SPECIAL PROVISIONS
SUPPLEMENTAL SPECIFICATIONS

Effective GDOT Shelf and Special Provisions NOT included in 2021 Edition of Standard Specifications for Construction of Transportation Systems, as Modified in the 2024 Edition

The following sections are applicable to this contract as GDOT Shelf and Special Provisions not included in the 2021 revision of GDOT's Standard Specifications and are specified as an attached:

Special Provision – Utility Conflicts *(dated 8/6/2012)*

Section 108.08 – Prosecution and Progress/Failure or Delay in Completing Work on Time *(dated 10/12/2026)*

Section 150 - Traffic Control *(dated 8/22/25)*

Section 150.3 - Construction Requirements *(dated 10/12/2026)*

Section 201 – Clearing and Grubbing Right-of-Way *(dated 7/21/2025)*

Section 419 – High Friction Surface Treatment *(dated 10/12/2026)*

Section 653 – Thermoplastic Traffic Stripe

Section 800 – Coarse Aggregate

Section 802 – Aggregates for Asphaltic Concrete *(dated 8/5/2024)*

Section 820 – Asphalt Cement *(dated 10/22/2024)*

First Use Date: January 1, 2007
Revised: March 26, 2008
March 5, 2009
September 30, 2009
August 6, 2012

DEPARTMENT OF TRANSPORTATION
STATE OF GEORGIA

SPECIAL PROVISION

Utility Conflicts

Utility companies having known facilities that conflict with the construction of this project will be directed by the Department to adjust or relocate their facilities and will be notified of the contract award.

Conform to all the requirements of the Specifications as they relate to cooperation with utility owners and the protection of utility installations that exist on the project. Refer to the requirements of Section 107, Legal Regulations and Responsibility to the Public, with particular attention to Subsection 107.21.

Coordinate The Work with any work to be performed by others in any right of way clearance and arrange a schedule of operations that will allow for completion of the Project within the specified contract time. Where stage construction is required, notify the utility owner when each stage of work is completed and the site is available for utility work to proceed.

Information concerning utility facilities known to exist within the project limits, including the list of owners, is available for reference.

Under Georgia Code Section 32-6-171, utilities are required to remove or relocate their facilities. The Department is required to give the utility at least 60 days written notice directing the removal, relocation, or adjustment and the utility owner is required to begin work within the time specified in the utility's work plan or revised work plan.

Upon request, copies of all approved Work Plans submitted by utility companies having facilities on this project will be made available for examination by the Contractor at the Department's District Office. Utility Adjustment Schedules, when submitted to the Department by the utilities, will be made available to the Contractor after the Notice to Contractors has been posted by the Office of Construction Bidding Administration. The Contractor is responsible for considering in its bid all existing and proposed utility locations and the removals, relocations, and adjustments specified in the Utility's Work Plan.

For this Project, Utility Owners that are required to remove, relocate, or adjust their facility to accommodate the construction of this Project may be liable to the Contractor for damages or delay costs resulting from the Utility Owner's failure to clear conflicts

108.08 Failure or Delay in Completing Work on Time

Delete the Schedule of Deductions for Each Day of Overrun in Contract Time table shown in Section 108.08; retain remaining Sub-Section 108.08 as written and add the following:

C. Completion Date

The Completion Date for the resurfacing of all streets included in this project is October 31, 2027, which includes completion of all pay items associated with Appendix A - List of Streets, with the exception of final thermoplastic pavement markings on streets that were resurfaced after **October 15, 2027.** Failure to complete the overall construction in accordance with the above will result in the assessment of Liquidated Damages at the rate of $2,000.00 per calendar day or portion thereof.

D. School Zone Work

Appendix A identifies those streets with schools located within or adjacent to the paving limits. Contractor shall adjust lane closures based upon the hours of operation of the given school. The contractor shall not impact traffic or close lanes in the vicinity of schools which impact ingress/egress use of the school driveways (buses and parent vehicles). Assistance in coordinating lane closures with the Cobb County School District is available through David Baggett, David.Baggett@cobbcounty.gov, or 770-528-6654.

October 12, 2026

DEPARTMENT OF TRANSPORTATION
COBB COUNTY GEORGIA

SPECIAL PROVISION

2027-4 RESURFACING CONTRACT
COUNTYWIDE MAJOR THOROUGHFARES (LMIG)
PROJECT NO. B2935

Section 108 – Prosecution and Progress

108.07 E. Extension of Contract Time

Add the following:

It is expressly agreed that the time for completion as stated in the Contract Documents includes due allowance for rain/cold/wet days on which productive work cannot be performed outside. For purposes of this contract, and for purposes of extensions of Contract Time, the Contractor agrees that it anticipates adverse weather sufficient to prevent productive work in accordance with the schedule set forth herein below, and the Contractor further agrees that unless it encounters actual adverse weather in excess of those days set forth below, it shall not request, nor shall it be entitled to, any extension of contract time:

January – 10 days	February – 9 days	March – 7 days	April – 5 days
May – 5 days	June – 4 days	July – 4 days	August – 4 days
September – 4 days	October – 5 days	November – 6 days	December – 10 days

Schedule above represents a standard Monday through Friday (5 day) work week. No extension of contract time will be considered for adverse weather on Saturdays, Sundays, and Holidays.

Furthermore, in addition to any other notice requirements set forth in this Contract, the Contractor agrees that it shall provide written notice to the County on the day of any adverse weather not anticipated and for which a request for a time extension has been, or will be, made. Said notice shall state with particularity a description of the adverse weather as well as a description of the nature and extent of any delay caused by such weather. Furthermore, the Contractor shall submit a written claim for extension of time within seven (7) days after the occurrence of the adverse weather and such claim shall be supported by documentation including, but not limited to, official weather reports, as the County may require.

