require an adjusted clear zone.



**APPENDIX D**

**SIGN**

**INFORMATION**

## **SIGNING REQUIREMENTS:**

Generally, only standard signs found in the *Manual on Uniform Traffic Control Devices* (Current Ed.) can be replaced and/or installed by the project. However, State and local highway agencies may develop special word message signs in situations where roadway conditions make it necessary to provide road users with additional regulatory, warning, or guidance information, such as when road users need to be notified of special regulations or warned about a situation that might not be readily apparent.

***Regulatory and warning signs should be used conservatively because these signs, if used to excess, tend to lose their effectiveness. If used, route signs and directional guide signs should be used frequently because their use promotes efficient operations by keeping road users informed of their location.***

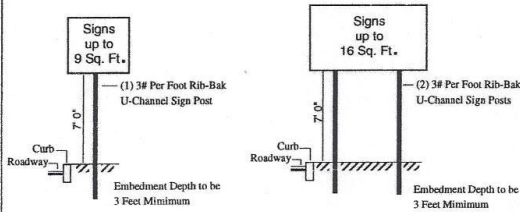
1. All signs shall be installed as per current *Georgia Standards & Specifications and Supplemental Standards* and the *Manual on Uniform Traffic Control Devices* (Current Ed.).
2. The project contractor is responsible for utility locates for all sign locations and installations.
3. It may be necessary for the LG to establish speed limits on unregulated roads included in the project. Spot speed studies may be needed as part of Engineering Traffic Investigations (ETI's) required by Georgia Code for enforcement using speed detection devices. ETI's are not necessary for roads not covered by a Speed Detection Devices permit but local authorities should always consider having qualified personnel conduct speed studies on each road for the purpose of determining the proper speed to be posted on a section of roadway. Once a proper speed limit is determined for a section of roadway, it should be formally established in a regular meeting of the Local Government's governing body and mentioned in the minutes of the meeting before appropriate signs are installed.

# Small Sign Installation Pocket Guide

**Conventional Signs** - This guide has been developed for conventional size signs only. Largest conventional sign is a 36"x48" speed limit sign (12 sq ft). Larger signs will require dual posts or stronger posts.

There are two factors needed for selecting the proper sign post type. They are:

1. Area of sign (Sq. Ft.)
2. Length of post (Ft.)



### Area of Sign

The area of the sign can be found by multiplying the length (ft.) by the width (ft.). This calculation is simple for square and rectangular signs. Irregular shaped signs require using a chart or memorizing the area. Irregular shaped signs include stop, yield, no passing, railroad crossing and school signs.

Sign Area Table

Square or Rectangular Signs			
Sign Size	Area (Sq.Ft.)	Sign Size	Area (Sq. Ft)
8"x36"	2.0	24"x24"	4.0
8"x48"	2.5	24"x36"	6.0
12"x18"	1.5	24"x48"	8.0
12"x24"	2.0	30"x15"	3.0
12"x30"	2.5	30"x24"	5.0
12"x36"	3.0	30"x30"	6.5
12"x48"	4.0	30"x36"	7.5
18"x18"	2.5	30"x48"	10.0
18"x24"	3.0		
18"x36"	4.5	36"x36"	9.0
18"x48"	6.0	36"x48"	12.0
21"x15"	2.0		

Irregular Shape Signs	
Sign	Area (Sq. Ft)
YIELD (RI-2) 36"x36"	4.0
YIELD (RI-2) 48"x48"	7.0
YIELD (RI-2) 69"x60"	10.5
NO PASSING PENNANT(W14-3) 48"x36"	6.0
RAILROAD WARNING (W10-1) 36"Dia.	7.1
SCHOOL (SI-I) 36"x36"	7.0
School Crossing (S2-I) 36"x36"	7.0
STOP (RI-I) 30"x30"	5.5
STOP (RI-I) 36"x36"	7.5
STOP (RI-I) 48"x48"	13.5

### Length of Post

The minimum length of post is the distance from the ground to the bottom of the sign added to the height of the sign and at least 3 more feet, the minimum distance installed into the ground.

Three (3) pound posts are easier and cheaper to install. Four (4) pound posts should not be used for most conventional sign installations. The 4 pound posts must be installed with breakaway footing which add to the cost and complexity of installing the heavier posts. Table 1 on the reverse side shows the cost effectiveness of dual 3.0 pound posts in comparison to 4.0 pound posts.



Georgia's Local Technical Assistance Program (800) 573-6445

### 2-Step Selection Guide

All posts should be driven or installed at least three (3) feet into the ground. Determining the proper post length is as simple as Two Steps:

- Step 1  $\Rightarrow$  36" signs or smaller (9.0 sq ft or less) - Use a 3# post and up to 13' total post length. (Check Table 1 for smaller size signs - example: sign faces of 4.5 sq ft or less can use a 18' length post.)
- Step 2  $\Rightarrow$  36", 48" or 60" signs (between 16 and 9 sq ft) - Use dual 3 # posts and up to 17' total post length. (Check Table 1 or smaller size signs - example: sign faces of 10.5 sq ft can use dual 20' length posts.)

Table 1  
FHWA Wind Load Design for Rib-back Posts - Sign Area (Sq. Ft.)  
Sign Post Length (Ground to Sign Bottom)

Post Size	6'	7'	8'	9'	10'	11'	12'	13'	14'
3.0 #/ft.	9.0	7.5	7.5	7.5	6.0	6.0	6.0	4.5	na
Dual 3.0 #/ft.	25.5	24.0	22.5	21.0	19.5	18.0	13.5	12.0	10.5
4.0 #/ft.	12.0	10.5	10.5	10.5	9.0	9.0	7.5	6.0	6.0

(Source: Marion Steel Co., 80 ksi steel posts, 70 mph pressures. This table only applies to 80 ksi steel posts, other steel posts will need different length posts for the design sign area.)

If you have any problems with the Two Step Post Selection Guide ask your traffic engineer.

### Examples of Post Length Selections Using the Three Step Selection Guide

#### Problem #1:

Install 36" stop sign on an urban road. The road is lower than the ground height and 3.5' from the edge of road. Choose the minimum length and weight post.

#### Solution:

Sign Area: 36" stop sign has 7.5 sq ft of sign area, See Sign Area Table, Irregular Shaped Signs  
Minimum length of post: 3' (foundation in ground) + 7' (urban area, ground to bottom of sign) + 0' (ground to road height) + 3' (36" sign height) = 13' post  
Choose weight of post - Check step one, sign is less than 9 sq ft and is 13' in length.  
Choose single 3# post - 13' length.

#### Problem #2

Sign Area: 24" x 36" speed limit sign on a rural road. The road is 5 feet higher than the ground level and 12' from the edge of the road. Choose minimum length and weight of post.

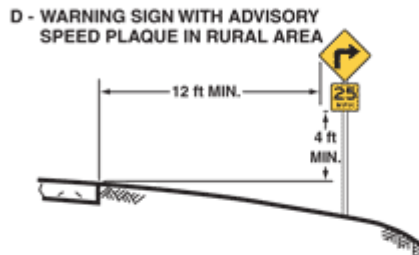
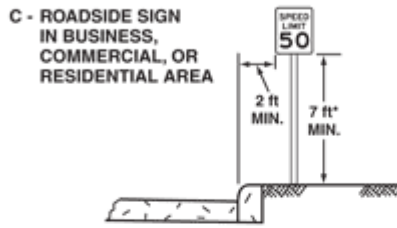
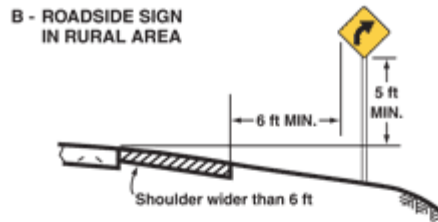
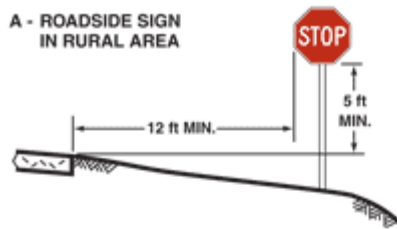
#### Solution:

Sign Area: 24"x36" sign is 2' by 3' and has a sign area of 6 sq ft. See Sign Area Table, regular shaped signs.  
Minimum length post: 3' (foundation in ground) + 5' (rural area, ground to bottom of sign) + 5' (ground to road height + 3' (36" sign height) = 16' post length.  
Choose weight of post - Check step one, sign is less than 9.0 sq ft and length is more than 13 feet; go to Table 1, sign is 6.0 sq ft. Table 1 allows a 6.0 sq foot sign face for a 12' length post from ground to sign bottom, add 3' for foundation and 3' from sign bottom to the top of sign (total allowed post length of 18').  
Choose dual 3# post - 16' length.

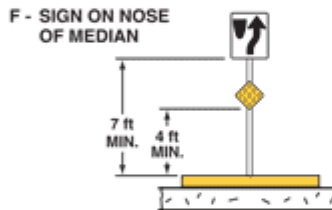
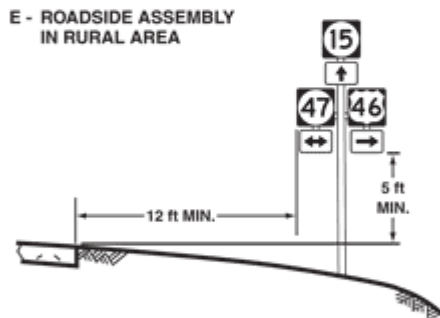
### Mounting Guide for Odd Shaped Signs

Sign Size	"X" Dimension	"Y" Dimension
24"x24"	22"	10"
30"x30"	28"	13"
36"x36"	34"	16"
48"x48"	40"	16"
36"x36"	28"	8"
48"x48"	34"	9"
60"x60"	46"	15"
48"x36"	27"	10"
18"x18"	22"	10"
30"x30"	36"	16"
36"x36"	44"	19"
48"x 48"	49"	16"
60"x60"	62"	19"

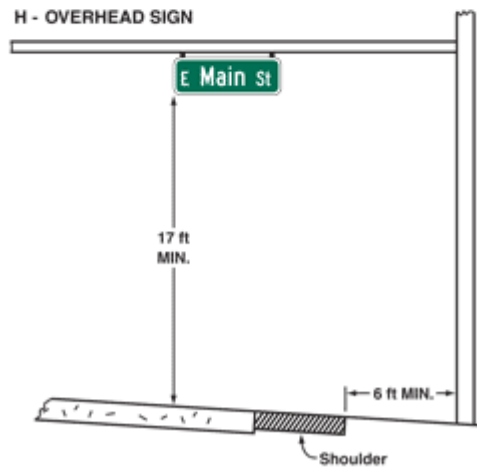
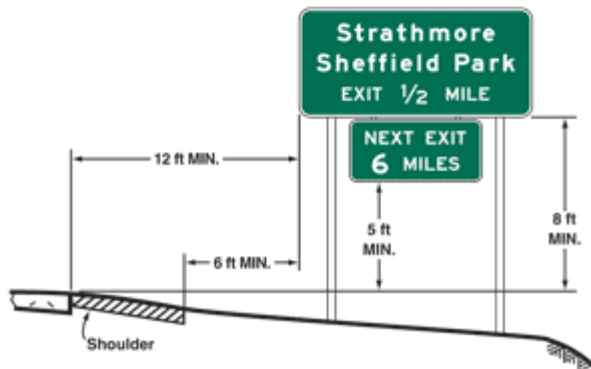
Figure 2A-2. Examples of Heights and Lateral Locations of Sign Installations



\*Where parking or pedestrian movements are likely to occur



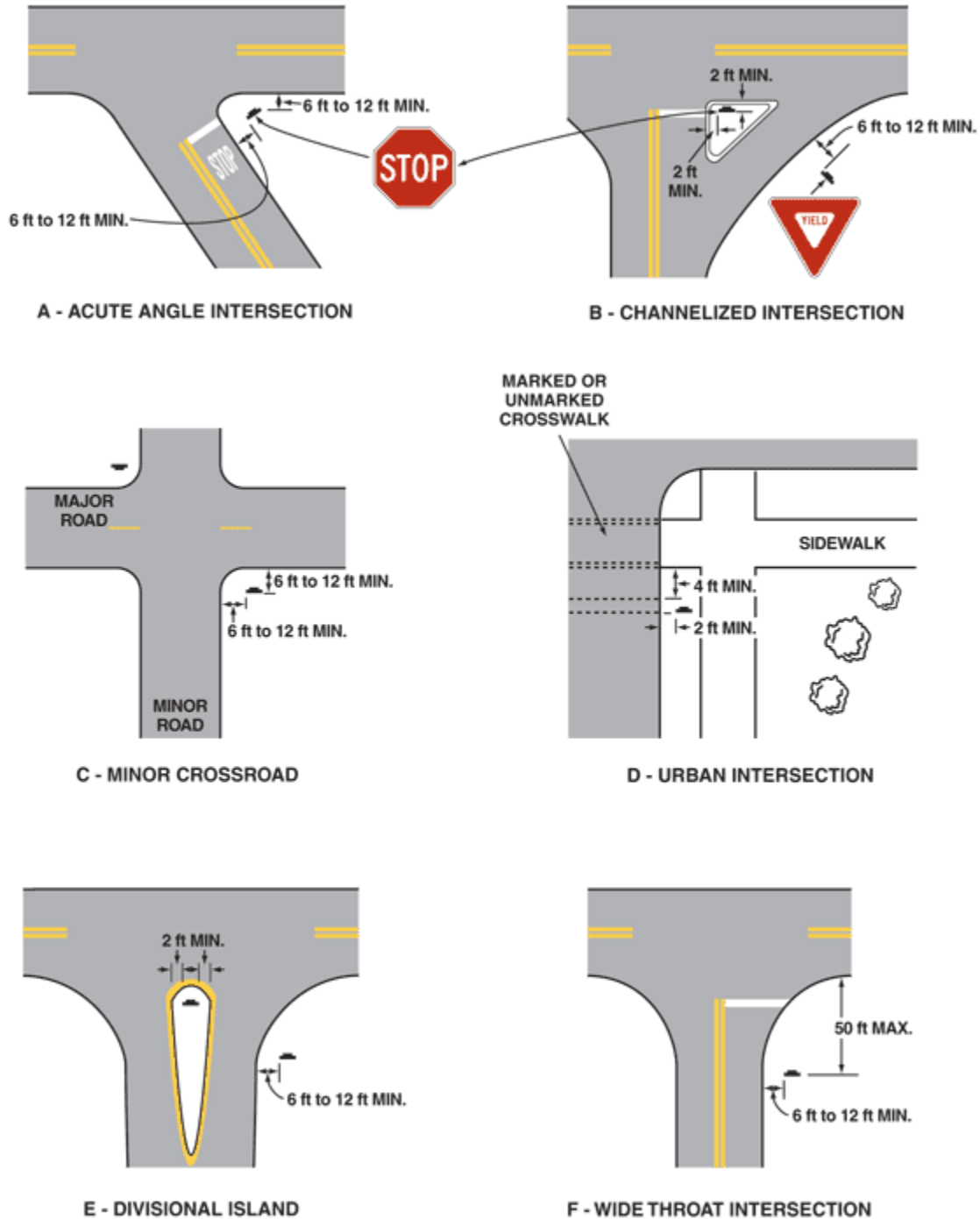
G - FREEWAY OR EXPRESSWAY SIGN WITH SECONDARY SIGN



Note:  
See Section 2A.19 for reduced lateral offset distances that may be used in areas where lateral offsets are limited, and in business, commercial, or residential areas where sidewalk width is limited or where existing poles are close to the curb.

## 2009 Edition Part 2 Figure 2A-2. Examples of Locations for Some Typical Signs at Intersections

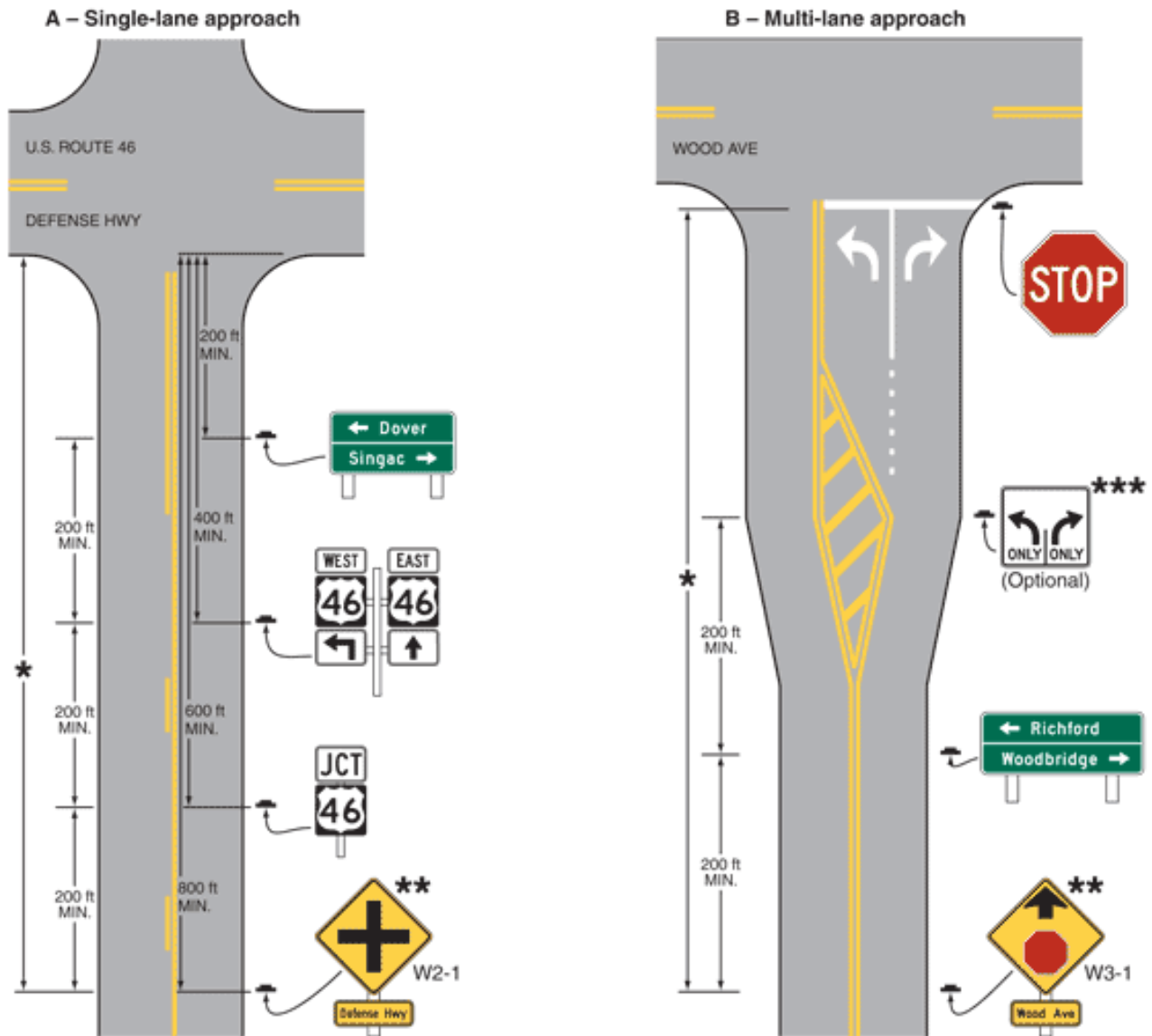
Figure 2A-3. Examples of Locations for Some Typical Signs at Intersections



Note: Lateral offset is a minimum of 6 feet measured from the edge of the shoulder, or 12 feet measured from the edge of the traveled way. See Section 2A.19 for lower minimums that may be used in urban areas, or where lateral offset space is limited.

## 2009 Edition Part 2 Figure 2A-4. Relative Locations of Regulatory, Warning, and Guide Signs on an Intersection Approach

**Figure 2A-4. Relative Locations of Regulatory, Warning, and Guide Signs on an Intersection Approach**



Note: See Chapter 2D for information on guide signs and Part 3 for information on pavement markings

- \* See Table 2C-4 for the recommended minimum distance
- \*\* See Section 2C.46 for the application of the W2-1 sign and Section 2C.36 for the application of the W3-1 sign
- \*\*\* See Section 2B.22 for the application of Intersection Lane Control signs

## Off System Safety Warning Sign Placement:

**Advanced placement of signs for complex driving situations:** *Typical conditions are locations where the road user must use extra time to adjust speed and change lanes in heavy traffic because of a complex driving situation. Typical signs are Merge and Right Lane Ends*

MPH	FEET IN ADVANCE
20	225
25	325
30	460
35	565
40	670
45	775
50	885
55	990
>55	MUTCD, Table 2C-4

**Advanced placement of signs for potential stop situations:** *Typical condition is the warning of a potential stop situation. Typical signs are Stop Ahead, Yield Ahead, Signal Ahead, and Intersection Warning signs.*

MPH	FEET IN ADVANCE
<40	100
40	125
45	175
50	250
55	325
>55	MUTCD, Table 2C-4



**Advanced placement of signs for decrease speed for warning condition:** *Typical conditions are locations where the road user must decrease speed to maneuver through the warned condition. Typical signs are Turn, Curve, Reverse Turn, or Reverse Curve.*

	Deceleration to the listed advisory speed (mph) for the condition				
MPH	10	20	30	40	50
<40	POC* to 100	POC* to 100	POC* to 100		
40	100	100	POC* to 100		
45	125	100	100	POC* to 100	
50	200	175	120	100	
55	275	225	200	125	POC* to 100
>55	Refer to MUTCD Table 2C-4				

\*Point of Curvature



## Section 2C.06 Horizontal Alignment Warning Signs

Support:

01 A variety of horizontal alignment warning signs (see [Figure 2C-1](#)), pavement markings (see Chapter 3B), and delineation (see Chapter 3F) can be used to advise motorists of a change in the roadway alignment. Uniform application of these traffic control devices with respect to the amount of change in the roadway alignment conveys a consistent message establishing driver expectancy and promoting effective roadway operations. The design and application of horizontal alignment warning signs to meet those requirements are addressed in [Sections 2C.06](#) through [2C.15](#).