Notwithstanding any other provision of this Contract, the Contractor specifically agrees that any and all weather delays shall be non-compensable, and the sole and exclusive remedy of the Contractor in the event of any such delay is an Extension of Contract Time.

108.08 Failure or Delay in Completing Work on Time

Delete the Schedule of Deductions for Each Day of Overrun in Contract Time table shown in Section 108.08; retain remaining Sub-Section 108.08 as written and add the following:

C. Completion Date

The Completion Date for the resurfacing of all streets included in this project is October 31, 2027, which includes completion of all pay items associated with Appendix A - List of Streets, with the exception of final thermoplastic pavement markings on streets that were resurfaced after **October 15, 2027.** Failure to complete the overall construction in accordance with the above will result in the assessment of Liquidated Damages at the rate of $2,000.00 per calendar day or portion thereof.

D. Milled Surfaces

All milled surfaces shall be covered within 5 calendar days. Failure to cover all exposed within 5 calendar days shall result in the assessment of non-refundable deductions in the amount of $2,000.00 per day, and will continue for each consecutive calendar day until covered.

E. School Zone Work

Appendix A identifies those streets with schools located within or adjacent to the paving limits. Contractor shall adjust lane closures based upon the hours of operation of the given school. The contractor shall not impact traffic or close lanes in the vicinity of schools which impact ingress/egress use of the school driveways (buses and parent vehicles). Assistance in coordinating lane closures with the Cobb County School District is available through David Baggett, David.Baggett@cobbcounty.gov, or 770-528-6654.

DEPARTMENT OF TRANSPORTATION
STATE OF GEORGIA

SPECIAL PROVISION

Section 150—Traffic Control

150.1 General Description

This section, as supplemented by the Plans, Specifications, and Manual on Uniform Traffic Control Devices (MUTCD) shall be considered the Temporary Traffic Control (TTC) Plan in accordance with Work Zone Safety and Mobility Policy. Activities shall consist of furnishing, installing, maintaining, and removing necessary traffic signs, pedestrian signs, barricades, lights, signals, cones, pavement markings and other traffic control devices and shall include flagging and other means for guidance and protection of vehicular and pedestrian traffic through the Work Zone. This Work shall include both maintaining existing devices and installing additional devices as necessary in construction work zones.

The Contractor shall be responsible for the maintenance of traffic signals and Advanced Traffic Management System (ATMs) devices from the time that the system is modified until final acceptance. The maintenance of traffic signals and ATMs devices that are not a part of the Work and that are not in conflict with any portion of the Work shall not be the responsibility of the Contractor. However, the Contractor is still responsible for damages to all devices that they or their subcontractors cause, in accordance with Section 107 and other Specifications.

When any provisions of this Specification or the Plans do not meet the minimum requirements of the MUTCD, the MUTCD shall control. The 2023 Edition of the MUTCD including revisions shall be in effect for the duration of the project.

All traffic control devices used during the construction of the project shall meet the standards utilized in the MUTCD, and shall comply with the requirements of these Specifications, Georgia Construction Standards and Details, Project Plans, Design Manuals, and Special Provisions.

The needs and control of all road users (motorists, bicyclists and pedestrians within the highway right-of-way and easements, including persons with disabilities in accordance with the Americans with Disabilities Act of 1990 (ADA), Title II,) through a Temporary Traffic Control (TTC) zone shall be an essential part of highway construction, utility work, maintenance operations and management of traffic incidents.

Utilities included in the Contract are bound by Special Provision 150 and shall follow its requirements. For utilities not included in the Contract but working within the project limits, they shall, at a minimum follow the MUTCD. Moreover, in accordance with Utility Accommodation Policy and Standards Manual dated 2016, the Engineer reserves the right to require additional certified flaggers, signs, warning lights, channelization devices, and other safety devices as may be necessary to properly protect, warn, and safeguard the traveling public. In addition, the Department reserves the right to place time restrictions or moratoriums on all utility work covered under a permit when, in the opinion of the Department, the continuance of the Work would seriously hinder traffic flow, be needlessly disruptive, or would unnecessarily inconvenience the traveling public. In case of emergencies, Utilities shall be provided access in accordance with Utility Accommodation Policy and Standards Manual.

150.1.01 Definitions

For Special Provision 150, the definitions for “shall”, “ should”, and “may” will be in accordance with MUTCD (1A.13) (1C.02).

Shall (Standard) - a statement of required, mandatory, or specifically prohibitive practice regarding a traffic control device.

Should (Guidance) - a statement of recommended, but not mandatory, practice in typical situations, with deviations allowed if engineering judgment or engineering study indicates the deviation to be appropriate.

May (Option) - a statement of practice that is a permissive condition and carries no requirement or recommendation.

150.1.02 Content

150.1 General Description

150.1.01 Definitions

150.1.02 Content

150.1.03 Related References

A. Standard Specification
B. Reference Documents

150.1.04 Submittals/Preconstruction

A. Worksite Traffic Control Supervisor
B. Sequence of Operations
C. Pedestrian Considerations

1. Pedestrian Signage
2. Temporary Pedestrian Facilities

150.2 Materials and Traffic Control Devices

150.2.01 Traffic Control Devices

A. NCHRP 350 and MASH
B. Approval
C. Quality Guidelines for All Temporary Traffic Devices

150.2.02 Reflectorization Requirements

A. Signs

B. Channelization Devices

150.2.03 Arrow Panels

150.2.04 Channelization Devices

A. General
B. Drums

1. Design
2. Application
3. Longitudinal Channelization
4. Removal

C. Vertical Panels

1. Design
2. Application

D. Cones

1. Design
2. Applications

E. Barricades

1. Design
2. Application

F. Warning Lights

1. Design
2. Application

150.2.05 Flashing Beacon

150.2.06 Guardrail

150.2.07 Interim Signs

A. Posts
B. Sign Blanks and Panels

150.2.08 Pavement Markings

A. All Traffic Striping for Forty-Five (45) Days or Less (≤45 Days)
B. All Temporary Striping Beyond Forty-Five (45) days (>45 Days)
C. All Temporary Traffic Striping on Final Surface

150.2.09 Portable Changeable Message Signs

150.2.10 Portable Impact Attenuators

150.2.11 Portable Temporary Traffic Control Signals

150.2.12 Raised Pavement Markers

150.2.13 Rumble Strips

150.2.14 Temporary Barriers

A. Design
B. Application

150.2.15 Temporary Guardrail Anchorage- Type 12

150.2.16 Temporary Traffic Signal

150.3 Construction Requirements

150.3.01 General

A. Implementation Requirements
B. Maintenance of Traffic Control Devices
C. Traffic Interruption Restrictions
D. Work Zone Restrictions

1. Interstate
2. Non-Interstate Divided Highways
3. Non-Divided Highways

E. Work Zone Geometric Restrictions
F. Clear Zone
G. Milled Surface Restrictions
H. Construction Vehicle
I. Environmental Impacts
J. Existing Street Lights
K. Nighttime Work Lighting
L. Removal/Reinstallation of Miscellaneous Items

150.3.02 Personnel – Worker Safety Apparel

150.3.03 Signage – General

A. Signing Requirements of the Temporary Traffic Control (TTC) Plan
B. Conflicting or Non-Applicable Signs
C. Removal of Existing Signs and Supports
D. Interim Guide, Warning and Regulatory Signs
E. Existing Special Guide Signs

1. Special Guide Signs
2. Interim Special Guide Signs
3. Interim Overhead Guide Sign Structures
4. Permanent Special Guide Signs

F. Stop Sign Regulated Intersections

G. Low Shoulder Signage

1. Low Shoulder for Construction/Reconstruction/Resurfacing Projects
2. Shoulder Drop-Off for Construction/Reconstruction/Resurfacing Project

H. Bump Signage
I. Sign Visibility

150.3.04 Advance Warning Signs

A. Project Signs - All Type of Highways

1. State Routes
2. Interstate, Limited Access and Multilane Divided Highways
3. Ramp Work on Limited Access Highways

B. Highway Work Zone

1. No Reduction in the Existing Posted Speed Limit in Highway Work Zone
2. Reducing the Speed Limit in a Highway Work Zone
3. Variable Speed Limit Zones

C. Installation/Removal of Work Area Signage

150.3.05 Shoulder/Lane Closure

A. Approval/Restrictions

1. Closure Length
2. Duration

B. Shoulder Closure
C. Lane Closure

1. Advance Warning Signs
2. Transition Area – Taper
3. Activity Area
4. Termination Area

D. Removal of Lane Closures
E. Exit and Entrance Ramps

150.3.06 Traffic Pacing Method

A. Pacing of Traffic
B. Methods of Signing for Traffic Pacing

150.3.07 Flagging Operation

A. Flaggers
B. Flagger Certification
C. Flagger Appearance and Equipment
D. Flagger Warning Signs
E. Pilot Vehicle Requirements
F. Automated Flagger Assistance Devices
G. Portable Temporary Traffic Control Signals

150.3.08 Traffic Signals

A. Responsibility/Cost
B. Law Enforcement Officer Requirement

150.3.09 Mobile Operations

150.3.10 Pavement Markings

A. General

1. Resurfacing Projects
2. Widening and Reconstruction Projects
3. New Location Construction Projects

B. Installation and Removal of Pavement Markings

1. Installation
2. Removal
3. Intermediate Surface
4. Final Surface
5. Pay Factor Reduction for Asphaltic Concrete Final Surfaces
6. Preparation and Planning for Traffic ShiftsC. Raised Pavement Markers

1. Supplementing Lane Lines
2. Supplementing Ramp Gore Lines
3. Other Lines

D. Exceptions for Interim Markings

1. Two-Lane, Two-Way Roadway

2. Multi-Lane Highway - with No Paved Shoulder(s) or Paved Shoulder(s) Four Feet or Less (≤ 4')
3. Limited Access Roadways and Roadways with Paved Shoulder Greater than Four Feet (>4')
4. Ramps for Multi-lane Divided Highways
5. Miscellaneous Pavement Markings

150.3.11 Differences in Elevation between Travel Lanes and Shoulders

A. Differences in Elevations

1. Difference of Two Inches (≤ 2") or Less Between Adjacent Travel Lanes
2. Difference of Two Inches (≤ 2") or Less Between Adjacent Travel Lane and Paved Shoulder
3. Difference of Greater Than Two Inches (>2") is Permitted for Continuous Operations
4. Difference of Greater Than Two Inches (>2") Between Travel Lanes and/or Shoulders for Non-Continuous Operations

B. Healed Section
C. Emergency Situations
D. Plating
E. Asphaltic Concrete Resurfacing Projects

1. Shoulder Construction Included as a Part of the Contract
2 Shoulder Construction Not Included as a Part of the Contract