2009 Edition Part 2 Figure 2C-1. Horizontal Alignment Signs and Plaques

**Figure 2C-1. Horizontal Alignment Signs and Plaques**



Note: Turn arrows and reverse turn arrows may be substituted for the curve arrows and reverse curve arrows on the W1-10 series signs where appropriate.

**Standard:**

02 **In advance of horizontal curves on freeways, on expressways, and on roadways with more than 1,000 AADT that are functionally classified as arterials or collectors, horizontal alignment warning signs shall be used in accordance with [Table 2C-5](#) based on the speed differential between the roadway's posted or statutory speed limit or 85th-percentile speed, whichever is higher, or the prevailing speed on the approach to the curve, and the horizontal curve's advisory speed.**

Table 2C-5. Horizontal Alignment Sign Selection					
Type of Horizontal Alignment Sign	Difference Between Speed Limit and Advisory Speed				
	5 mph	10 mph	15 mph	20 mph	25 mph or more
Turn (W1-1), Curve (W1-2), Reverse Turn (W1-3), Reverse Curve (W1-4), Winding Road (W1-5), and Combination Horizontal Alignment/Intersection (W1-10) (see <a href="#">Section 2C.07</a> to determine which sign to use)	Recommended	Required	Required	Required	Required
Advisory Speed Plaque (W13-1P)	Recommended	Required	Required	Required	Required
Chevrons (W1-8) and/or One Direction Large Arrow (W1-6)	Optional	Recommended	Required	Required	Required
Exit Speed (W13-2) and Ramp Speed (W13-3) on exit ramp	Optional	Optional	Recommended	Required	Required

Note: Required means that the sign and/or plaque shall be used, recommended means that the sign and/or plaque should be used, and optional means that the sign and/or plaque may be used.

See [Section 2C.06](#) for roadways with less than 1,000 AADT.

Option:

03 Horizontal Alignment Warning signs may also be used on other roadways or on arterial and collector roadways with less than 1,000 AADT based on engineering judgment.

### Section 2C.07 Horizontal Alignment Signs (W1-1 through W1-5, W1-11, W1-15)

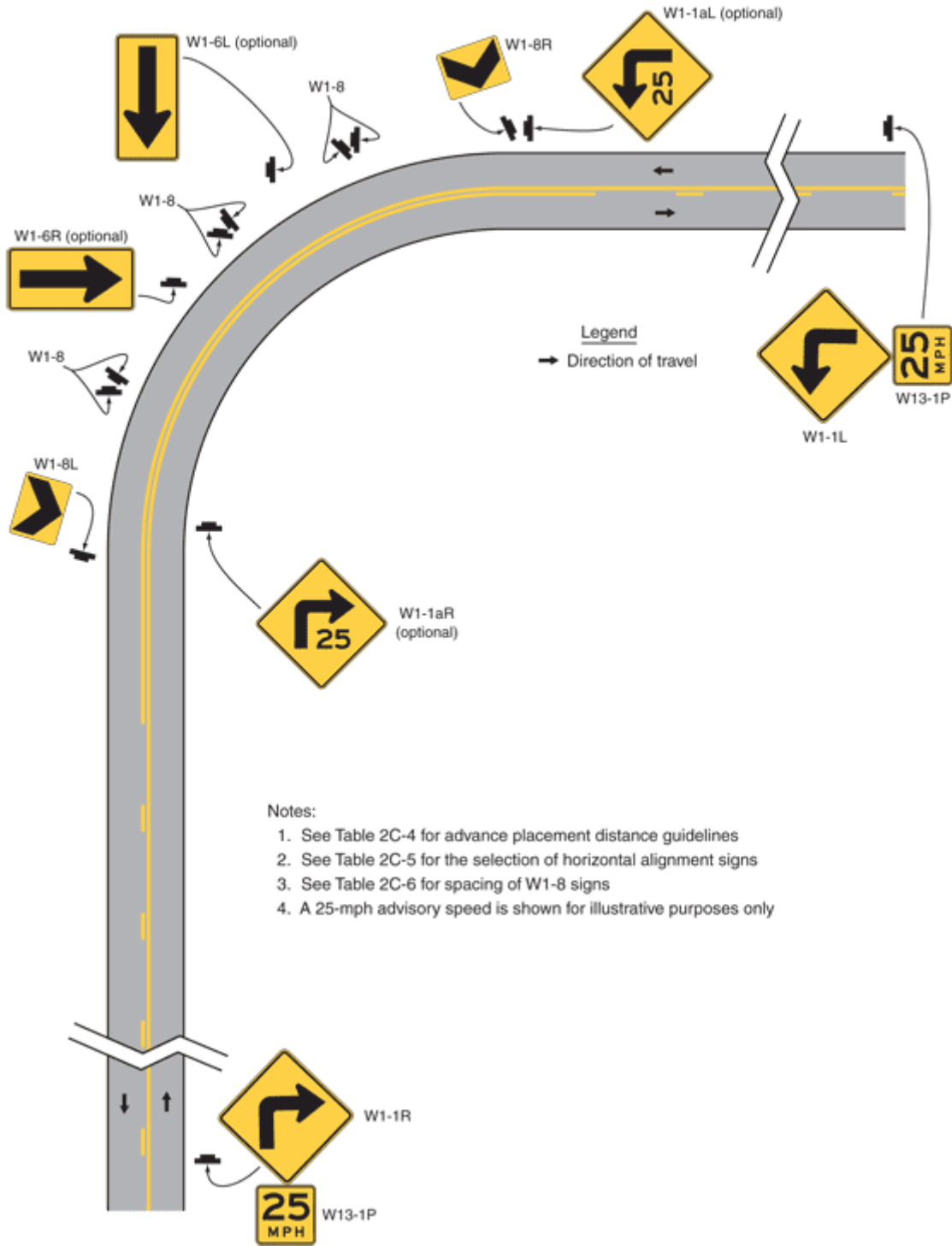
**Standard:**

01 If [Table 2C-5](#) indicates that a horizontal alignment sign (see [Figure 2C-1](#)) is required, recommended, or allowed, the sign installed in advance of the curve shall be a Curve (W1-2) sign unless a different sign is recommended or allowed by the provisions of this Section.

02 A Turn (W1-1) sign shall be used instead of a Curve sign in advance of curves that have advisory speeds of 30 mph or less (see [Figure 2C-2](#)).

2009 Edition Part 2 Figure 2C-2. Example of Warning Signs for a Turn

Figure 2C-2. Example of Warning Signs for a Turn



*Guidance:*

03 Where there are two changes in roadway alignment in opposite directions that are separated by a tangent distance of less than 600 feet, the Reverse Turn (W1-3) sign should be used instead of multiple Turn (W1-1) signs and the Reverse Curve (W1-4) sign should be used instead of multiple Curve (W1-2) signs.

*Option:*

04 A Winding Road (W1-5) sign may be used instead of multiple Turn (W1-1) or Curve (W1-2) signs where there are three or more changes in roadway alignment each separated by a tangent distance of less than 600 feet.

05 A NEXT XX MILES (W7-3aP) supplemental distance plaque (see [Section 2C.55](#)) may be installed below the Winding Road sign where continuous roadway curves exist for a specific distance.

06 If the curve has a change in horizontal alignment of 135 degrees or more, the Hairpin Curve (W1-11) sign may be used instead of a Curve or Turn sign.

07 If the curve has a change of direction of approximately 270 degrees, such as on a cloverleaf interchange ramp, the 270-degree Loop (W1-15) sign may be used instead of a Curve or Turn sign.

*Guidance:*

08 When the Hairpin Curve sign or the 270-degree Loop sign is installed, either a One-Direction Large Arrow (W1-6) sign or Chevron Alignment (W1-8) signs should be installed on the outside of the turn or curve.

## **Section 2C.08 Advisory Speed Plaque (W13-1P)**

*Option:*

01 The Advisory Speed (W13-1P) plaque (see [Figure 2C-1](#)) may be used to supplement any warning sign to indicate the advisory speed for a condition.

**Standard:**

02 **The use of the Advisory Speed plaque for horizontal curves shall be in accordance with the information shown in [Table 2C-5](#). The Advisory Speed plaque shall also be used where an engineering study indicates a need to advise road users of the advisory speed for other roadway conditions.**

03 **If used, the Advisory Speed plaque shall carry the message XX MPH. The speed displayed shall be a multiple of 5 mph.**

04 **Except in emergencies or when the condition is temporary, an Advisory Speed plaque shall not be installed until the advisory speed has been determined by an engineering study.**

05 **The Advisory Speed plaque shall only be used to supplement a warning sign and shall not be installed as a separate sign installation.**

06 **The advisory speed shall be determined by an engineering study that follows established engineering practices.**

Support:

07 Among the established engineering practices that are appropriate for the determination of the recommended advisory speed for a horizontal curve are the following:

- A. An accelerometer that provides a direct determination of side friction factors
- B. A design speed equation
- C. A traditional ball-bank indicator using the following criteria:
  - 1. 16 degrees of ball-bank for speeds of 20 mph or less
  - 2. 14 degrees of ball-bank for speeds of 25 to 30 mph
  - 3. 12 degrees of ball-bank for speeds of 35 mph and higher

08 The 16, 14, and 12 degrees of ball-bank criteria are comparable to the current AASHTO horizontal curve design guidance. Research has shown that drivers often exceed existing posted advisory curve speeds by 7 to 10 mph.

*Guidance:*

09 *The advisory speed should be determined based on free-flowing traffic conditions.*

10 *Because changes in conditions, such as roadway geometrics, surface characteristics, or sight distance, might affect the advisory speed, each location should be evaluated periodically or when conditions change.*

## **Section 2C.09 Chevron Alignment Sign (W1-8)**

**Standard:**

01 **The use of the Chevron Alignment (W1-8) sign (see [Figures 2C-1](#) and [2C-2](#)) to provide additional emphasis and guidance for a change in horizontal alignment shall be in accordance with the information shown in [Table 2C-5](#).**

Option:

02 When used, Chevron Alignment signs may be used instead of or in addition to standard delineators.

**Standard:**

03 **The Chevron Alignment sign shall be a vertical rectangle. No border shall be used on the Chevron Alignment sign.**

04 **If used, Chevron Alignment signs shall be installed on the outside of a turn or curve, in line with and at approximately a right angle to approaching traffic. Chevron Alignment signs shall be installed at a minimum height of 4 feet, measured vertically from the bottom of the sign to the elevation of the near edge of the traveled way.**

*Guidance:*

05 The approximate spacing of Chevron Alignment signs on the turn or curve measured from the point of curvature (PC) should be as shown in [Table 2C-6](#).

<b>Advisory Speed</b>	<b>Curve Radius</b>	<b>Sign Spacing</b>
15 mph or less	Less than 200 feet	40 feet
20 to 30 mph	200 to 400 feet	80 feet
35 to 45 mph	401 to 700 feet	120 feet
50 to 60 mph	701 to 1,250 feet	160 feet
More than 60 mph	More than 1,250 feet	200 feet

Note: The relationship between the curve radius and the advisory speed shown in this table should not be used to determine the advisory speed.

06 If used, Chevron Alignment signs should be visible for a sufficient distance to provide the road user with adequate time to react to the change in alignment.

**Standard:**

07 **Chevron Alignment signs shall not be placed on the far side of a T-intersection facing traffic on the stem approach to warn drivers that a through movement is not physically possible, as this is the function of a Two-Direction (or One-Direction) Large Arrow sign.**

08 **Chevron Alignment signs shall not be used to mark obstructions within or adjacent to the roadway, including the beginning of guardrails or barriers, as this is the function of an object marker (see [Section 2C.63](#)).**

**Section 2C.10 Combination Horizontal Alignment/Advisory Speed Signs (W1-1a, W1-2a)**

*Option:*

01 The Turn (W1-1) sign or the Curve (W1-2) sign may be combined with the Advisory Speed (W13-1P) plaque (see Section 2C.08) to create a combination Turn/Advisory Speed (W1-1a) sign or combination Curve/Advisory Speed (W1-2a) sign (see [Figure 2C-1](#)).

02 The combination Horizontal Alignment/Advisory Speed sign may be used to supplement the advance Horizontal Alignment warning sign and Advisory Speed plaque based upon an engineering study.

**Standard:**

03 **If used, the combination Horizontal Alignment/Advisory Speed sign shall not be used alone and shall not be used as a substitute for a Horizontal Alignment warning sign and Advisory Speed plaque at the advance warning location. The combination Horizontal Alignment/Advisory Speed sign shall only be used as a supplement to the advance Horizontal Alignment warning sign. If used, the combination Horizontal Alignment/Advisory Speed sign shall be installed at the beginning of the turn or curve.**

*Guidance:*

04 The advisory speed displayed on the combination Horizontal Alignment/Advisory Speed sign should be based on the advisory speed for the horizontal curve using recommended engineering practices (see [Section 2C.08](#)).

### **Section 2C.11 Combination Horizontal Alignment/Intersection Signs (W1-10 Series)**

*Option:*

01 The Turn (W1-1) sign or the Curve (W1-2) sign may be combined with the Cross Road (W2-1) sign or the Side Road (W2-2 or W2-3) sign to create a combination Horizontal Alignment/Intersection (W1-10 series) sign (see [Figure 2C-1](#)) that depicts the condition where an intersection occurs within or immediately adjacent to a turn or curve.

*Guidance:*

02 Elements of the combination Horizontal Alignment/Intersection sign related to horizontal alignment should comply with the provisions of [Section 2C.07](#), and elements related to intersection configuration should comply with the provisions of [Section 2C.46](#). The symbol design should approximate the configuration of the intersecting roadway(s). No more than one Cross Road or two Side Road symbols should be displayed on any one combination Horizontal Alignment/Intersection sign.

**Standard:**

03 **The use of the combination Horizontal Alignment/Intersection sign shall be in accordance with the appropriate Turn or Curve sign information shown in [Table 2C-5](#).**

### **Section 2C.12 One-Direction Large Arrow Sign (W1-6)**

*Option:*

01 A One-Direction Large Arrow (W1-6) sign (see [Figure 2C-1](#)) may be used either as a supplement or alternative to Chevron Alignment signs in order to delineate a change in horizontal alignment (see [Figure 2C-2](#)).

02 A One-Direction Large Arrow (W1-6) sign may be used to supplement a Turn or Reverse Turn sign (see [Figure 2C-2](#)) to emphasize the abrupt curvature.

**Standard:**

03 **The One-Direction Large Arrow sign shall be a horizontal rectangle with an arrow pointing to the left or right.**

04 **The use of the One-Direction Large Arrow sign shall be in accordance with the information shown in [Table 2C-5](#).**

05 **If used, the One-Direction Large Arrow sign shall be installed on the outside of a turn or curve in line with and at approximately a right angle to approaching traffic.**

06 **The One-Direction Large Arrow sign shall not be used where there is no alignment change in the direction of travel, such as at the beginnings and ends of medians or at center piers.**

07 **The One-Direction Large Arrow sign directing traffic to the right shall not be used in the central island of a roundabout.**

*Guidance:*

08 If used, the One-Direction Large Arrow sign should be visible for a sufficient distance to provide the road user with adequate time to react to the change in alignment.

### Section 2C.63 Object Marker Design and Placement Height

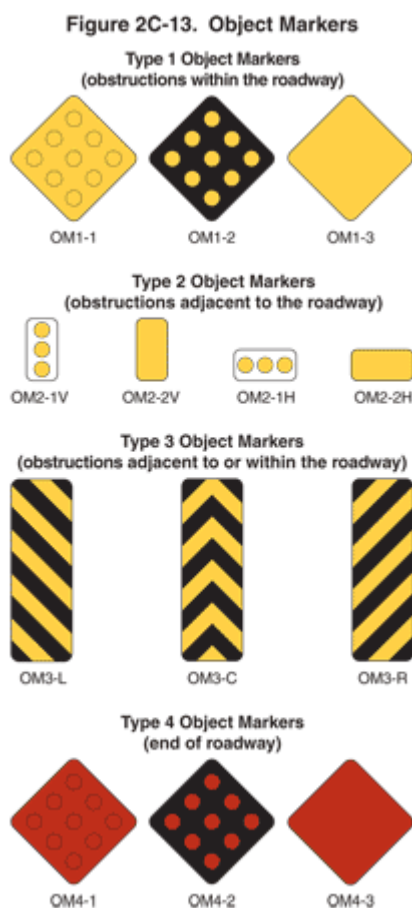
*Support:*

01 Type 1, 2, and 3 object markers are used to mark obstructions within or adjacent to the roadway. Type 4 object markers are used to mark the end of a roadway.

**Standard:**

02 **When used, object markers (see [Figure 2C-13](#)) shall not have a border and shall consist of an arrangement of one or more of the following types:**

**Figure 2C-13 Object Markers**



**Type 1**—a diamond-shaped sign, at least 18 inches on a side, consisting of either a yellow (OM1-1) or black (OM1-2) sign with nine yellow retroreflective devices, each with a minimum diameter of 3 inches, mounted symmetrically on the sign, or an all-yellow retroreflective sign (OM1-3).



**Type 2—either a marker (OM2-1V or OM2-1H) consisting of three yellow retroreflective devices, each with a minimum diameter of 3 inches, arranged either horizontally or vertically on a white sign measuring at least 6 x 12 inches; or an all-yellow horizontal or vertical retroreflective sign (OM2-2V or OM2-2H), measuring at least 6 x 12 inches.**

**Type 3—a striped marker, 12 x 36 inches, consisting of a vertical rectangle with alternating black and retroreflective yellow stripes sloping downward at an angle of 45 degrees toward the side of the obstruction on which traffic is to pass. The minimum width of the yellow and black stripes shall be 3 inches.**

**Type 4—a diamond-shaped sign, at least 18 inches on a side, consisting of either a red (OM4-1) or black (OM4-2) sign with nine red retroreflective devices, each with a minimum diameter of 3 inches, mounted symmetrically on the sign, or an all-red retroreflective sign (OM4-3).**

Support:

03 A better appearance can be achieved if the black stripes are wider than the yellow stripes.

04 Type 3 object markers with stripes that begin at the upper right side and slope downward to the lower left side are designated as right object markers (OM3-R). Object markers with stripes that begin at the upper left side and slope downward to the lower right side are designated as left object markers (OM3-L).

*Guidance:*

05 *When used for marking obstructions within the roadway or obstructions that are 8 feet or less from the shoulder or curb, the minimum mounting height, measured from the bottom of the object marker to the elevation of the near edge of the traveled way, should be 4 feet.*

06 *When used to mark obstructions more than 8 feet from the shoulder or curb, the clearance from the ground to the bottom of the object marker should be at least 4 feet.*

07 *Object markers should not present a vertical or horizontal clearance obstacle for pedestrians.*

Option:

08 When object markers or markings are applied to an obstruction that by its nature requires a lower or higher mounting, the vertical mounting height may vary according to need.

Support:

09 [Section 9B.26](#) contains information regarding the use of object markers on shared-use paths.

## **Section 2C.64 Object Markers for Obstructions Within the Roadway**

**Standard:**

01 **Obstructions within the roadway shall be marked with a Type 1 or Type 3 object marker. In addition to markers on the face of the obstruction, warning of approach to the obstruction shall be given by appropriate pavement markings (see [Section 3B.10](#)).**

Option:

02 To provide additional emphasis, a Type 1 or Type 3 object marker may be installed at or near the approach end of a median island.

03 To provide additional emphasis, large surfaces such as bridge piers may be painted with diagonal stripes, 12 inches or greater in width, similar in design to the Type 3 object marker.

**Standard:**

04 **The alternating black and retroreflective yellow stripes (OM3-L, OM3-R) shall be sloped down at an angle of 45 degrees toward the side on which traffic is to pass the obstruction. If traffic can pass to either side of the obstruction, the alternating black and retroreflective yellow stripes (OM3-C) shall form chevrons that point upwards.**

**Option:**

05 Appropriate signs (see [Sections 2B.32](#) and [2C.25](#)) directing traffic to one or both sides of the obstruction may be used instead of the object marker.