150.3.12 Work Zone Law Enforcement

150.4 Measurement

150.4.01 Traffic Control Items

A. Traffic Control
B. Changeable Message Sign, Portable
C. Flashing Beacon Assembly
D. Pavement Markings
E. Portable Impact Attenuators
F. Signs

1. Interim Ground Mounted or Interim Overhead Special Guide Signs
2. Remove and Reset Existing Special Guide Signs, Ground Mount or Overhead
3. Modify Special Guide Signs, Ground Mount or Overhead

G. Temporary Audible Information Device
H. Temporary Barrier
I. Temporary Curb Cut Wheelchair Ramps
J. Temporary Guardrail Anchorage, Type 12
K. Temporary Walkways with Detectable Edging
L. Traffic Signal Installation - Temporary
M. Work Zone Law Enforcement

150.5 Reserved

150.6 Special Conditions

150.7 Payment

150.7.01 Enforcement and Adjustments

150.1.03 Related References

A. Standard Specifications

Section 104 - Scope of Work

Section 105 - -Control of Work-Legal Regulations and Responsibility to the Public

Section 107 - Legal Regulations and Responsibility to the Public

Section 108 - Prosecution and Progress

Section 209 - Subgrade Construction

Section 400 - Hot Mix Asphaltic Concrete Construction

Section 441 - Miscellaneous Concrete

Section 429 - Rumble Strips

Section 620 - Temporary Barrier

Section 632 - Portable Changeable Message Signs

Section 641 - Guardrail

Section 647 - Traffic Signal Installation

Section 648 - Traffic Impact Attenuator

Section 652 - Painting Traffic Stripe

Section 653 - Thermoplastic Traffic Stripe

Section 654 - Raised Pavement Markers

Section 656 - Removal of Pavement Markings

Section 657 - Preformed Plastic Pavement Markings

Section 658 - Polyurea Traffic Strip

Section 659 - Hot Applied Preformed Plastic Pavement Markings

Section 911 - Sign Posts

Section 912 - Sign Blanks and Panels

Section 913 - Reflectorizing Materials

B. Referenced Documents

ASTM D4956-13 (Retro-reflectivity)

American Traffic Safety Services Association (ATSSA)

Construction Detail A-3 Curb Cut (Wheelchair) Ramps Concrete Sidewalk Details

Construction Detail A-4 Detectable Warning Surface Truncated Dome Size, Spacing and Alignment Requirements

Construction Detail T-3A (Type 7, 8, and 9 Square Tube Post Installation Detail)

GDOT Signing and Marking Design Guidelines

Georgia Standard 4000W "Lengths of Advancement, Clear Zone Distances, Fill Height Embankment"

Georgia Standard 4960 "Temporary Barrier (End Treatment Options)"

Georgia Standard 9102 "Traffic Control Detail for Lane Closure on Two-Lane Highway"

Georgia Standard 9106 "Traffic Control Detail for Lane Closure on Multi-Lane Divided Highway"

Georgia Standard 9107 "Traffic Control Detail for Lane Closure on Multi-Lane Undivided Highway"

Georgia Standard 9121 "Tapers, Signs, and Markings for Passing Lanes"

Manual for Assessing Safety Hardware (MASH)

Manual on Uniform Traffic Control Devices (MUTCD)

National Cooperative Highway Research Program (NCHRP) 350

National Safety Council

Qualified Product List #29 (QPL-29) Reflective Sheeting

Qualified Product List #34 (QPL-34) Work Zone Traffic Control Devices (Drums, Type III Barricades, Vertical Panels, and Portable Sign Systems)

Qualified Product List #35 (QPL-35) Drive Type Galvanized Steel Sign Posts

Qualified Product List #46 (QPL-46) Traffic Pavement Markings

Qualified Product List #64 (QPL-64) Attenuator Units (Compression Crash Cushion) and Guardrail End Treatments

Qualified Product List #76 (QPL-76) Raised Pavement Markers and Channel Markers

Qualified Product List #79 (QPL-79) Portable Arrow Boards

Qualified Product List #82 (QPL-82) "Portable Changeable Message Signs"

Utility Accommodation Policy and Standards Manual

Work Zone Safety and Mobility Policy

150.1.04 Submittals/Preconstruction

A. Worksite Traffic Control Supervisor

The Contractor shall designate a qualified individual as the Worksite Traffic Control Supervisor (WTCS). The WTCS shall be responsible for selecting, installing, and maintaining all traffic control devices in accordance with the Plans, Specifications, Special Provisions and the MUTCD. The WTCS shall be currently certified by the American Traffic Safety Services Association (ATSSA) Work Site Traffic Supervisor Certification program or the National Safety Council Certification program. On-line classes will not be accepted.

The WTCS shall be available on a twenty-four (24) hour basis to perform their duties. If the Work requires traffic control activities to be performed during the daylight and nighttime hours, it may be necessary for the Contractor

to designate an alternate WTCS. An alternate WTCS must meet the same requirements and qualifications as the primary WTCS and be accepted by the Engineer prior to beginning any traffic control duties. The Worksite Traffic Control Supervisor's traffic control responsibilities shall have priority over all other assigned duties.

As the representative of the Contractor, the WTCS shall have full authority to act on behalf of the Contractor in administering the TTC Plan. The WTCS shall have appropriate training in safe traffic control practices in accordance with Part 6 of the MUTCD. In addition to the WTCS, all other individuals making decisions regarding traffic control shall meet the training requirements of the Part 6 of the MUTCD.

The Worksite Traffic Control Supervisor (WTCS) shall have a copy of Part 6 of the MUTCD and the Contract on the job site. Copies of the current MUTCD may be obtained from the FHWA web page at http://mutcd.fhwa.dot.gov.

The WTCS shall supervise the initial installation of traffic control devices. The Engineer, prior to the beginning of construction, will review the initial installation. Modifications to traffic control devices as required by sequence of operations or staged construction shall be reviewed by the WTCS.

Any work performed on the interstate or limited access highway right-of-way that requires traffic control shall be supervised by a submitted/approved certified Worksite Traffic Control Supervisor. No work requiring traffic control shall be performed unless the certified WTCS is on the worksite. Failure to maintain a Certified Worksite Traffic Control Supervisor on the Work will be considered as non-performance under Subsection 150.7.01.

The WTCS or alternate WTCS shall be available on a full-time basis to maintain traffic control devices with access to all personnel, materials, and equipment necessary to respond effectively to an emergency situation within forty-five (45) minutes of notification of the emergency.

The WTCS shall perform inspections, at a minimum once a month, to ensure that traffic control is maintained. For all interstate and limited access highways, the WTCS shall perform, as a minimum, weekly traffic control inspections. The inspections will start with the installation of the advance warning signs and will stop when a maintenance acceptance is issued or when the corrective list is completed.

An inspection shall include both daytime and nighttime reviews. The inspection shall be reported to the Engineer on a Traffic Control Inspection Report (TC-1) form provided by the Department. Unless modified by the special conditions or by the Engineer, routine deficiencies shall be corrected within a twenty-four (24) hour period. Failure to comply with these provisions shall be grounds for dismissal from the duties of WTCS and/or removal of the WTCS from the project. Failure of the WTCS to execute their duties shall be considered as non-performance under Subsection 150.7.01.

The Engineer will periodically review the Work for compliance with the requirements of the TTC plan.

On projects where traffic control duties will not require full time WTCS supervision, the Engineer may allow the Contractor's Project superintendent, foreman, subcontractor, or other designated personnel to serve as the WTCS as long as satisfactory results are obtained. Nevertheless, the individual shall meet the requirements and perform the duties of a WTCS.

B. Sequence of Operations

Any Sequence of Operations provided in this Contract in conjunction with any staging details which may be shown in the Plans, is a suggested sequence for performing the Work. It is intended as a general staging plan for the orderly execution of the Work while minimizing the impact on pedestrian facilities, mainline, cross-streets and side streets. The Contractor shall develop detailed staging and temporary traffic control plans for performing specific areas of the Work including but not limited to all traffic shifts, detours, bridge widenings, paces, or other activities that disrupt traffic or pedestrian flow. The Engineer may require detailed staging and TTC Plans for lane closures or disruption to pedestrian facilities. These Plans shall be submitted for approval at least two (2) weeks prior to the scheduled date of the activity. Activities that have not been approved at least seven (7) days prior to the scheduled date shall be rescheduled.

Where traffic is permitted through the work area under stage construction, the Contractor may choose to construct, at no additional expense to the Department, temporary on-site bypasses, or detours in order to expedite the Work. Plans for such temporary bypasses or detours shall be submitted to the Engineer for review and approval thirty (30) calendar days prior to the proposed construction. Such bypasses or detours shall be removed promptly when in

the opinion of the Engineer; they are no longer necessary for the satisfactory progress of the Work. Bypasses and detours shall meet the minimum requirements of Subsection 150.3.01.E.

As an option to the Sequence of Operations in the Contract, the Contractor may submit an alternative Sequence of Operations for review and approval. Alternate Sequence of Operations for pedestrian facilities shall be in compliance with the MUTCD and ADA. Pedestrian needs identified in the preconstruction phase shall be included in the proposed alternate plan.

The Department will not pay, or in any way, reimburse the Contractor for claims arising from the Contractor's inability to perform the Work in accordance with the Sequence of Operations provided in the Contract or from an approved Contractor alternate.

The Contractor shall secure the Engineer's approval of the Contractor's proposed plan of operation, sequence of work and methods of providing for the safe passage of vehicular and pedestrian traffic before it is placed in operation. The proposed plan of operation shall supplement the approved traffic control plan. Any major changes to the approved TTC plan, proposed by the Contractor, shall be submitted to the Department for approval.

Some additional traffic control details will be required prior to any major shifts or changes in traffic. The traffic control details shall include, but not be limited to, the following:

1. A detailed drawing showing traffic locations and lanes for each step of the change.

2. The location, size, and message of all signs required by the MUTCD, Plan, Special Provisions, and other signs as required to fit conditions. Any portable changeable message signs used shall be included in the details.

3. The method to be used in, and the limits of, the obliteration of conflicting lines and markings.

4. Type, location, and extent of new lines and markings.

5. Horizontal and vertical alignment and superelevation rates for detours, including cross-section and profile grades along each edge of existing pavement.

6. Drainage details for temporary and permanent alignments.

7. Location, length, and/or spacing of channelization and protective devices (temporary barrier, guardrail, barricades, etc.)

8. Starting time, duration, and date of planned change.

9. For each traffic shift, a paving plan, erection plan, or work site plan, as appropriate, detailing workforce, materials, and equipment necessary to accomplish the proposed Work. This will be the minimum resource allocation required in order to start the Work.

The above details shall be submitted to the Engineer for approval at least fourteen (14) days prior to the anticipated traffic shift. Submission should be made electronically in a portable document format (pdf). The Contractor shall have traffic control details for a traffic shift which has been approved by the Engineer prior to commencement of the physical shift. All preparatory work relative to the traffic shift, which does not interfere with traffic, shall be accomplished prior to the designated starting time. The Engineer and the Contractor's representative will verify that all conditions have been met prior to the Contractor obtaining materials for the actual traffic shift.