**Section 2C.65 Object Markers for Obstructions Adjacent to the Roadway****Support:**

01 Obstructions not actually within the roadway are sometimes so close to the edge of the road that they need a marker. These include underpass piers, bridge abutments, handrails, ends of traffic barriers, utility poles, and culvert headwalls. In other cases there might not be a physical object involved, but other roadside conditions exist, such as narrow shoulders, drop-offs, gores, small islands, and abrupt changes in the roadway alignment, that might make it undesirable for a road user to leave the roadway, and therefore would create a need for a marker.

**Standard:**

02 **If a Type 2 or Type 3 object marker is used to mark an obstruction adjacent to the roadway, the edge of the object marker that is closest to the road user shall be installed in line with the closest edge of the obstruction.**

03 **Where Type 3 object markers are applied to the approach ends of guardrail and other roadside appurtenances, sheeting without a substrate shall be directly affixed to the approach end of the guardrail in a rectangular shape conforming to the size of the approach end of the guardrail with alternating black and retroreflective yellow stripes sloping downward at an angle of 45 degrees toward the side of the obstruction on which traffic is to pass.**

04 **Type 1 and Type 4 object markers shall not be used to mark obstructions adjacent to the roadway.**

**Guidance:**

05 *Standard warning signs in this Chapter should also be used where applicable.*

**Section 2C.66 Object Markers for Ends of Roadways****Support:**

01 The Type 4 object marker is used to warn and alert road users of the end of a roadway in other than construction or maintenance areas.

**Standard:**

02 **If an object marker is used to mark the end of a roadway, a Type 4 object marker shall be used.**

**DEPARTMENT OF TRANSPORTATION**

**STATE OF GEORGIA**

**SPECIAL PROVISION**

**XXXXXX COUNTY**

**SECTION 636 -- DELINEATORS**

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*Delete Subsection 636.4.D and substitute the following:*

**A. Delineators**

1. Type 1 Delineators (reflectORIZED guide markers) to be paid for are the number specified, including posts, rivets, and spacers, that are furnished, placed, and completed and accepted. Installation shall be as per the plans, Ga. Standard 9030C, and/or Ga. Details T-22A and T-22B. Color shall be red, white, or yellow as specified in the plans or directed by the Engineer.
2. Type 1A Delineators (reflectORIZED guardrail washers) to be paid for are the number specified that are furnished, placed on existing guardrail, and completed and accepted. Installation shall be as per the plans and Ga. Standard 4360. Color shall be white or yellow as specified in the plans or directed by the Engineer.
3. Type 2 Delineators (reflectORIZED guide markers) to be paid for are the number specified, including posts, rivets, and spacers, that are furnished, placed, and completed and accepted. Installation shall be as per the plans, Ga. Standard 9030C, and/or Ga. Details T-22A and T-22B. Color shall be red, white, or yellow as specified in the plans or directed by the Engineer.
4. Type 3 Delineators (Type 2 Object Markers or OM2) to be paid for are for the number specified, including posts, rivets, and spacers, that are furnished, placed, and completed and accepted. Installation and use shall be as per the plans and shall be the same as detailed for a Type 2 Object Marker as shown on Ga. Standard 9030C; and shall include one triple reflector unit (or equivalent) to be placed on one side of the post facing approaching traffic. Color shall be white or yellow as specified in the plans or directed by the Engineer.
5. Type 3A Delineators (Type 3 Object Markers or OM-3 L/R) to be paid are the number specified, including posts, rivets, and spacers, that are furnished, placed, and completed and accepted. Installation and use shall be as per the plans and shall be the same as detailed for a Type 3 Object Marker as shown on Ga. Standard 9030C and/or Ga. Detail T-22A and T-22B. Payment for EACH shall be for and include one 12"x36" Type 3 Object Marker sign (TP IX sheeting) and two (2) yellow triple reflector units, rivets, and spacers to be installed on the same post at each specified location  
Installation Clarification: Two (2) Type 3 delineator yellow triple reflector units (also shown as Type 2 Object Markers OM2 on Ga. Std. 9030C) are to be installed on the same post under a Type 3 Object Marker (OM-3 left or right) with one triple reflector unit on the front of the post and one on the back of the same post. Each reflector shall be 3 ¼" diameter center mount sealed prismatic reflex reflectors housed in aluminum backing with single grommetted hole in center of each reflector (as detailed and described in Ga. Std. 9030C).

9/25/2013

PAY ITEM NUMBERS FOR DELINEATORS

ITEM NO.	UNITS	DESCRIPTION
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636-5010	EA	DELINEATOR, TP 1
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636-5011	EA	DELINEATOR, TP 1A
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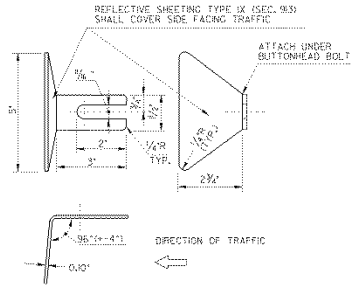
636-5020	EA	DELINEATOR, TP 2
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636-5030	EA	DELINEATOR, TP 3
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636-5031	EA	DELINEATOR, TP 3A
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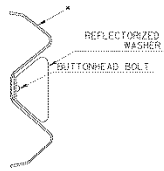
STATE	PROJECT NUMBER	SHEET NO.	TOTAL SHEETS
GA.			

### REFLECTORIZED WASHER DETAILS



MATERIALS: ALUMINUM (ASTM B 209 ALLOY 5052 H-32 OR 12 GA. STEEL (ASTM A 326 GALV. M-88 WITH REFLECTIVE SHEETING AS APPROVED BY THE DEPT. OF TRANSPORTATION LABORATORY).

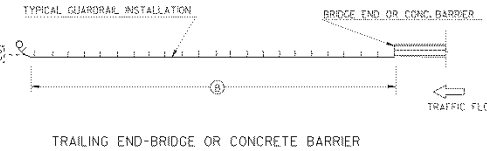
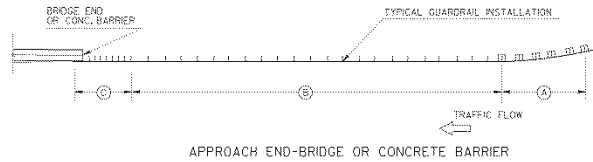
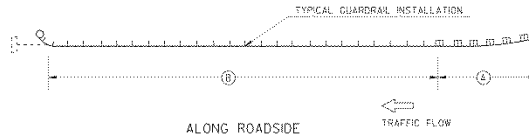
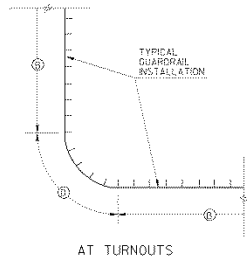
COLORS: YELLOW IN MEDIANS AND WHITE ON OUTSIDE SHOULDERS.



#### WASHER LOCATION DETAIL

NOTE: FOR T-BEAM GUARDRAIL, WASHER IS PLACED IN THE TOP POSITION.

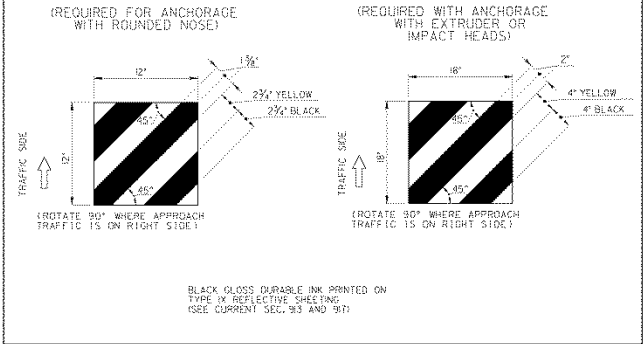
\* WHERE BOLT DOES NOT EXTEND THRU RAIL, REFLECTORIZED WASHER IS ATTACHED UNDER THE SPICE BOLT ON THE TOP CORNER, IF REQUIRED.



#### SPACING OF REFLECTORIZED WASHERS

- (A) AT ANCHORAGES;
  - TWO (2) REFLECTORIZED WASHERS ARE REQUIRED ON THE RAIL UNDER SPICE BOLTS AS DIRECTED BY THE ENGINEER FOR ELLIPTICALLY FLARED ANCHORAGES WITH ROUNDED END PIECES;
  - NO REFLECTORIZED WASHERS WILL BE USED FOR TANGENTIALLY ALIGNED OR STRAIGHT TAPERED ANCHORAGE WITH EXTRUDER OR IMPACT HEADS.
- (B) -AT 75 FT. SPACINGS FOR INTERMEDIATE SECTIONS.
- (C) -THREE WASHERS AT 6'-3" SPACING AT CONNECTIONS TO CONCRETE FACE ON THE APPROACH END;
- (A) -AT 12'-6" SPACINGS AROUND RADII TURNS.

### NOSE STRIPING DETAILS



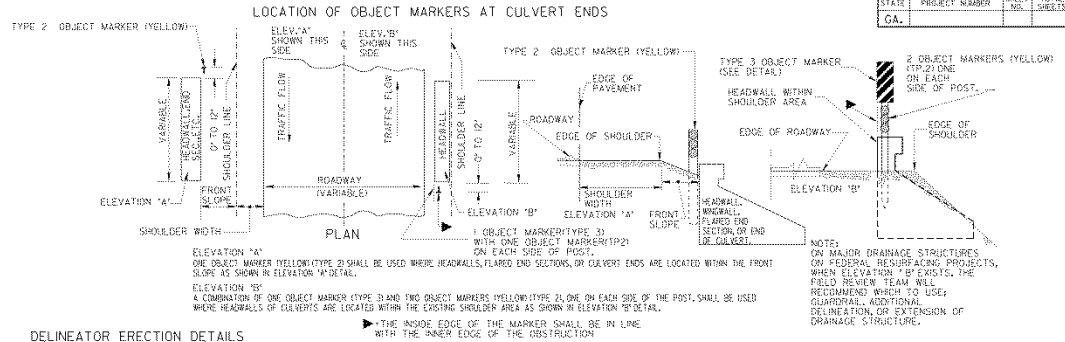
BLACK GLOSS DURABLE INK PRINTED ON TYPE IX REFLECTIVE SHEETING (SEE CURRENT SEC. 93 AND 94)

#### GENERAL NOTES:

- 1-SPECIFICATIONS: GEORGIA STANDARD, CURRENT EDITION, & SUPPLEMENTS THERETO.
- 2-SEE SEPARATE STANDARDS FOR DETAILS OF GUARDRAIL INSTALLATIONS, CONNECTING HARDWARE, AND ANCHORAGES.
- 3-PAYMENT FOR GUARDRAIL AND ANCHORAGES INCLUDES ALL REFLECTORIZED WASHERS AND NOSE STRIPING REQUIRED.
- 4-ADJUSTMENTS OF SPACINGS AND/OR REQUIREMENTS FOR REFLECTIVE WASHERS MAY BE DIRECTED BY THE ENGINEER TO SUIT INDIVIDUAL LOCATIONS.
- 5-WHERE DOUBLE FACED GUARDRAIL IS LOCATED ON THE INSIDE SHOULDER OF MEDIANS, REFLECTORIZED WASHERS SHALL BE REQUIRED ONLY ON THE SIDE WHICH IS NEAREST TO TRAFFIC, UNLESS SPECIFIED OTHERWISE.

DEPARTMENT OF TRANSPORTATION STATE OF GEORGIA	
STANDARD REFLECTORIZED GUARDRAIL WASHERS AND ANCHORAGE NOSE STRIPING	
NO SCALE	REV. & REDR. APRIL, 1999
DESIGNED BY: _____ CHECKED BY: _____ DATE: _____	APPROVED: <i>[Signature]</i> STATE ROAD & AIRPORT DESIGN ENGINEER CHIEF ENGINEER
NUMBER 4360	

SEE T-22A and T-22B FOR BRIDGE DELINEATION DETAILS



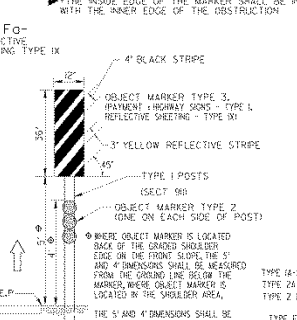
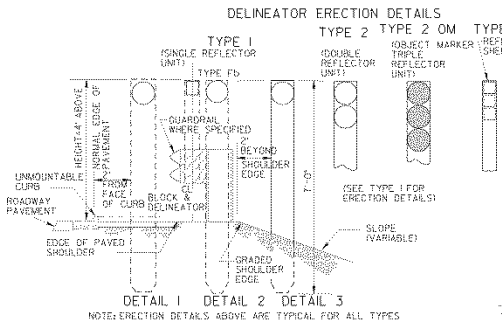
STATE	PROJECT NUMBER	SHEET NO.	TOTAL SHEETS
GA.			

**RECOMMENDED SPACING FOR DELINEATORS**

DELINEATORS SHOULD NORMALLY BE SPACED 50W APART, WHERE SUCH IS INTERRUPTED BY DRIVEWAYS, CROSSINGS, ETC., AND WHERE OTHER THAN NORMAL SPACING, A DELINEATOR SHOULD FALL WITHIN SUCH AN AREA THAT DELINEATOR MAY BE MOVED IN EITHER DIRECTION A DISTANCE NOT EXCEEDING 15' OUTSIDE THE NORMAL SPACING. IF SUCH DELINEATOR STEEL FALLS WITHIN THAT AREA, IT SHOULD BE ELIMINATED. SEE TABLE BELOW FOR RECOMMENDED SPACING OF HORIZONTAL CURVES.

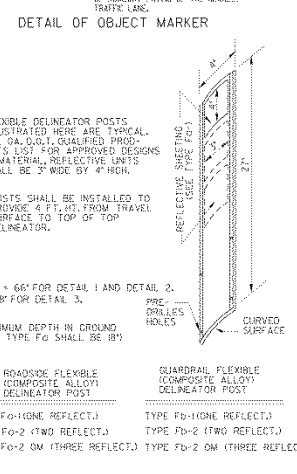
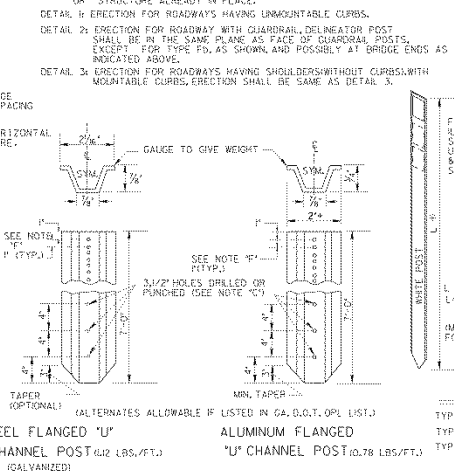
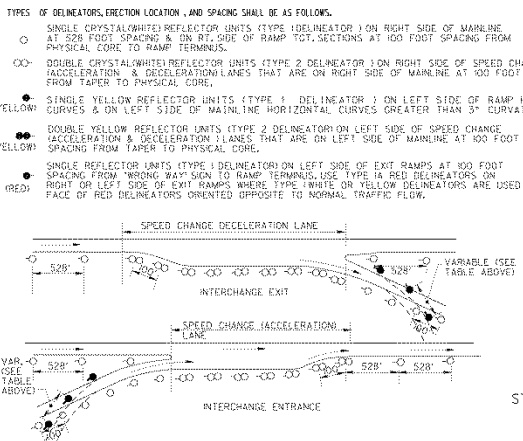
TABLE SPACING (D) FOR DELINEATORS ON HORIZONTAL CURVES		SPACING IN ADVANCE OF CURVE ON FEET			
RADIUS OF CURVE (IN FEET)	SPACING ON CURVE (ON FEET)	1ST	2ND	3RD	4TH
50	25	40	40	40	40
75	25	40	40	40	40
100	25	40	40	40	40
150	25	40	40	40	40
200	25	40	40	40	40
250	25	40	40	40	40
300	25	40	40	40	40
350	25	40	40	40	40
400	25	40	40	40	40
450	25	40	40	40	40
500	25	40	40	40	40
600	25	40	40	40	40
700	25	40	40	40	40
800	25	40	40	40	40
900	25	40	40	40	40
1000	25	40	40	40	40
1200	25	40	40	40	40
1400	25	40	40	40	40
1600	25	40	40	40	40
1800	25	40	40	40	40
2000	25	40	40	40	40
2500	25	40	40	40	40
3000	25	40	40	40	40
3500	25	40	40	40	40
4000	25	40	40	40	40
5000	25	40	40	40	40
6000	25	40	40	40	40
7000	25	40	40	40	40
8000	25	40	40	40	40
9000	25	40	40	40	40
10000	25	40	40	40	40

SPACING, W, FOR SPIRALS SHOULD BE DETERMINED FROM THE TABLE OR COMPUTED FROM THE FORMULA  $W = \frac{R \cdot S}{100}$ , WHERE R IS THE RADIUS OF CURVATURE IN FEET, AND S IS ROUNDED TO THE NEAREST 5 FT. THE SPACING TO THE FIRST DELINEATOR IN ADVANCE OF THE CURVE IS 25 TO THE SECOND IS, AND THE THIRD IS, BUT NONE TO EXCEED 500 FEET. MINIMUM SPACING IS 20 FEET.



- TYPES OF DELINEATORS**
- TYPE 1 - ALUMINUM OR GALVANIZED STEEL FLANGED 1" CHANNEL POST WITH SINGLE REFLECTOR UNIT. REFLECTOR UNIT TO CONSIST OF (A) ONE 3" DIAMETER SEALED PRISMATIC REFLEX REFLECTOR WITH PLATE AND FRAME, OR (B) ONE 4" X 5" RECTANGULAR TYPE 1 LEVEL 1 REFLECTIVE SHEETING REFLECTOR WITH PLATE AND FRAME, OR (C) ONE 3/4" DIAMETER CENTER MOUNT SEALED PRISMATIC REFLEX REFLECTOR HOUSED IN ALUMINUM BACKING WITH SINGLE GROMETTED HOLE IN CENTER OF EACH REFLECTOR.
  - TYPE 2 - ALUMINUM OR GALVANIZED STEEL FLANGED 1" CHANNEL POST WITH DOUBLE REFLECTOR UNIT. REFLECTOR UNIT TO CONSIST OF (A) TWO 3" DIAMETER SEALED PRISMATIC REFLEX REFLECTORS WITH PLATE AND FRAME, OR (B) TWO 4" X 5" RECTANGULAR TYPE 1 LEVEL 1 REFLECTIVE SHEETING REFLECTORS WITH PLATE AND FRAME, OR (C) TWO 3/4" DIAMETER CENTER MOUNT SEALED PRISMATIC REFLEX REFLECTORS HOUSED IN ALUMINUM BACKING WITH SINGLE GROMETTED HOLE IN CENTER OF EACH REFLECTOR.
  - TYPE 3 - ALUMINUM OR GALVANIZED STEEL FLANGED 1" CHANNEL POST WITH TRIPLE REFLECTOR UNIT. REFLECTOR UNIT TO CONSIST OF (A) THREE 3" DIAMETER SEALED PRISMATIC REFLEX REFLECTORS WITH PLATE AND FRAME, OR (B) THREE 4" X 5" RECTANGULAR TYPE 1 LEVEL 1 REFLECTIVE SHEETING REFLECTORS WITH PLATE AND FRAME, OR (C) THREE 3/4" DIAMETER CENTER MOUNT SEALED PRISMATIC REFLEX REFLECTORS HOUSED IN ALUMINUM BACKING WITH SINGLE GROMETTED HOLE IN CENTER OF EACH REFLECTOR.
  - TYPE 1A-SINGLE REFLECTOR UNIT ONLY MOUNTED ON POST OR STRUCTURE ALREADY IN PLACE. REFLECTOR UNIT SAME AS FOR TYPE 1, 2 AND 3, BUT NO REFLECTOR.
  - TYPE 2A-DOUBLE REFLECTOR UNIT ONLY MOUNTED ON POST OR STRUCTURE ALREADY IN PLACE. REFLECTOR UNIT SAME AS FOR TYPE 2, 3 AND 4, BUT NO REFLECTOR.
  - TYPE F0 - FLEXIBLE DELINEATOR POSTS SHALL BE USED AT LOCATIONS WHERE HIGH FREQUENCY OF HITS ARE CONTINGENT, SUCH AS CURVE AREAS, OUTSIDE OF SHARP CURVES, ETC., AND MAY ALSO BE USED AS ALTERNATIVES TO EITHER TYPE 1, TYPE 2, OR TYPE 3 DELINEATORS WHEN SPECIFIED ON THE PLANS. DIFFERENT DESIGN FLEXIBLE DELINEATORS PERMITTEDLY APPROVED BY THE QUALITY OFFICE OF MATERIALS AND RESEARCH.