C. Pedestrian Considerations

All existing pedestrian facilities, including access to transit stops, shall be maintained. Where pedestrian routes are closed, alternate routes shall be provided. Closures of existing, interim, and final pedestrian facilities shall have the prior written approval of the Engineer. When existing pedestrian facilities are disrupted, closed, or relocated in a TTC zone, the temporary facilities shall be detectable and shall include accessibility features consistent with the features present in the existing pedestrian facility. Pedestrian facilities are considered improvements and provisions made to accommodate or encourage walking. Whenever a sidewalk is to be closed, the Engineer shall notify the maintaining agency two (2) weeks prior to the closure. Prior to closure, detectable barriers (that are detectable by a person with a visual disability traveling with the aid of a long cane), as described by the MUTCD, shall be placed

across the full width of the closed sidewalk. Barriers and channelizing devices used along a temporary pedestrian route shall be in compliance with the MUTCD.

Temporary Traffic Control devices used to delineate a Temporary Traffic Control Zone Pedestrian Walkway shall be in compliance with Subsection 150.3.01.A. Appropriate signs as described in the MUTCD shall be maintained to allow safe passage of pedestrian traffic or to advise pedestrians of walkway closures (Refer to MUTCD Figures TA-28 and TA-29 for guidance). Advance closure signing should be placed at intersections rather than midblock locations so that pedestrians are not confronted with midblock work sites that will induce them to attempt skirting the work site or making a midblock crossing. Temporary Traffic Control devices and construction material shall not intrude into the usable width of the pedestrian walkway. Signs and other devices shall be placed such that they do not narrow or restrict any pedestrian passage to less than forty-eight inches (≥ 48").

1. Pedestrian Signage

A pedestrian walkway shall not be severed or relocated for non-construction activities, such as parking for construction vehicles and equipment. Movement by construction vehicles and equipment across designated pedestrian walkways should be minimized. When necessary, construction activities shall be controlled by flaggers. Pedestrian walkways shall be kept free of mud, loose gravel, or other debris.

When temporary covered walkways are used, they shall be lighted during nighttime hours. When temporary traffic barrier is used to separate pedestrian and vehicular traffic, the temporary barrier shall meet Manual for Assessing Safety Hardware (MASH) Test Level 3 and/or NCHRP-350 Test Level Three. The barrier ends shall be protected in accordance with Georgia Standard 4960. Curbing shall not be used as a substitute for temporary traffic barriers when temporary traffic barriers are required. Tape, rope, or plastic chain strung between temporary traffic control devices are not considered as detectable and shall not be used as a control for pedestrian movements.

The WTCS shall inspect the activity area daily to ensure that effective pedestrian TTC is being maintained. The inspection of TTC for pedestrian traffic shall be included as part of the TC-1 report.

2. Temporary Pedestrian Facilities

Temporary pedestrian facilities shall be detectable and include accessibility features consistent with the features present in the existing pedestrian facility. The geometry, alignment and construction of the facility should meet the applicable requirements of the "Americans with Disabilities Act Accessibility Guidelines for Buildings and Facilities (ADAAG)".

a. Temporary Walkways with Detectable Edging

A smooth, continuous hard surface (firm, stable and slip resistant) shall be provided throughout the entire length of the temporary pedestrian facility. Compacted soils, sand, crushed stone, or asphaltic pavement millings shall not be used as a surface course for walkways.

Temporary walkways shall include detectable edging as defined in the MUTCD. When temporary traffic barrier is included as a pay item in the Contract and where locations identified on the Plans for positive protection will also allow them to serve as pedestrian detectable edging, payment will be made for the temporary traffic barrier in accordance with Section 620. No payment will be made for temporary walkways with Detectable Edging where existing pavements or existing edging (that meets the requirements of MUTCD) are utilized as temporary walkways. Payment for temporary detectable edging, including approved barriers and channelizing devices, installed on existing pavements shall be included in Traffic Control-Lump Sum.

Regardless of the materials used, temporary walkways shall be constructed with sufficient thickness and durability to withstand the intended use for the duration of the construction project. If concrete or asphalt is used as the surface course for the walkway, it shall be a minimum of one and one-half inches (≥ 1-1/2") thick. Temporary walkways constructed across unimproved streets and drives shall be a minimum thickness of four inches (≥ 4") for concrete and three inches (≥ 3") for asphalt. Joints formed in concrete sidewalks shall be in accordance with Section 441 Concrete surfaces shall have a broom finish.

If plywood is used as a walkway, it must be a minimum of three quarters of an inch (≥ 3/4") thick, pressure treated and supported with pressure treated longitudinal joists spaced a maximum of sixteen inches (≤ 16") on center. The plywood shall be secured to the joist with galvanized nails or galvanized deck screws. Nails and screws shall be countersunk to prevent snagging or tripping the pedestrians. A slip resistant friction course shall be applied to any plywood surface that is used as a walkway. Any slip resistant material used shall have the prior written approval of the Engineer.

The Contractor may propose alternate types of Temporary Walkways provided that the Contractor can document that the proposed walkway meets the requirements of the "Americans with Disabilities Act Accessibility Guidelines for Buildings and Facilities (ADAAG)". Alternate types of Temporary Walkways shall have the prior written approval of the Engineer.

Temporary walkways shall be constructed and maintained so there are no abrupt changes in grade or terrain that could cause a tripping hazard or could be a barrier to wheelchair use. The Contractor shall construct and maintain the walkway to ensure that joints in the walkway have a vertical difference in elevation of no more than one quarter (≤ 1/4") of an inch and that the horizontal joints have gaps no greater than one half (≤ 1/2") of an inch. The grade of the temporary walkway should parallel the grade of the existing walkway or roadway and the cross slope should be no greater than two percent (≤ 2%). A width of sixty inches (60"), if practical, should be provided throughout the entire length of any temporary walkway. The temporary walkway shall be a minimum width of forty eight (48") inches. When it is not possible to maintain a minimum width of sixty (60") inches throughout the entire length of temporary walkway, a sixty (60") inch by sixty (60") inch passing space should be provided at least every two hundred feet (200 ft.), to allow individuals in wheelchairs to pass.

Temporary walkways shall be constructed on firm subgrade. Compact the subgrade according to Section 209. Furnish and install any needed temporary pipes prior to constructing any walkway to ensure positive drainage away from or beneath the temporary walkway. Once the walkway is no longer required, remove any temporary materials, and restore the area to the original conditions or as shown in the Plans.

b. Temporary Curb Cut Wheelchair Ramps

Temporary curb cut wheelchair ramps shall be constructed in accordance with Section 441 and Construction Detail A-3 Curb Cut (Wheelchair) Ramps Concrete Sidewalk Details. Ramps shall also include a detectable warning surface in accordance with Construction Detail A-4 Detectable Warning Surface Truncated Dome Size, Spacing and Alignment Requirements. Other types of material for the construction of the temporary curb cut wheelchair ramps, including the detectable warning surface, may be used provided the Contractor can provide documentation that the material to be used meets the requirements of the "Americans with Disabilities Act Accessibility Guidelines for Buildings and Facilities (ADAAG)". When a wheelchair ramp is no longer required, remove the temporary materials, and restore the area to existing conditions or as shown in the Plans. For the items required to restore the area to original conditions or as shown in the Plans, measures for payment shall be covered by Contract pay items. If pay items are not included in the Contract, then payment for these items shall be included in Traffic Control-Lump Sum.

c. Temporary Audible Information Device

Temporary audible information devices, when shown in the Plans, shall be installed in compliance with the "Americans with Disabilities Act Accessibility Guidelines for Buildings and Facilities (ADAAG)". The devices shall be installed in accordance with the manufacturer's recommendations. Prior to installation, the Contractor shall provide the Engineer with a set of manufacturer's drawings detailing the proper installation procedures for each device. When no longer required, the devices shall remain the property of the Contractor.

150.2 Materials and Traffic Control Devices

150.2.01 Traffic Control Devices

A. NCHRP 350 and MASH

All devices shall be certified in accordance with the Manual for Assessing Safety Hardware (MASH) Test Level 3 and/or the National Cooperative Highway Research Program (NCHRP) 350 Test Level 3 as applicable unless modified by this Special Provision. In addition, temporary work zone devices, including portable barriers, manufactured after December 31, 2019, must have been successfully tested under 2016 edition of MASH requirements. Such devices manufactured on or before this date, and successfully tested under either NCHRP Report 350 or the 2009 edition of MASH, may continue to be used throughout their normal service lives.

B. Approval

All traffic control devices with applicable Qualified Products List (QPL) categories shall come from the appropriate QPL list. Products not on the QPL may be used with an approval letter from the Georgia Department of Transportation Office of Materials and Testing. If there is no applicable QPL, the Contractor shall provide proof of MASH/NCHRP 350 certification. The proof may be a letter or written statement from the manufacturer that the product is MASH/NCHRP 350 approved. Decal certifications are not proof of certification and are not required.

C. Quality Guidelines for All Temporary Traffic Devices

All traffic control devices found to be unacceptable in accordance with the current ATSSA, "Quality Guidelines for Temporary Traffic Devices and Features" regardless of total numbers shall be replaced within twenty-four (24) hours unless stated otherwise in the Specifications, in the Contract, or as directed by the Engineer.

150.2.02 Retroreflectivity Requirements

A. Signs

Reflective sheeting shall meet the requirements of Section 913 and QPL-29

All construction warning signs (black on fluorescent orange) shall meet the minimum reflectivity and color requirements of ASTM D4956 Type XI regardless of the mounting height. All other signs reflectorization shall be in accordance with the Plans, Contract, and "GDOT Signing and Marking Design Guidelines".

B. Channelization Devices

Reflective sheeting shall meet the requirements of Section 913 and QPL-29

All channelization devices (white/ fluorescent orange and white/red) shall meet the minimum retroreflectivity requirements of ASTM D4956 Type IV or Type VI.

150.2.03 Arrow Panels

Arrow panels shall meet the requirements for MUTCD (6L.06) and QPL-79.

Portable sequential arrow, sequential chevron, or flashing arrow panels shall be a minimum size of forty-eight inches (48") high by ninety-six inches (96") wide with not less than fifteen (15) lamps used for the arrow. The arrow shall occupy virtually the entire size of the arrow panel and shall have a minimum legibility distance of one (1) mile. The minimum legibility distance is the distance at which the arrow panel can be comprehended by an observer on a sunny day, or clear night. Arrow panels shall be equipped with automatic dimming features for use during hours of darkness. The arrow panels shall also meet the requirements for a Type C panel as shown in the MUTCD (6L.06). The sequential or flashing arrow panels shall not be used for lane closure on two-lane, two-way highways when traffic is restricted to one-lane operations in which case, appropriate signing, flaggers and when required, pilot vehicles will be deemed sufficient.

The arrow panels shall be placed on the shoulder at or near the point where the lane closing transition begins. The panels shall be mounted on a vehicle, trailer, or other suitable support. Vehicle mounted panels shall be provided with remote controls. Minimum mounting height shall be seven feet (7') above the roadway to the bottom of the panel, except on vehicle mounted panels which should be as high as practical.