**LOCATION OF DELINEATORS ON FREEWAY & EXPRESSWAY TYPE HIGHWAYS**



**GENERAL NOTES:**

- SPECIFICATIONS, GA. STANDARD, CURRENT EDITION, & SUPPLEMENTS THERE TO.
- REFLECTORS FOR TYPES 1 AND 3 SHALL BE CRYSTAL (WHITE), YELLOW OR RED, AS SPECIFIED ON THE PLANS. REFLECTORS FOR TYPES 2 AND 2A SHALL BE CRYSTAL (WHITE) OR YELLOW AS SPECIFIED ON THE PLANS. REFLECTORS FOR TYPE 3 AND 3A SHALL BE YELLOW OR Y AS SPECIFIED ON THE PLANS.
- WHEN POSTS ARE SET IN CONCRETE, METAL REES SHALL BE INSERTED IN 1/2" DIA. HOLES LOCATED AT BOTTOM OF POST. MIN SIZE OF REES SHALL BE 1/2" DIA. X 3' LONG.
- MONODIRECTIONAL DELINEATORS SHALL BE USED AND ERECTED AT THE RECOMMENDED SPACING, UNLESS OTHERWISE SPECIFIED ON THE PLANS.
- FOR ADDITIONAL DATA ON DELINEATORS, REFER TO THE MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES AND ALL SUPPLEMENTS THERE TO.
- 1/2" OR 3/4" DIA. HOLES ON 4" CENTERS FOR A DISTANCE OF 10' MINIMUM FROM TOP POST.

NO. OF REFLECTOR UNITS PER POST	DATE	REVISION

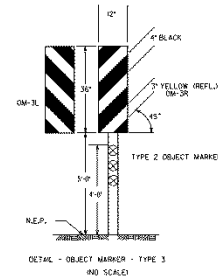
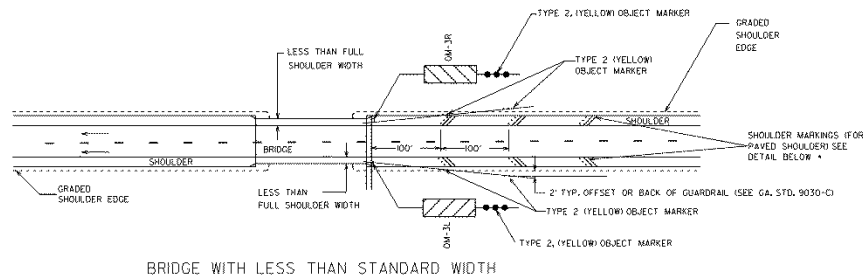
**DEPARTMENT OF TRANSPORTATION**  
**STATE OF GEORGIA**

**STANDARD DELINEATORS & MARKERS AND ALTERNATE POSTS**

NO SCALE REV. & REDR, MAR., 2001

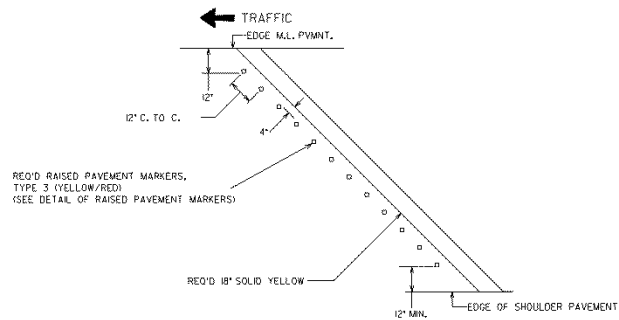
DES. ....	SUBMITTED	DATE	NUMBER
REV. ....	STATE ROAD & AIRPORT DESIGN ENGINEER		9030C
TRK. ....	APPROVED	DATE	
CHK. ....	CHIEF ENGINEER		

STATE	PROJECT NUMBER	SHEET NO.	TOTAL SHEETS
GA.			

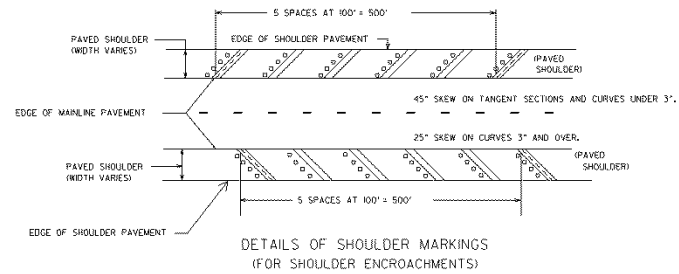


SUMMARY OF MATERIALS		
DESCRIPTION	UNIT	QTY.
OBJECT MARKERS, TYPE 1X SIGN MATERIAL (2" X 3" BLACK ON YELLOW)	SO. FT.	6.00
GALVANIZED STEEL POSTS, TYPE 2, (1/2" DIA., FT. EACH)	LN.FT.	22
OBJECT MARKERS, TYPE 2, (YELLOW/INCL. POST)	EACH	4
OBJECT MARKERS, TYPE 2, (YELLOW/ MOUNT ON OBJECT MARKER POSTS)	EACH	2
THERMOPLASTIC SOLID TRAFFIC STRIPE, 18" WHITE	LN.FT.	VARIES
RAISED PAVEMENT MARKERS, TYPE 3	EACH	VARIES

BRIDGE WITH LESS THAN STANDARD WIDTH



TYPICAL MARKING FOR 10' PAVED INSIDE SHOULDER



DETAILS OF SHOULDER MARKINGS (FOR SHOULDER ENCROACHMENTS)

GENERAL NOTES:

- OBJECT MARKERS SHALL BE PLACED IN A STRAIGHT LINE FLARE WITH THE FIRST UNIT OFFSET AS SHOWN.
- ALL OBJECT MARKERS SHALL CONFORM TO GEORGIA STANDARD 9030-C AND SECTION 3D OF THE M.U.T.C.D. OBJECT MARKERS SHALL BE PER SECTION 3C OF THE M.U.T.C.D.
- REFLECTIVE SHEETING FOR OBJECT MARKERS SHALL BE TYPE IX.
- TREATMENT SHOWN IS MINIMAL. ADDITIONAL DELINEATION MAY BE ADDED AT THE ENGINEER'S DISCRETION.
- DELINEATION DETAILS APPLY WHERE BRIDGE WIDTH ON DIVIDED HIGHWAYS IS LESS THAN IS REQUIRED BY M.O.G. DIRECTIVE #4265. SHOULDER MARKINGS APPLY TO SAME IF SHOULDERS ARE PAVED.
- SEE GEORGIA STANDARD 9030-C FOR DELINEATION AT FULL WIDTH BRIDGES.
- DIAGONAL STRIPES SHALL BE WHITE ON OUTSIDE SHOULDER AND YELLOW ON INSIDE SHOULDER.
- TYPE 3 RAISED PAVEMENT MARKERS SHALL BE CLEAR/RED ON OUTSIDE SHOULDER AND YELLOW/RED ON INSIDE SHOULDER.
- CLEAR AND YELLOW FACE OF TYPE 3 RAISED PAVEMENT MARKERS SHALL BE ORIENTED TOWARD APPROACHING TRAFFIC.

LENGTH OF STRIPE			NO. OF RAISED PAVEMENT MARKERS		
SHOULDER WIDTH	45° SKEW	25° SKEW	SHOULDER WIDTH	45° SKEW	25° SKEW
10' PAVED SHOULDER	14,14'	18,1'	10' PAVED SHOULDER	12 ea.	15 ea.
8' PAVED SHOULDER	11,3'	14,63'	8' PAVED SHOULDER	9 ea.	11 ea.
4' PAVED SHOULDER	5,66'	7,35'	4' PAVED SHOULDER	4 ea.	4 ea.

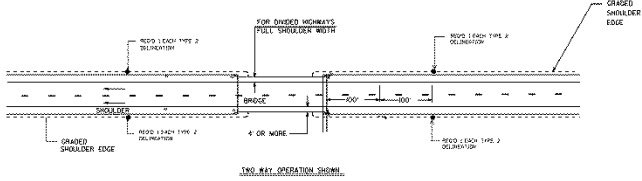
DATE	REVISIONS	GEORGIA DEPARTMENT OF TRANSPORTATION OFFICE OF TRAFFIC SAFETY & DESIGN
8-7-18	REVISED TITLE BLOCK AND REV. TYP. MARKING DETAIL	
		DETAILS FOR BRIDGE DELINEATION ON DIVIDED HIGHWAYS
		NO SCALE JANUARY 2000



# BRIDGE DELINEATION DETAILS

STATE	PROJECT NUMBER	SHEET TOTAL NO.	TOTAL SHEETS
GA.			

**TYPE 1 - NORMAL BRIDGE**  
BRIDGES THAT ARE 4 FEET OR MORE WIDER THAN THE APPROACH PAVEMENT, EACH SIDE

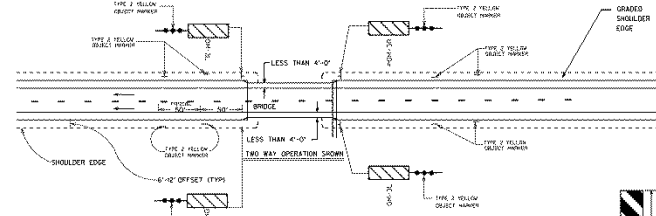


DESCRIPTION	UNIT	QUAN.
<b>TWO WAY OPERATION</b>		
DELINEATORS, TYPE 2, WHITE	EACH	12
<b>ONE WAY OPERATION</b>		
DELINEATORS, TYPE 1, WHITE	EACH	3
DELINEATORS, TYPE 1, YELLOW	EACH	5

### GENERAL NOTES

1. PLACE DELINEATIONS IN A STRAIGHT LINE AND FLARE WITH THE FIRST ONE OFFSET AS SHOWN.
2. THE INSIDE EDGE OF THE DELINEATION NEAREST THE BRIDGE SHALL BE IN LINE WITH THE INNER EDGE OF PAV. OR ADJUSTED TO FACE OF BRIDGE CURB IF PRESENT.
3. ALL DELINEATORS SHALL CONFORM TO SECTION STANDARD SPEC. AND SECT 3-6 OF THE MULTISID.
4. TREATMENT SIGN IS MINIMAL. ADDITIONAL DELINEATION MAY BE ADDED AT THE ENGINEER'S DISCRETION.

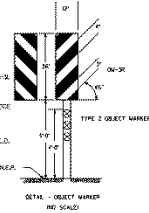
**TYPE 2 - INTERMEDIATE BRIDGE**  
2 OR MORE LANE OPERATION - WIDTH GREATER THAN ROADWAY WIDTH, BUT LESS THAN 4' IN EXCESS OF APPROACH PAVEMENT WIDTH, EACH SIDE



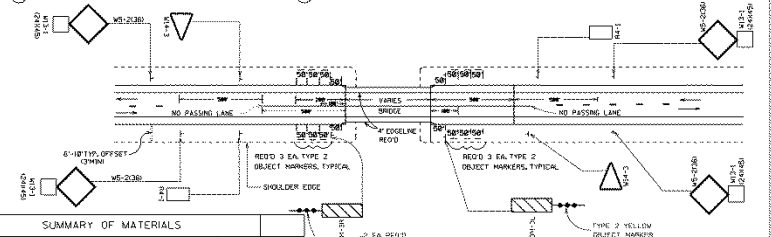
DESCRIPTION	UNIT	QUAN.	QUAN. PER BAY
OBJECT MARKERS, TYPE 1, SIGN MATERIAL, 10\"/>			
SAVANES STEEL POSTS, TYPE 1, 12\"/>			
OBJECT MARKER, TYPE 2, YELLOW (MOUNTED ON OBJECT MARKER POSTS)			
SOLID TRAFFIC STRIPE, TYPE 2, WHITE (EDGE LINE)			
SOLID TRAFFIC STRIPE, TYPE 1, YELLOW (EDGE LINE)			

### GENERAL NOTES

1. ON BRIDGES WITH ONE WAY OPERATION, BRIDGE APPROACH DELINEATION (INCLUDING AND INCLUDING) SHALL BE INSTALLED ON THE REVERSE END ONLY.
2. THE INSIDE EDGE OF THE OBJECT MARKER NEAREST THE BRIDGE SHALL BE IN LINE WITH THE INNER EDGE OF THE APPROACH OR FULL-FACE OF BRIDGE CURB IF PRESENT.
3. OBJECT MARKERS SHALL BE PLACED IN A STRAIGHT LINE WITH THE FIRST UNIT OFFSET AS SHOWN.
4. ALL OBJECT MARKERS SHALL CONFORM TO SECTION STANDARD SPEC. AND SECT 3-6 OF THE MULTISID. OBJECT MARKERS SHALL BE FOR SECT. 3-6 OF THE MULTISID.
5. REFLECTIVE SHEETING FOR OBJECT MARKERS SHALL BE TYPE 3, LEVEL A.
6. TREATMENT SIGN IS MINIMAL. ADDITIONAL DELINEATION MAY BE ADDED AT THE ENGINEER'S DISCRETION.



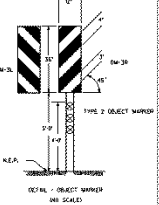
**TYPE 3 - NARROW BRIDGE**  
A) 2 LANE OPERATION - BETWEEN 16' AND 24' WIDE  
B) 3 OR MORE LANE OPERATION EQUAL TO OR LESS THAN APPROACH PAVEMENT WIDTH



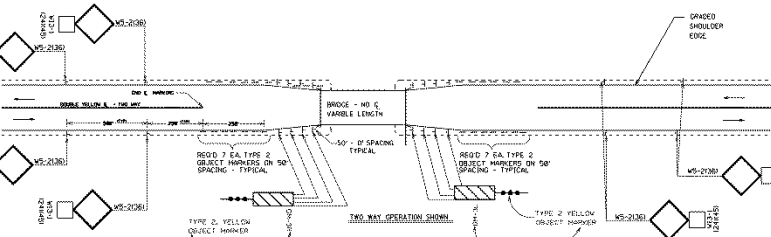
DESCRIPTION	UNIT	QUAN. ONEWAY	QUAN. TWOWAY
OBJECT MARKERS, TYPE 3, TYPE III SIGN MATERIAL, 10\"/>			
GALVANIZED STEEL POSTS, TYPE 1, 10\"/>			
OBJECT MARKER, TYPE 2, YELLOW			
NO. 20 SADDLES, TYPE I SIGN MATL.			
NO. 20 SADDLES, TYPE II SIGN MATL.			
SAVANES STEEL POSTS, TYPE I 12\"/>			
SAVANES STEEL POSTS, TYPE I 12\"/>			
SAVANES STEEL POSTS, TYPE I 12\"/>			
SAVANES STEEL POSTS, TYPE I 12\"/>			
SAVANES STEEL POSTS, TYPE I 12\"/>			
FRUSED PAVEMENT MARKERS TYPE 1 FOR CENTERLINE SPACING, 4\"/>			
SOLID TRAF. STRIPE FOR EDGELINES, 4\"/>			
SOLID WHITE - CENTERLINE (CONCENT)			

### GENERAL NOTES

1. ON BRIDGES WITH ONE WAY OPERATION BRIDGE APPROACH AND MARKINGS SHALL BE INSTALLED ON THE APPROACH END OF THE BRIDGE ONLY. MARKS AND MARKINGS FOR NO PASSING LINES ARE NOT REQUIRED. LEFT EDGE LINES AND BRIDGE PAVEMENT MARKINGS SHALL BE YELLOW. RIGHT EDGE LINES AND PAVEMENT MARKINGS SHALL BE WHITE. LANE LINE SHALL BE SFT WHITE.
2. PAVEMENT MARKINGS FOR THE CENTERLINE AND LANE LINE SHALL BE PAINTED OR APPLIED AS SHOWN IN ACCORDANCE WITH DEPARTMENT POLICY.
3. THE INSIDE EDGE OF THE OBJECT MARKER NEAREST THE BRIDGE SHALL BE IN LINE WITH THE INNER EDGE OF THE APPROACH OR FULL-FACE OF BRIDGE CURB IF PRESENT.
4. PLACE OBJECT MARKER AND DELINEATIONS IN A STRAIGHT LINE FLARE WITH THE FIRST ONE OFFSET AS SHOWN.
5. ALL REFLECTIVE SHEETING SHALL BE TYPE 1A.
6. ALL OBJECT MARKERS SHALL CONFORM TO GA STD. 508-C AND MEET ALL OF THE MULTISID. ALL OBJECT MARKERS SHALL CONFORM TO SECT 3-6 OF THE MULTISID.
7. HEIGHT AND TREATMENT IS MINIMAL. ADDITIONAL TREATMENT MAY BE ADDED AT THE ENGINEER'S DISCRETION.



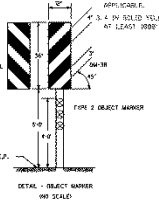
**TYPE 4 - ONE LANE BRIDGE**  
A) BRIDGES LESS THAN 16' IN WIDTH, B) 16' WIDE WITH POOR APPROACH ALIGNMENT OR SUBSTANTIAL TRUCK VOLUME.



DESCRIPTION	UNIT	QUAN.
OBJECT MARKERS, TYPE 3, TYPE III SIGN MATL., 10\"/>		
GALV. STEEL POSTS, TYPE 1, 12\"/>		
OBJECT MARKERS, TYPE 2, YELLOW (MOUNTED ON OBJECT MARKER POSTS)		
OBJECT MARKER, TYPE 2, YELLOW (MOUNTED ON OBJECT MARKER POSTS)		
NO. 20 SADDLES, TYPE II SIGN MATL.		
NO. 20 SADDLES, TYPE I SIGN MATL.		
SOLID TRAFFIC STRIPE - WHITE FOR EDGELINE		
SOLID TRAFFIC STRIPE - WHITE FOR CENTERLINE		
FRUSED PAVEMENT MARKERS, TYPE 1 (FOR CENTERLINE SPACING, 4\"/>		

### GENERAL NOTES

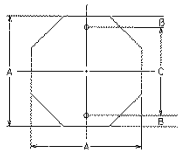
1. OBJECT MARKER NEAREST THE BRIDGE SHALL BE IN LINE WITH THE INNER EDGE OF THE APPROACH OR FULL-FACE OF BRIDGE CURB IF PRESENT. OBJECT MARKERS AND DELINEATORS SHALL FOLLOW THE LAYOUT OF THE ROADWAY TO FULL WIDTH OF ROADWAY THEN PARALLEL FOR DISTANCE SHOWN.
2. FRUSED MARKERS USED ON NO. 20 PAVING LINES APPROACHING THE BRIDGE SHALL BE ON AN 4\"/>
3. IF 4\"/>
4. REFLECTIVE SHEETING, TYPE 1A LEVEL A SHALL BE USED FOR ALL SIGN AND OBJECT MARKERS.
5. ALL DELINEATORS SHALL CONFORM TO GA STD. 508-C AND SECT. 3-6 OF THE MULTISID. OBJECT MARKERS SHALL CONFORM TO SECT. 3-6 OF THE MULTISID.
6. DELINEATION SIGN IS MINIMAL. ADDITIONAL DELINEATION MAY BE ADDED AT THE ENGINEER'S DISCRETION.
7. IN THE EVENT THE ROADWAY IS A ONE WAY OPERATION, CONTACT THE DISTRICT TRAFFIC AND SAFETY ENGINEER FOR DELINEATION DETAILS.



DATE	REVISIONS	GEORGIA DEPARTMENT OF TRANSPORTATION
5-7-14	ADDED STRIPE, REFLECT. AND REF. REFLECTIVE SHEET.	OFFICE OF TRAFFIC SAFETY & DESIGN
		DETAILS FOR BRIDGE DELINEATION ON DIVIDED HIGHWAYS TWO WAY OPERATION
		NO SCALE REV 5/23/05

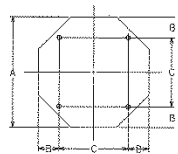


STATE	PROJECT NUMBER	SHEET NO.	TOTAL SHEETS
GA.			



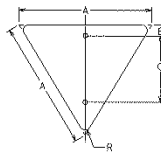
OCTAGON

A	B	C
24	3	18
30	3	24
36	3	30



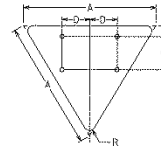
EQUILATERAL TRIANGLE

A	B	C
48	9	30

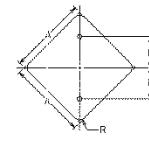


DIAMOND

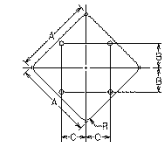
A	B	C	R
30	3	18	1 1/2
36	3	21	2
48	3	27	3



A	B	C	D	R
60	3	18	15	3

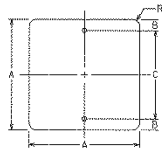


A	B	C	R
24	12	1 1/2	
30	15	1 3/4	
36	18	2 1/4	



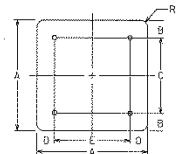
A	B	C	R
36	10	10	2 1/4
48	15	15	3
60	18	18	3 3/4

\* FOR TWO POST ERECTION

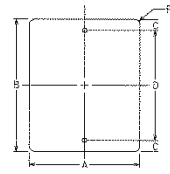


SQUARE

A	B	C	R
18	3	12	1 1/2
24	3	18	1 1/2
30	3	24	1 1/2

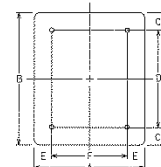


A	B	C	D	E	R
36	6	24	6	24	2 1/4
48	6	36	6	36	3

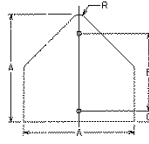


VERTICAL RECTANGLE

A	B	C	D	R
12	18	1 1/2	15	1 1/2
18	24	3	18	1 1/2
24	30	3	24	1 1/2
30	36	3	30	1 1/2

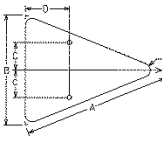


A	B	C	D	E	F	R
36	48	6	36	6	24	2 1/4
48	60	6	48	9	30	3



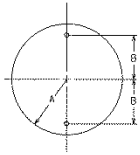
PENTAGON

A	B	C	R
30	21	3	1 3/8
36	24	3	2 1/4



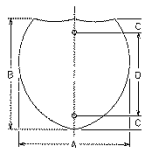
ISOSCELES TRIANGLE

A	B	C	D	R
40	30	1 1/2	12	1 1/2
48	36	9	15	2 1/4



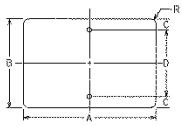
CIRCLE

A	B
15	12
18	15



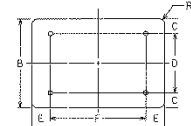
INTERSTATE SHIELD

A	B	C	D
24	24	3	18
30	24	3	18
36	36	6	24
45	36	6	24



HORIZONTAL RECTANGLE

A	B	C	D	R
21	15	1 1/2	12	1 1/2
24	12	1 1/2	9	1 1/2
24	18	3	12	1 1/2
30	15	1 1/2	12	1 1/2
30	24	3	18	1 1/2
36	12	1 1/2	9	1 1/2
36	24	3	18	1 1/2
48	12	1 1/2	9	1 1/2
48	24	3	18	1 1/2

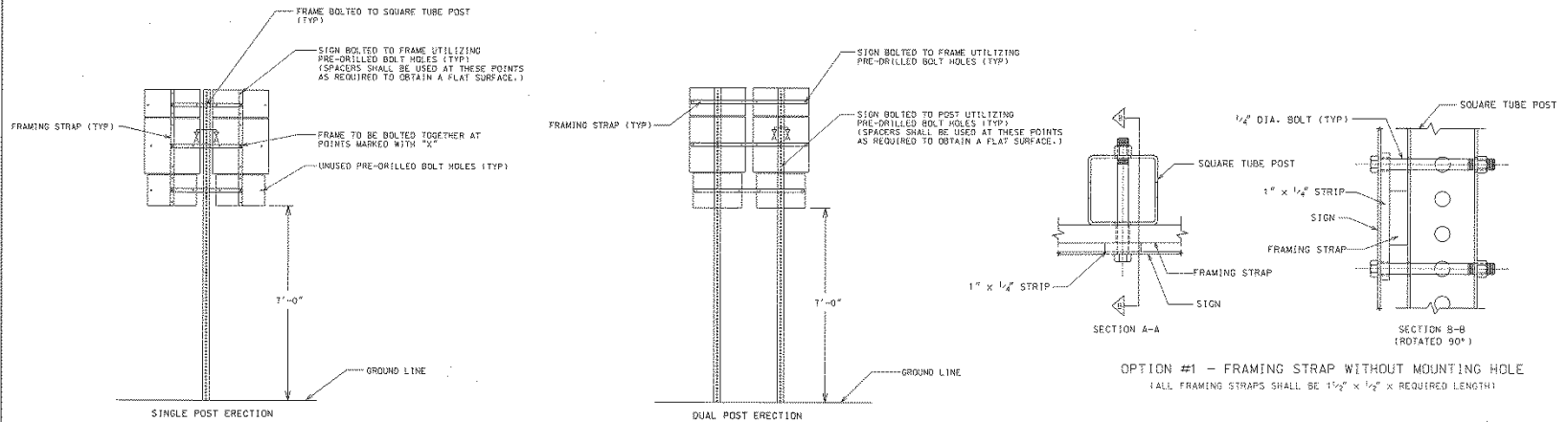


A	B	C	D	E	F	R
48	36	6	24	9	30	2 1/4
60	24	3	18	12	36	1 1/2
60	36	6	24	12	36	2 1/4

DATE	REVISIONS	GEORGIA DEPARTMENT OF TRANSPORTATION OFFICE OF TRAFFIC SAFETY & DESIGN
		DETAILS OF SIGN PLATES
		NO SCALE JANUARY 2000

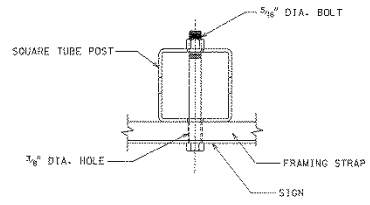
T-1000 (REV. 05-01)

STATE	PROJECT NUMBER	SHEET NO.	TOTAL SHEETS
GA.			



TYPICAL ASSEMBLY UNIT (BACK VIEW)

OPTION #1 - FRAMING STRAP WITHOUT MOUNTING HOLE  
(ALL FRAMING STRAPS SHALL BE 1 1/2" x 1/2" x REQUIRED LENGTH)

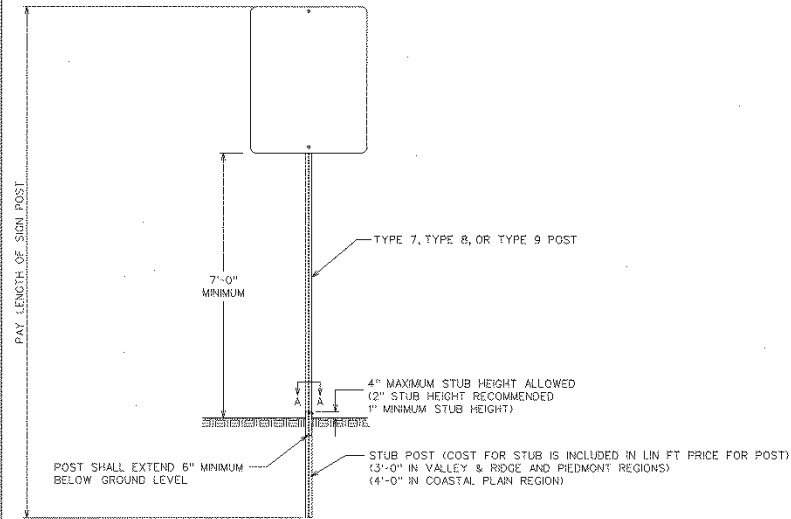


OPTION #2 - FRAMING STRAP WITH MOUNTING HOLE  
(ALL FRAMING STRAPS SHALL BE 2" x 1/2" x REQUIRED LENGTH)

- GENERAL NOTES:
1. STYLE OF FRAMING IS OPTIONAL. ALTERNATE DESIGNS ARE ACCEPTABLE UPON APPROVAL OF THE ENGINEER. FRAME SHALL BE DESIGNED SO AS TO HOLD THE ASSEMBLY IN A FIXED, RIGID POSITION.
  2. FRAMING STRAPS SHALL BE GALVANIZED STEEL OR ALUMINUM.
  3. STEEL SHALL BE A.S.T.M. DESIGNATION A-283, GRADE D, GALVANIZED IN ACCORDANCE WITH A.S.T.M. DESIGNATION A-123.
  4. ALUMINUM SHALL BE ALLOY 6061-T6.
  5. BOLTS, NUTS, WASHERS, AND SPACERS SHALL CONFORM TO THE STANDARD SPECIFICATIONS AND/OR SPECIAL PROVISIONS.
  6. FRAMING STRAPS ON A DUAL POST ERECTION SHALL NOT BE BOLTED TO THE POST.

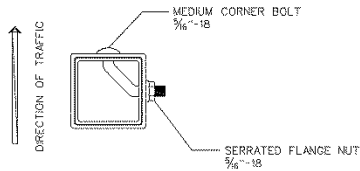
DATE	REVISIONS	GEORGIA DEPARTMENT OF TRANSPORTATION OFFICE OF TRAFFIC OPERATIONS
1/29/00	DESIGNED FOR SINGLE POST TO SQUARE TUBE POST	DETAILS FOR TYPICAL FRAMING
		NO SCALE JANUARY 2000

STATE	PROJECT NUMBER	SHEET TOTAL
G.A.		No. SHEETS



FRONT VIEW

POST	STUB SIZE
TYPE 7	2 1/4" x 2 1/4"
TYPE 8	2 1/2" x 2 1/4"
TYPE 9	2 1/2" x 2 1/2"



SECTION A-A

SIGN POST SELECTION CHART

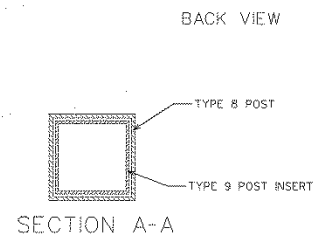
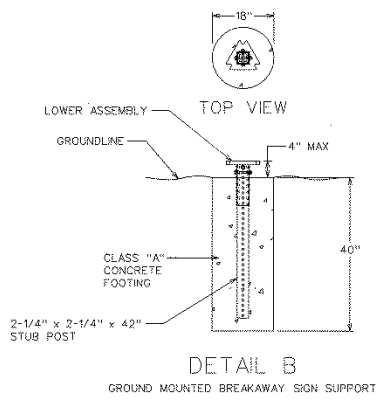
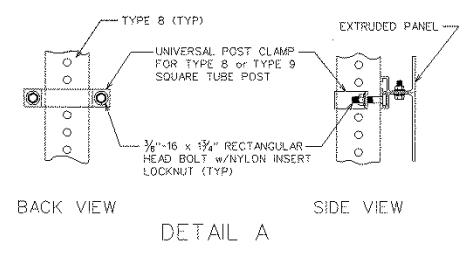
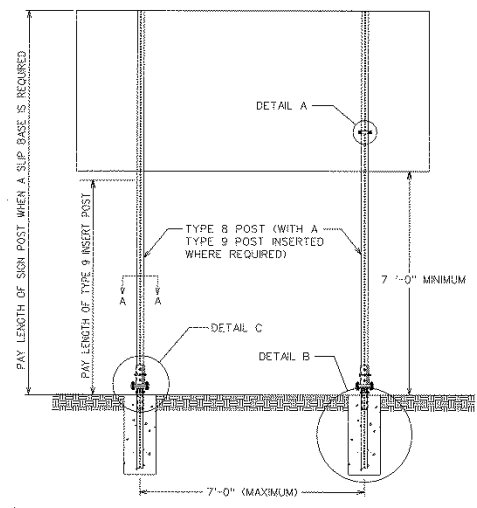
10 MPH Wind Load Chart + 15% Gust Factor

Sign Centroid	SLIP BASE NOT REQUIRED			GROUND MOUNTED BREAKAWAY SIGN SUPPORT REQUIRED		
	TYPE 7 2" x 14 ga.		TYPE 8 2 1/4" x 14 ga.	TYPE 8 2 1/2" x 12 ga.		TYPE 8 w/TYPE 8 Insert 2 1/2" x 12 ga. w/2 1/4" x 14 ga.
	1 Post	2 Post	1 Post	2 Post	3 Post	3 Post
	SQUARE FOOTAGE			SQUARE FOOTAGE		
6'	13.50	27.00	18.25	30.00	60.00	90.00
7'	11.80	23.60	16.50	27.75	55.50	83.25
8'	10.15	20.30	14.45	24.55	49.10	73.65
9'	9.00	18.00	12.85	21.00	40.00	60.00
10'	8.10	16.20	11.85	19.00	36.00	54.00
11'	7.40	14.80	10.90	17.40	32.80	49.20
12'	6.80	13.60	9.95	15.90	30.00	45.00
13'	6.25	12.50	9.00	14.55	27.70	41.55
14'	5.80	11.60	8.25	13.30	25.80	38.70
15'	5.30	10.60	7.45	12.10	23.90	35.85
16'	4.90	9.80	6.65	11.00	22.00	33.00
17'	4.40	8.80	5.90	9.90	19.80	29.70
18'	4.10	8.20	5.40	9.00	18.00	27.00
19'	3.85	7.70	5.10	8.35	16.70	25.05
20'	3.75	7.50	4.85	7.95	15.90	23.85

SIGN CENTROID IS DISTANCE FROM GROUND LEVEL TO BOTTOM OF SIGN PLUS HALF THE HEIGHT OF SIGN.  
**EXAMPLE:** 24" X 48" SIGN THAT IS 7 FEET FROM GROUND TO BOTTOM OF SIGN. ADD HALF OF 48" (24") OR 2 FT. PLUS 7 FT. = 9' CENTROID.  
 SIGN PLATE SHALL NOT EXCEED 48" IN WIDTH ON A SINGLE POST.  
 TYPE 9 INSERT SHALL BE A CONTINUOUS POST INSERTED INTO THE TYPE 8 POST WHERE REQUIRED. THE INSERT POST SHALL EXTEND FROM THE BOTTOM OF THE SLIP BASE UPPER ASSEMBLY TO 4" BELOW THE BOTTOM OF THE SIGN. THE INSERT POST SHALL NOT EXTEND ABOVE THE BOTTOM OF THE SIGN. PAYMENT FOR THE INSERT POST SHALL BE PER LINEAR FOOT OF TYPE 9 POST.  
 GROUND MOUNTED BREAKAWAY SIGN SUPPORT WILL BE MEASURED AND PAID FOR SEPARATELY. THE COST FOR THIS WORK SHALL INCLUDE THE UPPER AND LOWER ASSEMBLY, STUB POST, CLASS "A" CONCRETE, ALL HARDWARE NECESSARY TO COMPLETE THE INSTALLATION, AND BE INCLUDED IN THE BID PRICE SUBMITTED FOR ITEM 6.06-3.010.

DATE	REVISIONS	GEORGIA DEPARTMENT OF TRANSPORTATION OFFICE OF TRAFFIC SAFETY & DESIGN
		TYPE 7, 8, AND 9 SQUARE TUBE POST INSTALLATION DETAIL
		NO SCALE JULY 2002

STATE	PROJECT NUMBER	SHEET NO.	TOTAL SHEETS
GA.			



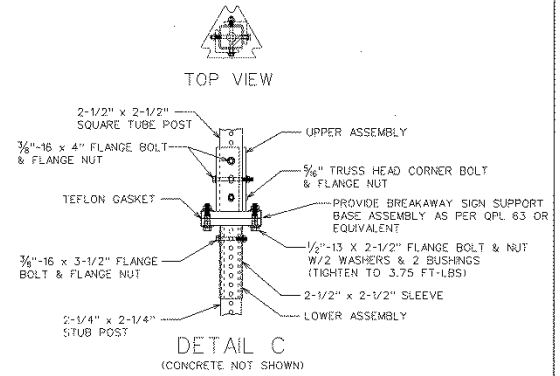
SIGN POST SELECTION CHART  
70MPH Wind Load Chart • 15% Gust Factor

Sign Centroid	SLIP BASE NOT REQUIRED			GROUND MOUNTED BREAKAWAY SIGN SUPPORT REQUIRED					
	TYPE 7 2" x 14 ga.		TYPE 9 2 1/4" x 14 ga.	TYPE 8 2 1/2" x 12 ga.	TYPE 8 2 1/2" x 12 ga.		TYPE 8 w/TYPE 9 Insert 2 1/2" x 12 ga. w/ 2 1/4" x 14 ga.		
	1 Post	2 Post	1 Post	1 Post	2 Post	3 Post	1 Post	2 Post	3 Post
	SQUARE FOOTAGE								
6'	13.50	27.00	19.25	30.00	60.00	90.00	48.25	96.50	144.75
7'	15.00	30.00	19.50	30.75	61.50	92.25	48.75	97.50	146.25
8'	16.15	32.30	19.75	31.50	63.00	94.50	49.50	99.00	148.50
9'	17.00	34.00	19.88	32.00	64.00	96.00	50.00	100.00	150.00
10'	17.60	35.20	19.95	32.40	64.80	97.20	50.40	100.80	151.20
11'	18.00	36.00	19.98	32.70	65.40	98.10	50.70	101.40	152.10
12'	18.30	36.60	19.99	32.90	65.80	98.70	50.85	101.70	152.55
13'	18.50	37.00	19.99	33.00	66.00	99.00	50.90	101.80	152.70
14'	18.60	37.20	19.99	33.10	66.20	99.30	50.92	101.84	152.76
15'	18.65	37.30	19.99	33.15	66.30	99.45	50.93	101.86	152.79
16'	18.70	37.40	19.99	33.20	66.40	99.60	50.94	101.88	152.82
17'	18.75	37.50	19.99	33.25	66.50	99.75	50.95	101.90	152.85
18'	18.80	37.60	19.99	33.30	66.60	99.90	50.96	101.92	152.88
19'	18.85	37.70	19.99	33.35	66.70	100.05	50.97	101.94	152.91
20'	18.90	37.80	19.99	33.40	66.80	100.20	50.98	101.96	152.94

SIGN CENTROID IS DISTANCE FROM GROUND LEVEL TO BOTTOM OF SIGN PLUS HALF THE HEIGHT OF SIGN.  
EXAMPLE: 24" x 48" SIGN THAT IS 7 FEET FROM GROUND TO BOTTOM OF SIGN. ADD HALF OF 48" (24") OR 2 FT. PLUS 7 FT. = 9' CENTROID.  
SIGN PLATE SHALL NOT EXCEED 48" IN WIDTH ON A SINGLE POST.

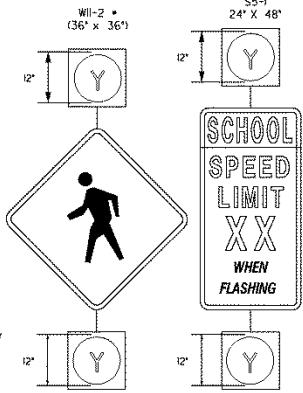
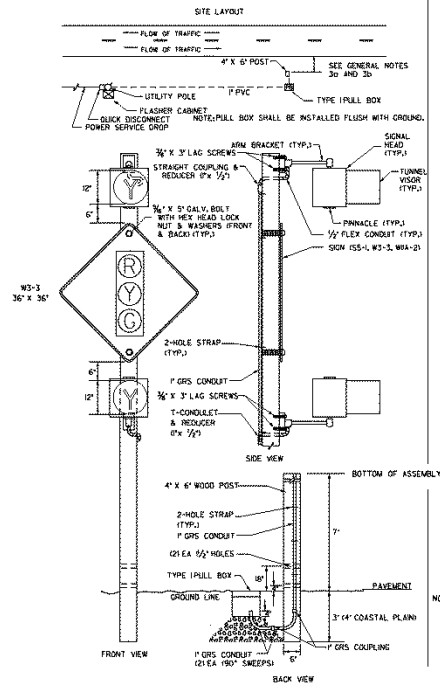
TYPE 9 INSERT SHALL BE A CONTINUOUS POST INSERTED INTO THE TYPE 8 POST WHERE REQUIRED. THE INSERT POST SHALL EXTEND FROM THE BOTTOM OF THE SLIP BASE UPPER ASSEMBLY TO 4" BELOW THE BOTTOM OF THE SIGN. THE INSERT POST SHALL NOT EXTEND ABOVE THE BOTTOM OF THE SIGN. PAYMENT FOR THE INSERT POST SHALL BE PER LINEAR FOOT OF TYPE 9 POST.

GROUND MOUNTED BREAKAWAY SIGN SUPPORT WILL BE MEASURED AND PAID FOR SEPARATELY. THE COST FOR THIS WORK SHALL INCLUDE THE UPPER AND LOWER ASSEMBLY, STUB POST, CLASS "A" CONCRETE, ALL HARDWARE NECESSARY TO COMPLETE THE INSTALLATION, AND BE INCLUDED IN THE BID PRICE SUBMITTED FOR ITEM 636-3030.



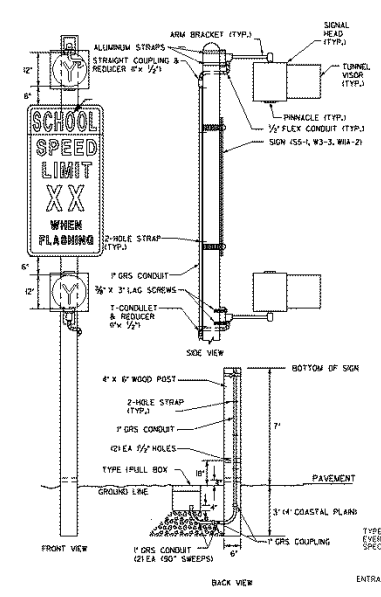
DATE	REVISIONS	GEORGIA DEPARTMENT OF TRANSPORTATION OFFICE OF TRAFFIC SAFETY & DESIGN
		DETAILS OF SQUARE TUBE POST (BREAKAWAY SIGN SUPPORT)
		NO SCALE July 2002

T-3B

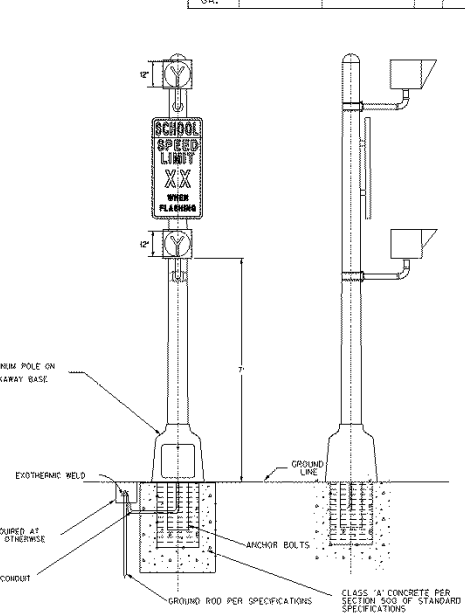


NOTE: SIGN SIZE FOR POLE MOUNTED INSTALLATION SHALL BE BASED ON SECTION 76.0 OF THE M.U.T.C.D. THE SCHOOL SPEED LIMIT SIGN (SS-1) SPECIAL 42" X 48" SIGN SHOWN ON SPAN MOUNTED WARNING FLASHER INSTALLATION DETAIL MAY BE SUBSTITUTED FOR THE SS-1.

\* A FLUORESCENT YELLOW-GREEN BACKGROUND COLOR MAY BE USED FOR THIS SIGN



WOOD POLE MOUNTED FLASHING SCHOOL SIGNAL



PEDESTRIAN POLE MOUNTED FLASHING SCHOOL SIGNAL

STANDARD SIGN SUMMARY GENERAL NOTES

- ALL STANDARD HIGHWAY SIGNS SHALL BE FABRICATED AND ERECTED IN ACCORDANCE WITH THE DETAILS SHOWN IN THE PLANS, THE MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES, CURRENT EDITION, AND THE GEORGIA STANDARD SPECIFICATIONS, SUPPLEMENTAL SPECIFICATIONS, AND/OR SPECIAL PROVISIONS.
- ALL STANDARD HIGHWAY SIGNS SHALL BE ERECTED AT A HEIGHT OF 7 FEET ABOVE THE NORMAL EDGE OF PAVEMENT TO THE BOTTOM OF THE SIGN OR ASSEMBLY.
- HORIZONTAL CLEARANCE FOR STANDARD HIGHWAY SIGNS ON INTERSTATE HIGHWAYS SHALL BE 32 FEET FROM THE NORMAL EDGE OF PAVEMENT TO THE NEARER EDGE OF THE SIGNS, UNLESS SPECIFIED OTHERWISE IN THE PLANS. HORIZONTAL CLEARANCE FOR STANDARD HIGHWAY SIGNS ON RAMPS SHALL BE 2 FEET FROM THE NORMAL EDGE OF PAVED SHOULDER, OR EDGE OF GRADED SHOULDER WHEN PRESENT.
- HORIZONTAL CLEARANCE FOR STANDARD HIGHWAY SIGNS ON ALL OTHER ROADWAYS SHALL BE 6 FEET FROM THE EDGE OF PAVED SHOULDER OR 12 FEET FROM THE NORMAL EDGE OF PAVEMENT TO THE NEARER EDGE OF THE SIGNS, WHICHEVER IS GREATER. THE HORIZONTAL CLEARANCE IN NON-MOUNTABLE CURB SECTIONS SHALL BE AT LEAST 2 FEET FROM THE CURB FACE TO THE NEARER EDGE OF THE SIGNS.
- HORIZONTAL CLEARANCE FOR STANDARD HIGHWAY SIGNS MOUNTED BEHIND GUARD RAIL SHALL BE 6 FEET FROM THE FACE OF THE GUARD RAIL, TO THE NEARER EDGE OF THE SIGNS.
- TYPE R (ENCAPSULATED LENS) REFLECTIVE SHEETING SHALL BE USED FOR ALL STANDARD HIGHWAY SIGNS REQUIRING RETROREFLECTIVE BACKGROUNDS EXCEPT AS SPECIFIED BELOW OR SPECIFIED OTHERWISE IN THE PLANS. EITHER CLASS 1 OR CLASS 2 ADHESIVE BACKING IS PERMISSIBLE.
- TYPE XI (VERY HIGH INTENSITY) YELLOW-GREEN FLUORESCENT BACKGROUND SHALL BE USED FOR SCHOOL WARNING SIGNS, INCLUDING THE "SCHOOL" PORTION OF THE SCHOOL SPEED LIMIT (SS-1) SIGN, AND INCLUDING ANY SUPPLEMENTAL PLAQUES USED IN ASSOCIATION WITH THESE WARNING SIGNS. SHALL USE TYPE XI (VERY HIGH INTENSITY) YELLOW-GREEN FLUORESCENT BACKGROUND WITH A BLACK LEGEND AND BORDER UNLESS OTHERWISE NOTED IN THE M.U.T.C.D.
- REFER TO GDOT TRAFFIC SIGNAL STANDARD DETAILS AND GDOT STANDARD SPECIFICATIONS 647 AND 925.
- DETAILS SHOWN IS FOR WOOD POST AND ALUMINUM POLE. GALVANIZED SQUARE TUBE STEEL POST MAY BE SUBSTITUTED, REFER TO STANDARD SPECIFICATIONS SECTION 90. GALVANIZED SQUARE TUBE POSTS MAY BE USED AS APPROVED BY THE DEPARTMENT OF TRANSPORTATION ENGINEER.
- IF WARNING BEACONS HAVE MORE THAN ONE SIGNAL SECTION, THEY SHALL FLASH ALTERNATELY.
- SUBMIT ALTERNATE MOUNTING METHODS TO THE OFFICE OF TRAFFIC OPERATIONS FOR APPROVAL PRIOR TO FABRICATION AND INSTALLATION.

Guidelines For Usage On Metric Projects

When these details are incorporated into plans and or projects that are being prepared or constructed in metric units, avoid or precise conversion to metric units is not required. The dimensions shown that are in feet and inches may be converted to corresponding metric units using the following: "Rounded-Off" conversion factors: 1" = 25mm, 4" = 100mm, 12" = 300mm. All measurement notes that refer to linear feet and square yards shall be interpreted to mean linear meters and square meters.

DATE	DEPARTMENT OF TRANSPORTATION STATE OF GEORGIA
REVISION	TRAFFIC SIGNAL DETAIL FLASHING SCHOOL ASSEMBLY POST MOUNTED INSTALLATION
DATE	FEBRUARY 2012
REVISION	DETAIL NUMBER TS-12B

**APPENDIX E**

**PAVEMENT**

**MARKING**

**INFORMATION**

## STRIPING REQUIREMENTS:

### Materials

Pavement marking material is typically thermoplastic or paint; however, preformed material with contrast should be used on bridges and all other concrete surfaces. Widths for longitudinal lines, hatching, and stop bars are defined in the *GDOT Signing and Marking Details*. Striping should be offset two (2) inches from the longitudinal joint. Pavement marking material should conform to Policies and Procedures (P&P) 6146-2 for maintenance activities.

**Table 1 Pavement Marking Material Selection Matrix**

AADT	Asphalt			Concrete		
	2 Lanes	>2 Lanes	Interstate/ Freeway	2 Lanes	>2 Lanes	Interstate/ Freeway
n < 8,000	H or T	H or T		F* or P*	F* or P*	
8,000 ≥ n <15,000	T	T	T or P	F* or P*	F* or P*	F* or P*
≥ 15,000	T	T / P	P	F / P	P	F

**H** – High build Paint and Wet Weather Paint Traffic Stripe (652)  
**T** – Standard and Wet Weather Thermoplastic Traffic Stripe (653)  
**F** – Preformed Plastic Pavement Markings (657)  
**P** – Standard and Wet Weather Polyurea Traffic Strip (658)

- \*8" contrast markings shall be used for all lane lines on PCC surfaces (includes skip and edge lines).
- Words and symbols shall be thermoplastic (653) or preformed material (657). Raised pavement markers (654) shall be used as determined by the contract.
- Preformed plastic pavement marking material should not be used on pavements with open-graded surface treatment.
- Wet Reflective material shall be used on all interstates and freeways. Wet Reflective material should also be used on routes where lane departure crashes exceed the statewide average for comparable routes or where the analysis of crash data indicates a need. The State Traffic Engineer or Sate Maintenance Engineer may request use of wet reflective markings on a case-by-case basis.

Above Table from GDOT Signing & Marking Guidelines

All Pavement Markings shall be installed as per current *Georgia Standards & Specifications and Supplemental Standards* and the *Manual on Uniform Traffic Control Devices* (Current Ed.).

(From MUTCD)

## Section 3B.02 No-Passing Zone Pavement Markings and Warrants

### Standard:

01 No-passing zones shall be marked by either the one direction no-passing zone pavement markings or the two-direction no-passing zone pavement markings described in [Section 3B.01](#) and shown in [Figures 3B-1](#) and [3B-3](#).

02 When center line markings are used, no-passing zone markings shall be used on two-way roadways at lane-reduction transitions (see [Section 3B.09](#)) and on approaches to obstructions that must be passed on the right (see [Section 3B.10](#)).

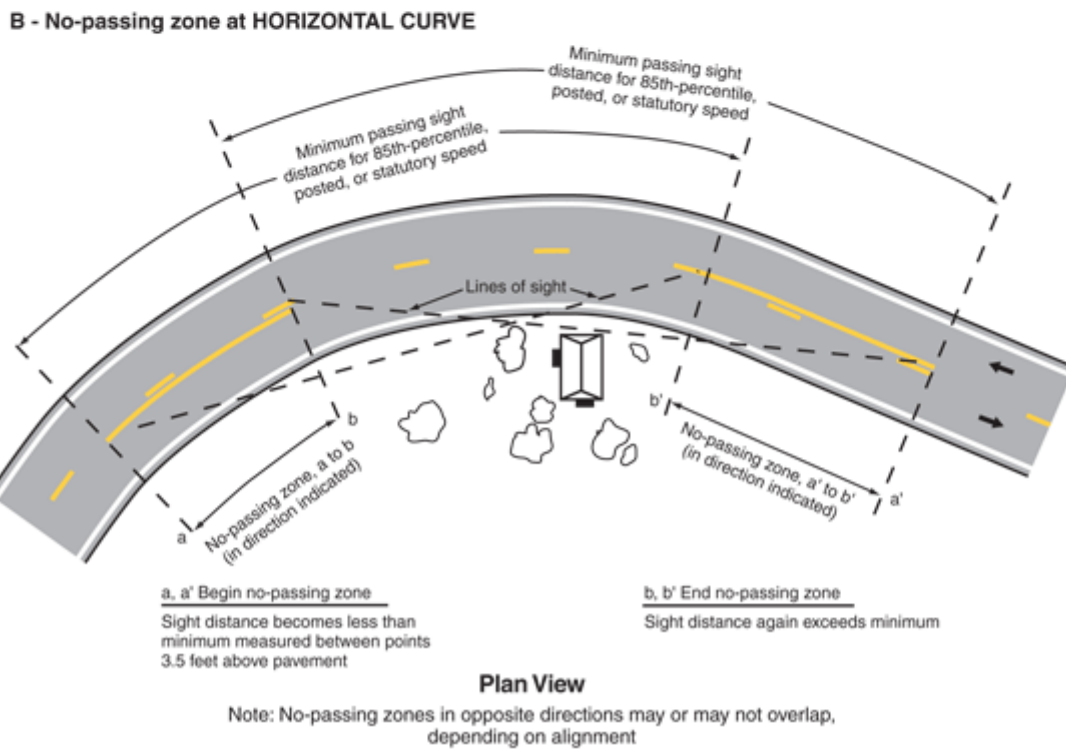
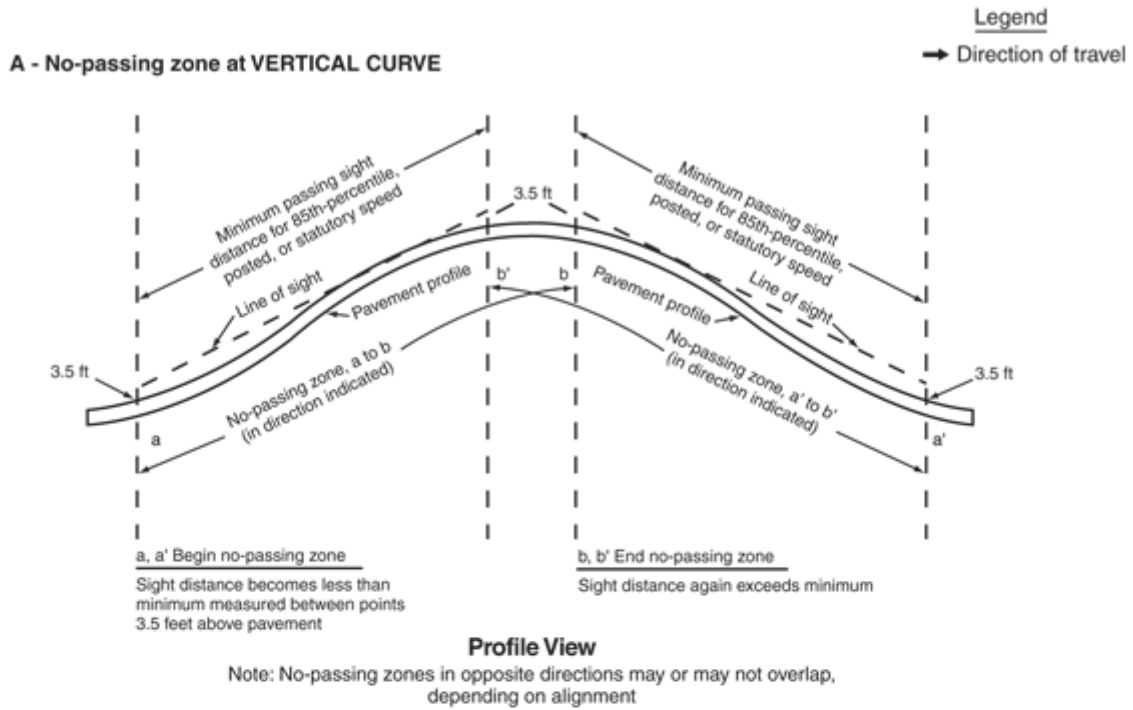
03 On two-way, two- or three-lane roadways where center line markings are installed, no-passing zones shall be established at vertical and horizontal curves and other locations where an engineering study indicates that passing must be prohibited because of inadequate sight distances or other special conditions.

04 On roadways with center line markings, no-passing zone markings shall be used at horizontal or vertical curves where the passing sight distance is less than the minimum shown in Table 3B-1 for the 85th-percentile speed or the posted or statutory speed limit. The passing sight distance on a vertical curve is the distance at which an object 3.5 feet above the pavement surface can be seen from a point 3.5 feet above the pavement (see [Figure 3B-4](#)). Similarly, the passing sight distance on a horizontal curve is the distance measured along the center line (or right-hand lane line of a three-lane roadway) between two points 3.5 feet above the pavement on a line tangent to the embankment or other obstruction that cuts off the view on the inside of the curve (see [Figure 3B-4](#)).

<b>85th-Percentile or Posted or Statutory Speed Limit</b>	<b>Minimum Passing Sight Distance</b>
25 mph	400 feet
30 mph	500 feet
35 mph	550 feet
40 mph	600 feet
45 mph	700 feet
50 mph	800 feet
55 mph	900 feet
60 mph	1,000 feet
65 mph	1,100 feet
70 mph	1,200 feet

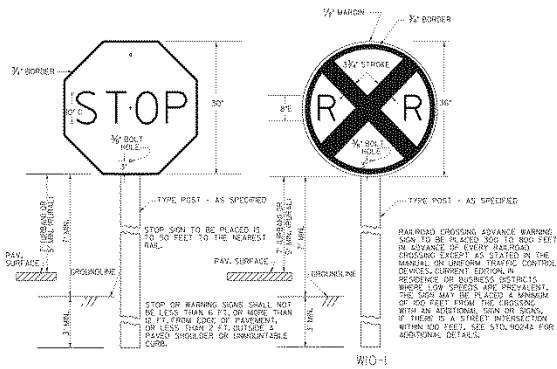


**Figure 3B-4. Method of Locating and Determining the Limits of No-Passing Zones at Curves**



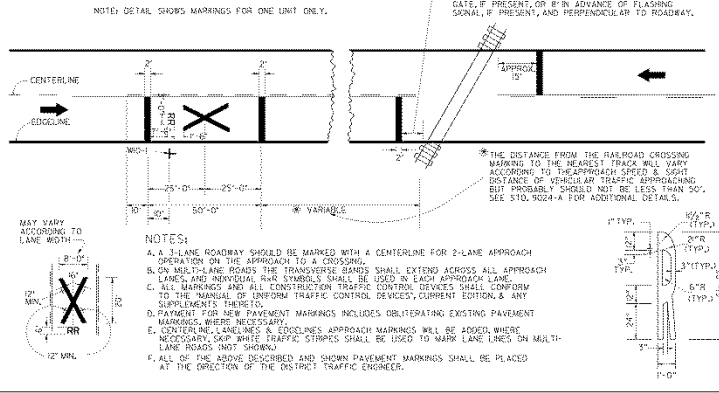
STATE	PROJECT NUMBER	SHEET NO.	TOTAL SHEETS
GA.			

### DETAILS OF STOP AND RAILROAD ADVANCE WARNING SIGN



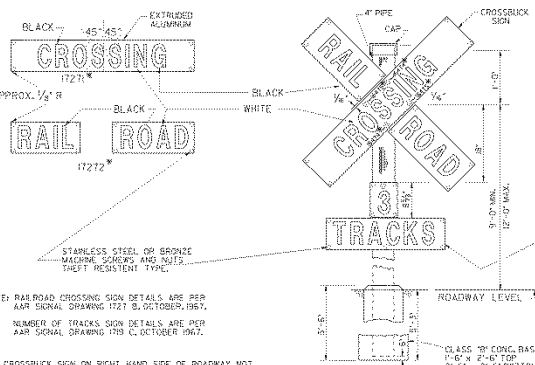
- NOTES:
- RAILROAD ADVANCE WARNING SIGNS SHALL HAVE A YELLOW REFLECTORIZED BACKGROUND WITH BLACK LEGEND SYMBOL AND BORDER. BACKGROUND SHALL BE TYPE IV REFLECTIVE SHEETING. SIGN PLATE SHALL BE ALUMINUM, 0.028 INCH MINIMUM THICKNESS.
  - STOP SIGNS SHALL BE OCTAGONAL IN SHAPE. SHALL HAVE RED TRANSPARENT DURABLE INK PRINTED ON TYPE IX REFLECTORIZED SHEETING. THE TOPPOFF SHALL BE REFLECTORIZED WHITE BACKGROUND SHALL BE REFLECTORIZED WITH REFLECTIVE SHEETING. SIGN PLATE SHALL BE ALUMINUM, 0.028 INCH MINIMUM THICKNESS.
  - STOP SIGNS AND RAILROAD ADVANCE WARNING SIGNS SHALL CONFORM TO THE SPECIFICATIONS AND REQUIREMENTS SET FORTH IN THE MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES, CURRENT EDITION, AND THE GEORGIA STANDARD SPECIFICATIONS AND/OR THE SPECIAL PROVISIONS.

### TYPICAL PAVEMENT MARKINGS



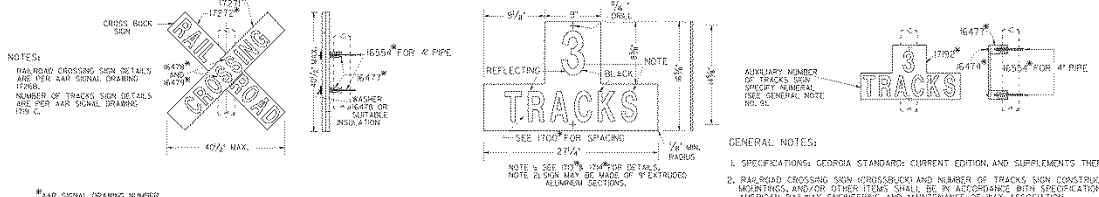
- NOTES:
- A 3-LANE ROADWAY SHOULD BE MARKED WITH A CENTERLINE FOR 2-LANE APPROACH OPERATION ON THE APPROACH TO A CROSSING.
  - ON MULTI-LANE ROADS THE TRANSVERSE BARRIERS SHALL EXTEND ACROSS ALL APPROACH LANE, ONE INDIVIDUAL BAR SYMBOL SHALL BE USED IN EACH APPROACH LANE.
  - ALL MARKINGS AND ALL CONSTRUCTION TRAFFIC CONTROL DEVICES SHALL CONFORM TO THE MANUAL OF UNIFORM TRAFFIC CONTROL DEVICES, CURRENT EDITION, & ANY SUPPLEMENT THERE TO.
  - PAVEMENT FOR NEW PAVEMENT MARKINGS INCLUDES OBLITERATING EXISTING PAVEMENT MARKINGS, WHERE NECESSARY.
  - CENTERLINE LABELS & EDGE LINES APPROACH MARKINGS WILL BE ADDED WHERE NECESSARY. STOP WHITE TRAFFIC STRIPES SHALL BE USED TO MARK LANE LINES ON MULTI-LANE ROADS (NOT SHOWN).
  - ALL OF THE ABOVE DESCRIBED AND SHOWN PAVEMENT MARKINGS SHALL BE PLACED AT THE DISCRETION OF THE DISTRICT TRAFFIC ENGINEER.

### DETAILS OF RAILROAD CROSSING SIGNS



- NOTE: RAILROAD CROSSING SIGN DETAILS ARE PER AAR SIGNAL DRAWING 1727 B, OCTOBER, 1987. NUMBER OF TRACKS SIGN DETAILS ARE PER AAR SIGNAL DRAWING 173 C, OCTOBER, 1987.
- SHEET CROSSBUCK SIGN ON RIGHT HAND SIDE OF ROADWAY NOT MORE THAN 15 FT. FROM CENTERLINE OF NEAREST TRACK AND NOT LESS THAN 8 FT. OR MORE THAN 15 FT. FROM EDGE OF ROADWAY PAVEMENT, OR LESS THAN 2 FT. OUTSIDE A PAVED SHOULDER OR UNMOUNTABLE CURB.

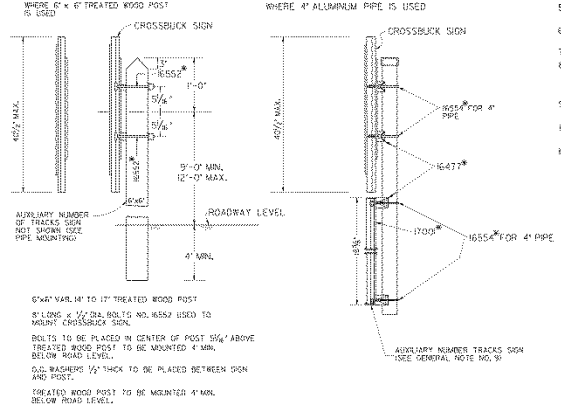
### DETAILS OF RAILROAD CROSSING SIGNS USING REFLEX REFLECTING SHEET EXTRUDED ALUMINUM



- NOTE: RAILROAD CROSSING SIGN DETAILS ARE PER AAR SIGNAL DRAWING 1727 B. NUMBER OF TRACKS SIGN DETAILS ARE PER AAR SIGNAL DRAWING 173 C.
- \*AAR SIGNAL DRAWING NUMBER

- GENERAL NOTES:
- SPECIFICATIONS, GEORGIA STANDARD, CURRENT EDITION, AND SUPPLEMENTS THERE TO.
  - RAILROAD CROSSING SIGN (CROSSBUCK) AND NUMBER OF TRACKS SIGN CONSTRUCTION DETAILS, MOUNTINGS, AND/OR OTHER ITEMS SHALL BE IN ACCORDANCE WITH SPECIFICATION OF THE AMERICAN RAILWAY ENGINEERING AND MAINTENANCE-OF-WAY ASSOCIATION.
  - WHERE STANDARD 9023A CROSSBUCK SIGN IS SPECIFIED STANDARD 9023A WARNING SIGN SHALL BE PLACED ALSO.
  - A 90° CROSSBUCK SIGN SHALL BE USED ONLY.
  - LOCATE CROSSBUCK SIGN AT SUCH POINTS AS WILL ADMIT THE BEST VIEW BY PERSONS APPROACHING THE CROSSINGS.
  - A DISTANCE OF 100 FT. SHALL BE ASSUMED TO SEPARATE TRACKS BEFORE AN ADDITIONAL CROSSBUCK SIGN IS CONSIDERED UNLESS LOCAL CONDITIONS REQUIRE OTHERWISE.
  - CROSSBUCK SIGN AND STOP SIGN SHALL BE PLACED ON SEPARATE POSTS.
  - CROSSBUCK SIGN AND NUMBER OF TRACKS SIGN SHALL HAVE A WHITE BACKGROUND WITH BLACK LETTERS AND SHALL BE REFLECTORIZED BY REFLECTIVE COATING ON THE BACKGROUND. REFLECTORIZED CROSSBUCK SIGNS CONSIST OF 16 CROSSBUCK SIGN COMPLETE NO. 1702-1703 REFLECTORIZED NUMBER OF TRACKS SIGN CONSISTS OF TRACKS SIGN COMPLETE NO. 1704.
  - IF THERE ARE TWO OR MORE TRACKS, AN AUXILIARY SIGN INDICATING THE TOTAL NUMBER OF TRACKS CROSSED, INCLUDING SIDINGS, SHALL BE MOUNTED BELOW THE CROSSBUCK SIGN.
  - WOOD SHALL BE TREATED IN ACCORDANCE WITH THE GEORGIA STANDARD SPECIFICATIONS FOR PRESERVATIVE TREATMENT OF WOOD PRODUCTS.
  - THE TYPICAL PAVEMENT MARKINGS MAY BE VARIED IF IN ACCORDANCE WITH STANDARD ALPHABETS FOR HIGHWAY SIGNS AND PAVEMENT MARKINGS AND APPROVED BY THE ENGINEER.

### TYPICAL MOUNTINGS

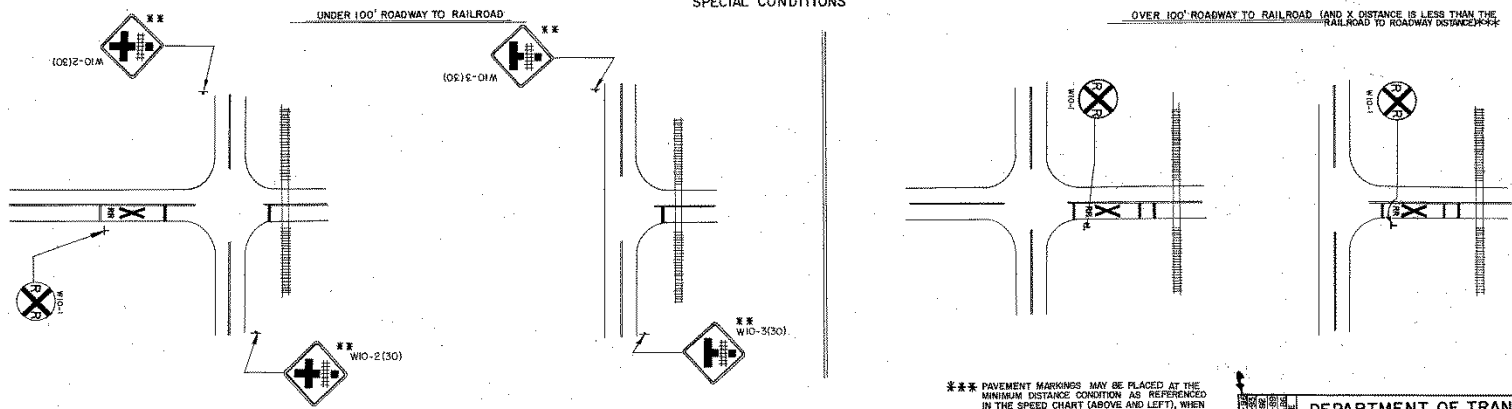
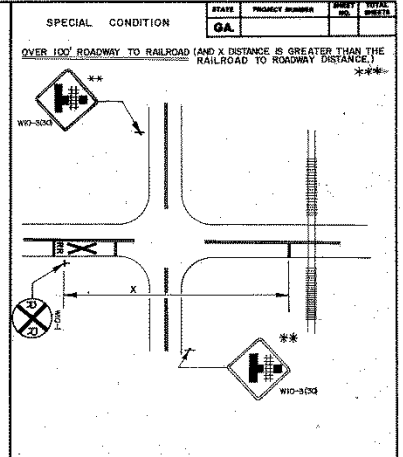
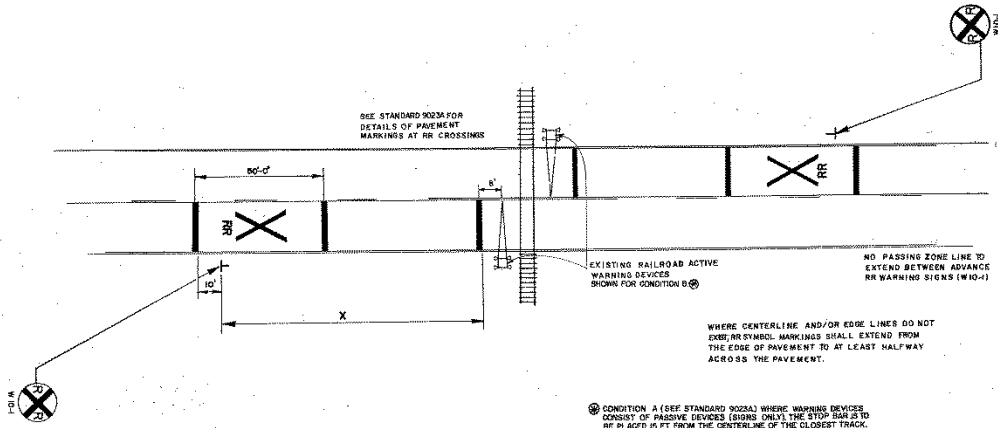


- NOTE: RAILROAD CROSSING SIGN DETAILS ARE PER AAR SIGNAL DRAWING 1727 B, OCTOBER, 1987. NUMBER OF TRACKS SIGN DETAILS ARE PER AAR SIGNAL DRAWING 173 C, OCTOBER, 1987.
- SHEET CROSSBUCK SIGN ON RIGHT HAND SIDE OF ROADWAY NOT MORE THAN 15 FT. FROM CENTERLINE OF NEAREST TRACK AND NOT LESS THAN 8 FT. OR MORE THAN 15 FT. FROM EDGE OF ROADWAY PAVEMENT, OR LESS THAN 2 FT. OUTSIDE A PAVED SHOULDER OR UNMOUNTABLE CURB.

DEPARTMENT OF TRANSPORTATION STATE OF GEORGIA			
STANDARD RAILROAD GRADE CROSSING SIGNS & MARKINGS			
NO SCALE		REV. & REDR. NOV., 1999	
REV. & REDR. DATE	BY	STATE ROAD & AIRPORT DESIGN ENGINEER	NUMBER
1727 B	1727 B	1727 B	9023A
173 C	173 C	173 C	
1702-1703	1702-1703	1702-1703	
1704	1704	1704	
1705	1705	1705	
1706	1706	1706	
1707	1707	1707	
1708	1708	1708	
1709	1709	1709	
1710	1710	1710	
1711	1711	1711	
1712	1712	1712	
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1738	1738	1738	
1739	1739	1739	
1740	1740	1740	
1741	1741	1741	
1742	1742	1742	
1743	1743	1743	
1744	1744	1744	
1745	1745	1745	
1746	1746	1746	
1747	1747	1747	
1748	1748	1748	
1749	1749	1749	
1750	1750	1750	

SPEED (MPH)	MINIMUM DISTANCE X (FT)	
	CONDITION B	CONDITION A
0-20	100	175
25	100	250
30	100	325
35	150	400
40	225	475
45	300	550
50	375	625
55	450	700
60	550	775
65	650	850

\* WHERE THIS DISTANCE IS DISRUPTED BY GRADES, CURVATURE, SIGHT DISTANCE, OR PHYSICAL CONDITIONS OF ROADWAY, ADJUSTMENTS WILL BE MADE ACCORDINGLY BY THE ENGINEER.  
 CONDITION A IS FOR CROSSINGS WITH PASSIVE DEVICES ONLY.  
 CONDITION B IS FOR CROSSINGS WITH ACTIVE DEVICES.



\*\* MAXIMUM DISTANCE FROM INTERSECTION  
 MINIMUM DISTANCE FROM INTERSECTION

**RURAL** 500'  
 250'

**URBAN** 250'  
 100'

NOTE:  
 SEE STANDARD 9023A FOR DETAILS OF PAVEMENT MARKINGS AT RR CROSSINGS.

NOTE:  
 THE SPECIAL CONDITION MAY BE SPECIFIED ON BOTH SIDES OF THE TRACKS, WHERE APPLICABLE.

\*\*\* PAVEMENT MARKINGS MAY BE PLACED AT THE MINIMUM DISTANCE CONDITION AS REFERENCED IN THE SPEED CHART (ABOVE AND LEFT), WHEN A STOP CONDITION EXISTS ON THE APPROACH ROADWAY AND WHERE SPACE PERMITS PLACEMENT OF THE MARKINGS.

DEPARTMENT OF TRANSPORTATION  
 STATE OF GEORGIA

**STANDARD RAILROAD GRADE CROSSINGS**  
 RR SIGNING & MARKING AT CROSSINGS WITH RR SIGNALS AND/OR GATES

NO SCALE      SEPT. 1982

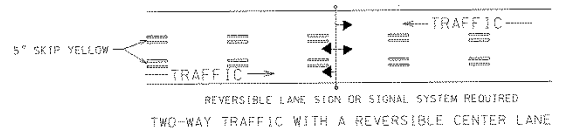
ISSUED: *[Signature]*  
 REV. RML: *[Signature]*  
 TRG: GME  
 CHR: RKC

APPROVED: *[Signature]*  
 STATE HIGHWAY ENGINEER

NUMBER  
**9024A**



STATE	PROJECT NUMBER	SHEET NO.	TOTAL SHEETS
GA.			



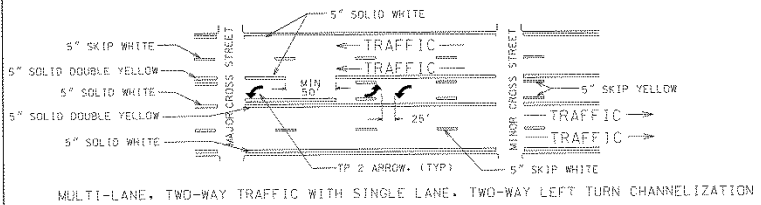
TWO-WAY TRAFFIC WHERE MOTORISTS IN A SINGLE LANE ARE PERMITTED TO PASS



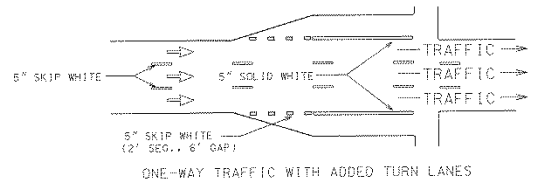
TWO-WAY TRAFFIC WHERE MOTORISTS IN A SINGLE LANE ARE NOT PERMITTED TO PASS



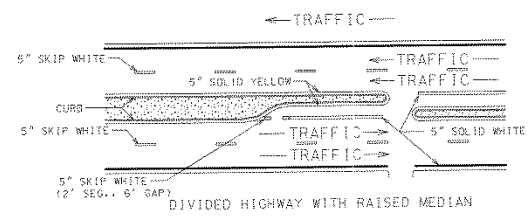
TWO-LANE, TWO-WAY TRAFFIC WITH PASSING PERMITTED



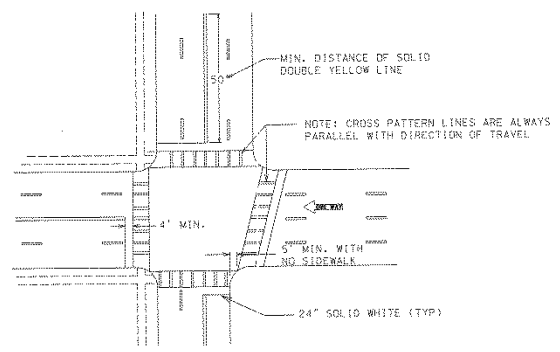
MULTI-LANE, TWO-WAY TRAFFIC WITH SINGLE LANE, TWO-WAY LEFT TURN CHANNELIZATION



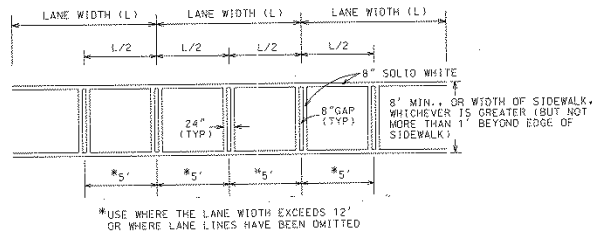
ONE-WAY TRAFFIC WITH ADDED TURN LANES



DIVIDED HIGHWAY WITH RAISED MEDIAN



TYPICAL LOCATION OF CROSSWALKS AND STOP BARS



CROSSWALK DETAIL

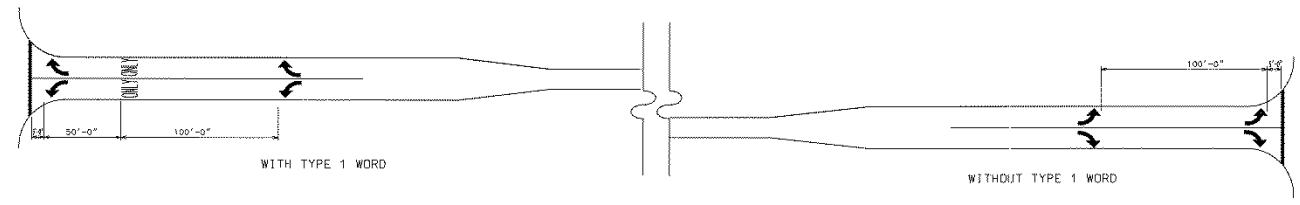
GENERAL NOTES:

1. SPACING BETWEEN DOUBLE LINES SHALL BE EQUAL TO THE LINE WIDTH.
2. EDGE LINES SHALL BE PLACED A MINIMUM OF 4 INCHES FROM THE NORMAL EDGE OF PAVEMENT.

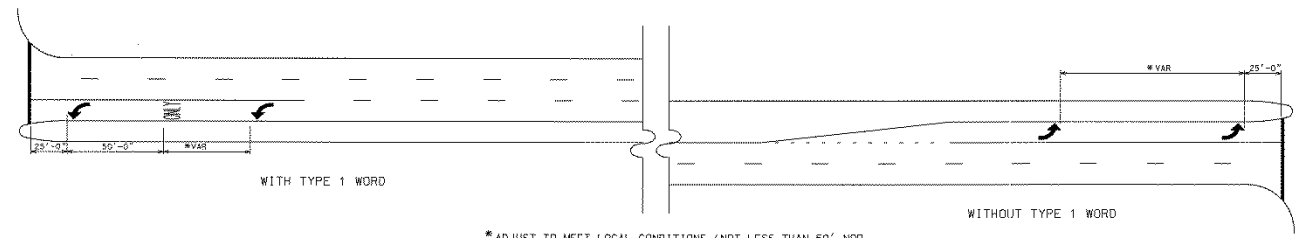
DATE	REVISIONS	GEORGIA DEPARTMENT OF TRANSPORTATION OFFICE OF TRAFFIC SAFETY & DESIGN
		DETAILS OF PAVEMENT MARKING PLACEMENT NON-LIMITED ACCESS ROADWAY
		NO SCALE JANUARY 2000

STATE	PROJECT NUMBER	SHEET TOTAL
GA.		NO. SHEETS

### EXIT RAMP

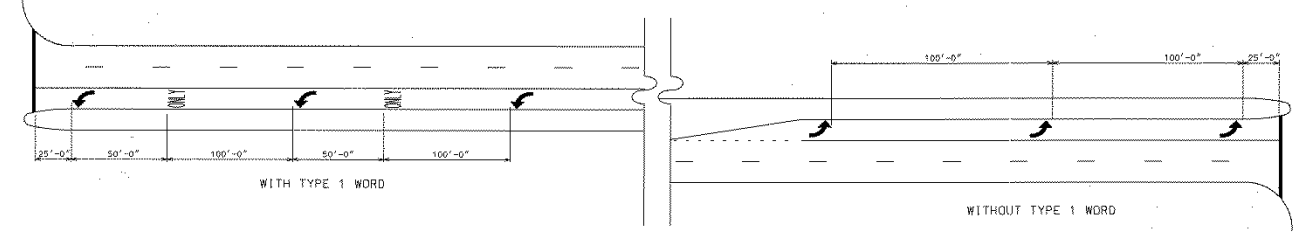


### SHORT TURN LANES



\* ADJUST TO MEET LOCAL CONDITIONS (NOT LESS THAN 50' NOR MORE THAN 100')

### LONG TURN LANES



**GENERAL NOTES:**

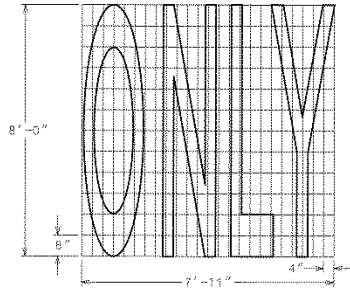
1. SPACING OF TYPE 2 ARROW IS REPRESENTATIVE OF SPACING FOR TYPE 1, TYPE 3, TYPE 4, & TYPE 5 ARROWS.
2. ALL TURNING LANES SHALL HAVE A MINIMUM OF 2 ARROWS.
3. GROUND MOUNTED OR OVERHEAD SIGNING SHALL BE SUPPLEMENTED BY TYPE 1 WORD.

DATE	REVISIONS	GEORGIA DEPARTMENT OF TRANSPORTATION OFFICE OF TRAFFIC SAFETY & DESIGN
		DETAILS OF PAVEMENT MARKING ARROW LOCATION
		NO SCALE JANUARY 2000

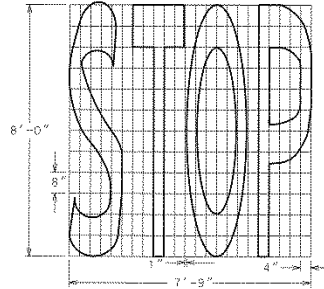
T-12A



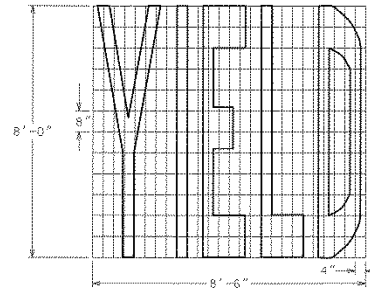
STATE	PROJECT NUMBER	SHEET TOTAL
GA.		NO. SHEETS



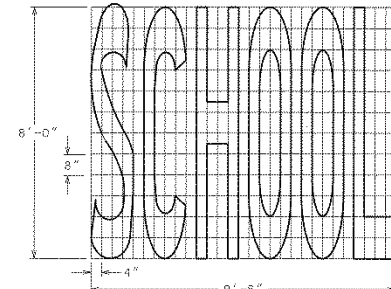
TYPE 1  
AREA = 20.8 FT<sup>2</sup>



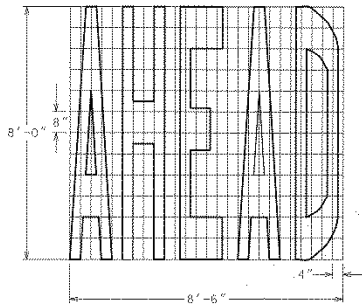
TYPE 2  
AREA = 25.4 FT<sup>2</sup>



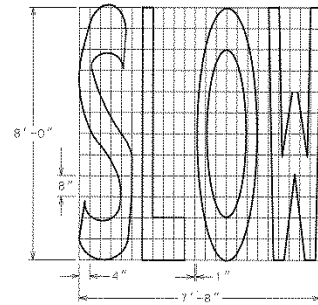
TYPE 15  
AREA = 25.4 FT<sup>2</sup>



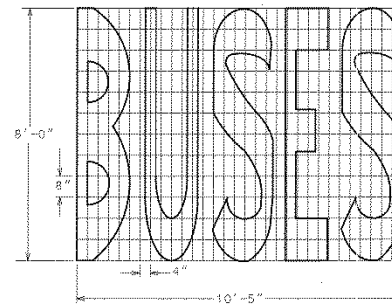
TYPE 3A  
(SINGLE LANE)  
AREA = 33.5 FT<sup>2</sup>



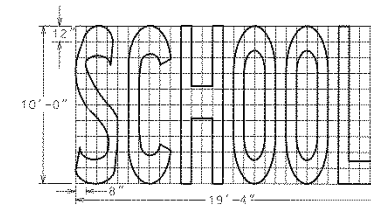
TYPE 4  
AREA = 29.1 FT<sup>2</sup>



TYPE 5  
AREA = 25.4 FT<sup>2</sup>



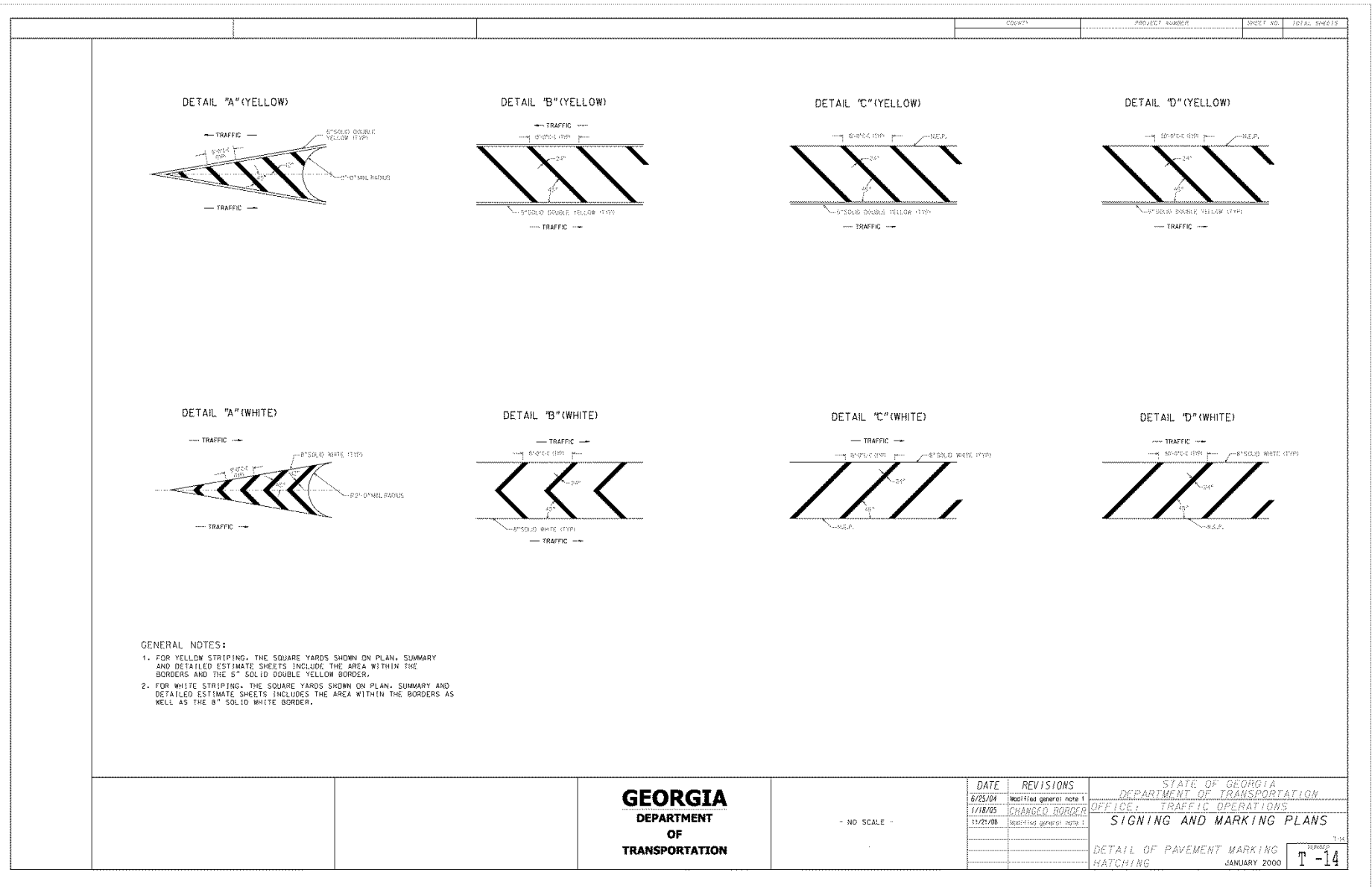
TYPE 6  
AREA = 38.1 FT<sup>2</sup>



TYPE 3B  
(TWO LANES)  
AREA = 85.0 FT<sup>2</sup>

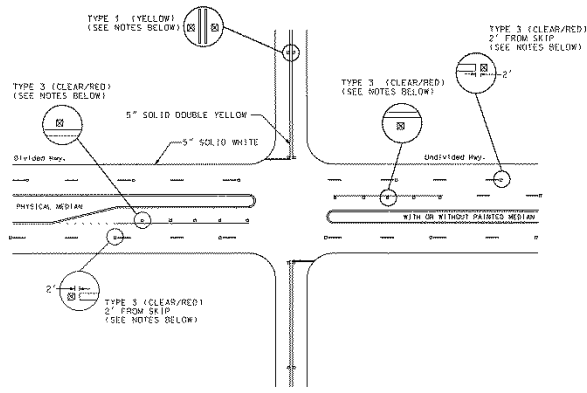
DATE	REVISIONS	GEORGIA DEPARTMENT OF TRANSPORTATION OFFICE OF TRAFFIC SAFETY & DESIGN
		DETAILS OF PAVEMENT MARKING WORDS
		SHEET 1 OF 2
		NO SCALE JANUARY 2000

T-13A

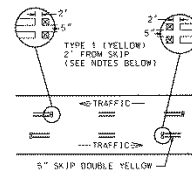




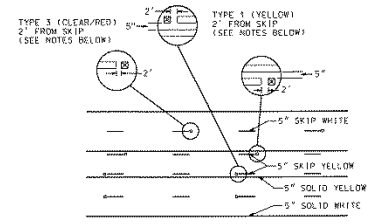
STATE	PROJECT NUMBER	SHEET NO.	TOTAL SHEETS
GA.			



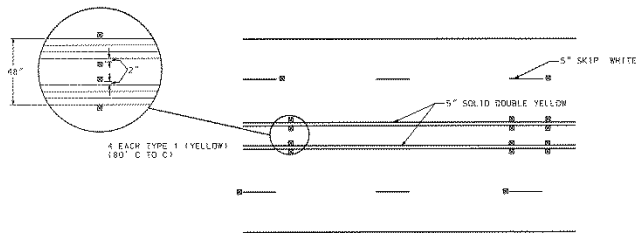
DIVIDED / UNDIVIDED HIGHWAY



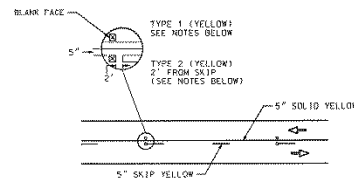
REVERSIBLE LANE



TWO WAY LEFT TURN LANE



4'-0" STRIPED FLUSH MEDIAN



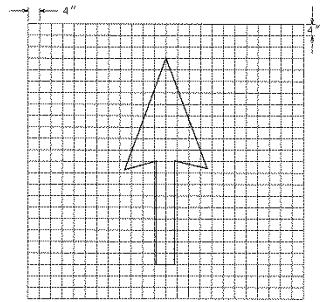
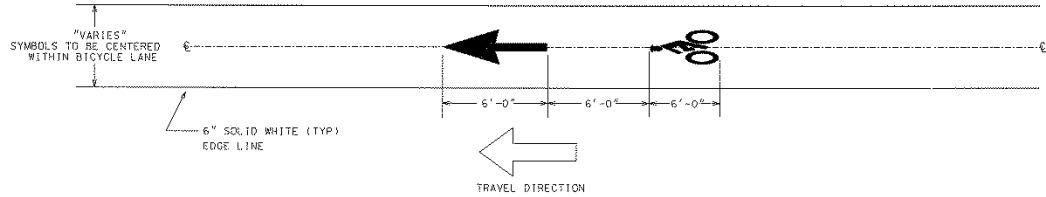
NO PASSING ZONE

GENERAL NOTES:

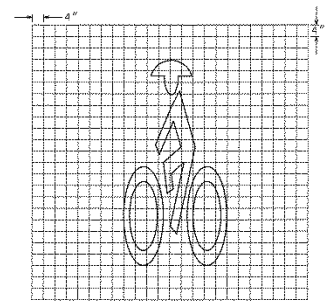
1. RAISED PAVEMENT MARKERS SHALL BE SPACED EVERY 80 FT UNLESS OTHERWISE SPECIFIED.
2. ON SOLID WHITE TURN BAY LINES, SPACING SHALL BE 20 FT.
3. RAISED PAVEMENT MARKERS SHALL BE OFFSET 5 INCHES FROM SOLID LANE LINES.
4. CLEAR FACE OF TYPE 3 RAISED PAVEMENT MARKERS SHALL BE ORIENTED TOWARD ONCOMING TRAFFIC.
5. ON HORIZONTAL CURVES WHERE AT LEAST 3 MARKERS CANNOT BE SEEN AT ONE TIME USING NORMAL SPACING, MARKERS SHALL BE PLACED 40 FT.

DATE	REVISIONS	GEORGIA DEPARTMENT OF TRANSPORTATION OFFICE OF TRAFFIC SAFETY & DESIGN
9-4-03	NO PASSING ZONE RPM'S	
7-13-04	NO PASSING ZONE RPM'S	
DETAILS OF RAISED PAVEMENT MARKER LOCATION NON-LIMITED ACCESS ROADWAY NO SCALE JANUARY 2000		

STATE	PROJECT NUMBER	SHEET NO.	TOTAL SHEETS
GA.			



TYPE 1 ARROW - BICYCLE LANE



TYPE 4 SYMBOL - BICYCLE LANE

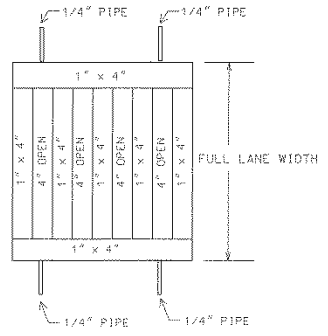
GENERAL NOTES:

1. BICYCLE LANE SYMBOLS SHALL BE PLACED ON THE FAR SIDE OF EACH INTERSECTION 6 FEET BEYOND THE CROSS WALK OR END OF INTERSECTING ROAD RADIUS. ADDITIONAL SYMBOLS MAY BE PLACED ON LONG, UNINTERRUPTED SECTIONS OF ROADWAY BASED ON ENGINEERING JUDGEMENT.
2. ALL BICYCLE LANE PAVEMENT MARKING, INCLUDING EDGE LINE, SHALL BE PAINT.
3. FOR ADDITIONAL INFORMATION REFER TO MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES, CURRENT EDITION, AND AASHTO GUIDE FOR THE DEVELOPMENT OF BICYCLE FACILITIES, CURRENT EDITION.

DATE	REVISIONS	GEORGIA DEPARTMENT OF TRANSPORTATION OFFICE OF TRAFFIC SAFETY & DESIGN
		DETAILS OF BICYCLE LANE PAVEMENT MARKINGS
		NO SCALE JANUARY 2000

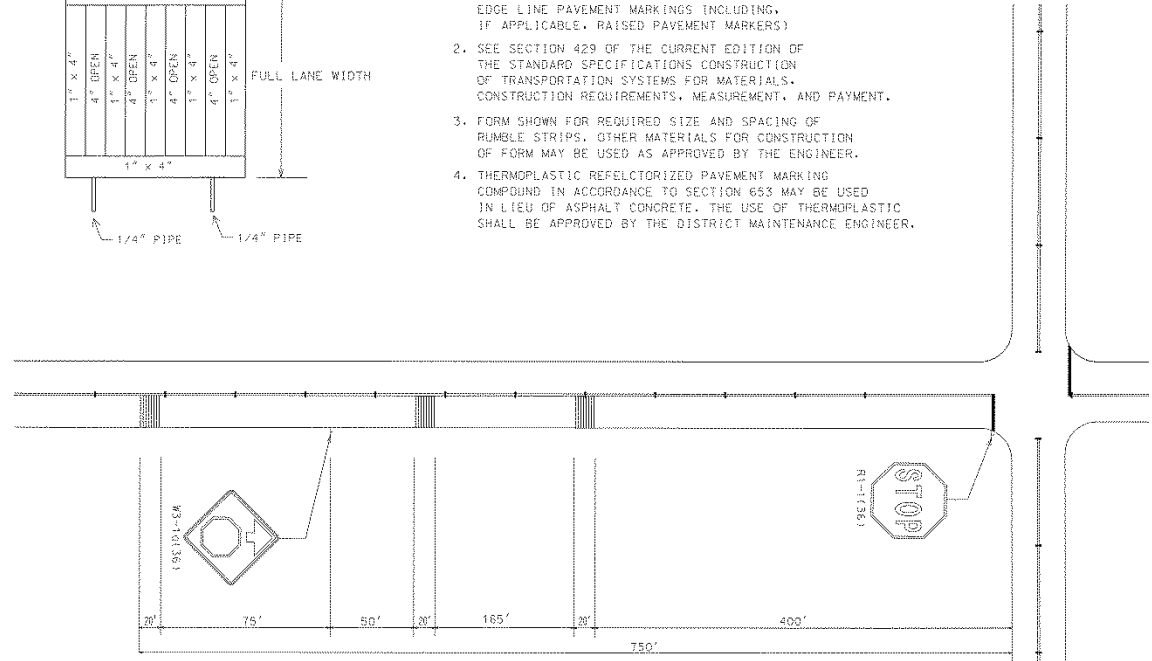
T-16

STATE	PROJECT NUMBER	SHEET NO.	TOTAL SHEETS
G.A.			



**GENERAL NOTES**

1. FORM SHALL BE FULL WIDTH OF LANE.  
(NOTE: NOT TO EXCEED CENTER LINE OR EDGE LINE PAYMENT MARKINGS (INCLUDING, IF APPLICABLE, RAISED PAYMENT MARKERS))
2. SEE SECTION 429 OF THE CURRENT EDITION OF THE STANDARD SPECIFICATIONS CONSTRUCTION OF TRANSPORTATION SYSTEMS FOR MATERIALS, CONSTRUCTION REQUIREMENTS, MEASUREMENT, AND PAYMENT.
3. FORM SHOWN FOR REQUIRED SIZE AND SPACING OF RUMBLE STRIPS. OTHER MATERIALS FOR CONSTRUCTION OF FORM MAY BE USED AS APPROVED BY THE ENGINEER.
4. THERMOPLASTIC REFLECTORIZED PAYMENT MARKING COMPOUND IN ACCORDANCE TO SECTION 653 MAY BE USED IN LIEU OF ASPHALT CONCRETE. THE USE OF THERMOPLASTIC SHALL BE APPROVED BY THE DISTRICT MAINTENANCE ENGINEER.



DATE	REVISIONS	GEORGIA DEPARTMENT OF TRANSPORTATION
2-21-00	ISSUED WITH 2000 TRC 304	OFFICE OF TRAFFIC SAFETY & DESIGN
4-09-03	REVISED LINE SPACING TO RUMBLE STRIP SPACING PER TRC 304	
		DETAILS AND PLACEMENT OF RUMBLE STRIPS
		NO SCALE JANUARY 2000

# **APPENDIX F**

## **BID**

### **DOCUMENT**

### **CHECKLIST**

# **BID DOCUMENT CHECKLIST FOR OFF-SYSTEM SAFETY PROJECTS**

## **03/18/2014**

### **COVER SHEET**

- Name of project
- Project and P.I. numbers
- Include County name in Sponsor line, if the Sponsor is not a county.

### **GENERAL REQUIREMENTS**

- Advertise the project for bid according to requirements of O.C.G, A., Title 32, Chapter 2, excluding that provision which provides for negotiations. The minimum advertising period is at least four weeks before bid opening and one week after the first advertising notice. We recommend the first advertisement be made four weeks prior to bid opening. Sponsors must follow Title 32 and not Title 36 for bidding procedures. No negotiating allowed between opening of bids and execution of the construction contract with the contractor.
- Include a sentence indicating that the GDOT Standard Specifications Construction of Transportation Systems, 2013 Edition, and the Manual on Uniform Traffic Control Devices (current ed.) apply to the contract. Since the Contract Agreements between the Sponsor and the State require the use of the GDOT Standard Specifications, the only additional specifications would be for those items not included in the GDOT Standard Specifications but possibly required by the Sponsor.
- Bidders submitting bids in excess of \$2,000,000 must be prequalified with GDOT.
- A bid bond is required. (Section 102.08)
- Performance and payment bonds are required as per Section 103.05. This results in a performance bond of 100% of the contract amount and a payment bond of 110% of the contract amount.
- Add the following sentence as the basis of the contract award: If the Contract is awarded, it will be awarded to the lowest reliable bidder whose proposal shall have met all the prescribed requirements. (Section 103.02)
- Specify how the lowest bidder will be determined if the proposal includes a base bid and alternates. Usually include language such as the low bid will be determined based on the sum of the base bid and any alternates.
- If bidding using unit prices, assure the item list in the proposal matches the detailed estimate in the plans.
- Include a time of period of the contract, usually number of calendar days following the Notice to Proceed with Construction given by the Sponsor to the Contractor.
- Include provision for liquidated damages conforming to Section 108.08.
- Include provision for a preconstruction conference with, at a minimum, the Sponsor, The Contractor, and the District Off-System Safety Coordinator.
- Determine if Davis-Bacon wage rates apply to the project. Davis-Bacon applies unless the project is located off highway right-of-way or if the road is functionally classified as a local road or rural minor collector. If Davis-Bacon applies, include a copy of the current wage rate determination in the proposal. The web site for the wage rates is: <http://www.access.gpo.gov/davisbacon/>. To find the wage rate determination, select the county in which the project is located and then select HIGHWAY.
- DBE goals are not included in the Sponsor Off-System Safety projects and bid documents at this time but could be included in future projects.
- Include the required contract provisions, which are available from the District Traffic Operations office and/or the District Off-System Safety Coordinator.