For emergency situations, arrow display panels that meet the MUTCD requirements for Type A or Type B panels may be used until Type C panels can be located and placed at the site. The use of Type A and Type B panels shall be held to the minimum length of time possible before having the Type C panel(s) in operation. The Engineer shall determine when conditions and circumstances are considered to be emergencies. The Contractor shall notify the Engineer, in writing, when any non-specification arrow display panel(s) is being used in the Work.

150.2.04 Channelization Devices

A. General

Channelization shall clearly delineate the travel way through the work zone and alert drivers and pedestrians to conditions created by work activities in or near the travel way. Channelization shall be in accordance with the Plans, Specifications, MUTCD, QPL-34, and the following requirements.

B. Drums

1. Design

Drums shall meet the minimum requirement of the MUTCD (6K.06). Drums shall have six inch (6") wide stripes – white/fluorescent orange.

2. Application

Drums shall be used as the required channelizing device to delineate the full length of a lane closure, shift, or encroachment, except as modified by this Subsection.

3. Longitudinal Channelization

Drums shall be spaced as listed below for various roadside work conditions except as modified by Subsection 150.3.11. Spacing shall be used for situations meeting any of the conditions listed as follows:

a. FORTY FOOT (40') SPACING MAXIMUM
- For difference in elevation exceeding two inches (> 2").
- For healed sections no steeper than 4:1 as shown in Subsection 150.3.11, Detail 150-H.

b. EIGHTY FOOT (80') SPACING MAXIMUM
- For difference in elevation of two inches (≤ 2") or less.
- Flush areas where equipment or workers are within ten feet (≤ 10') of the travel lane.

c. 200 FOOT SPACING MAXIMUM: Where equipment or workers are more than ten feet (> 10') from travel lane. Lateral offset clearance to be four feet (4') from the travel lane.
- For paved areas, eight feet (> 8') or greater in width that are paved flush with a standard width travel lane.
- For disturbed shoulder areas not completed to typical section that are flush to the travel lane and considered a usable shoulder.

4. Removal of Drums

Drums may be removed after shoulders are completed to typical section and grassed. Guardrail and other safety devices shall be installed and appropriate signs advising of conditions such as soft or low shoulder shall be posted before the drums are removed.

C. Vertical Panels

1. Design

All vertical panels shall meet the minimum requirements of the MUTCD (6K.05). All vertical panels shall have a minimum of 270 square inches of retroreflective area facing the traffic and be a minimum of thirty-six inches (≥ 36") high. The vertical panels shall be in addition a minimum eight inches (≥ 8") wide with a stripe width of six inches (6") – white/fluorescent orange.

2. Application
Vertical panels with retroreflectivity less than Type VI can only be used when traffic drums reduce the travel lane to less than ten feet (≤ 10'); vertical panels shall be used to restore the travel lane to ten feet (≥ 10') or greater. No other application of vertical panels with retroreflectivity less than type VI will be permitted.

Vertical panels with a minimum type VI retroreflectivity and six (6") inch stripe may be used for longitudinal channelization in the activity zone where work takes place for short-term stationary lane closures and intermediate-term stationary lane closures. They can be used for lane closures lasting three (3) days and with Engineer approval up to seven (7) days. They shall not be used in the transition zone including the tapers and the tangent lengths between tapers.

D. Cones

1. Design:
All cones shall be a minimum of twenty-eight inches (≥ 28") in height regardless of application and shall meet the requirements of the MUTCD (6K-1). Retroreflectivity may be deleted from all cones.

2. Application
On interstates, cones shall be prohibited. On all other routes, cones may only be used for longitudinal channelization in the activity zone where work takes place for short-term stationary lane closures. They shall not be used in the transition zone including the tapers and the tangent lengths between tapers. The use of cones for nighttime work will not be permitted. Cones shall not be stored or allowed to be visible on the worksite during nighttime. Cones may be used for daytime flagging operations including tapers at flagging stations.

E. Barricades

1. Design

Type 3 barricades shall meet the minimum requirements of the MUTCD (6K.07). The Contractor has the option of choosing Type 3 barricades from the QPL-34 or the Contractor may utilize generic barricades that are approved by the Federal Highway Administration (FHWA). When barricades have been specifically crash tested with signs attached, the Contractor has the responsibility to attach the signs as per the manufacturer's recommendations to ensure crashworthiness. If the barricades were not tested with the signs, crashworthy compliance may require that rigid signs be mounted separate from the Type 3 barricade.

The use of Type 1 and Type 2 barricades will not be permitted.

2. Application
Type 3 barricades shall be placed as required by the Plans, the Standards, and as directed by the Engineer. When a barricade is placed so that it is subject to side impact from a vehicle, a drum shall be placed at the side of the barricade to add target value to the barricade.

F. Warning Lights

1. Design
All warning lights shall meet the requirements of the MUTCD (6L.07).

2. Application:
   a. Type A low-intensity flashing lights shall be used as shown in the Plans, the Standards, and as directed by the Engineer.

   b. Type C Steady-Burn lights shall be used as shown in the Plans, the Standards, and as directed by the Engineer.

150.2.05 Flashing Beacon

The flashing beacon assembly, when specified, shall be used in conjunction with construction warning signs, regulatory, or guide signs to inform traffic of special road conditions which require additional driver attention. The flashing beacon assembly shall be installed in accordance with the requirements of Section 647.

150.2.06 Guardrail

Guardrail shall comply with Section 641 Guardrail and the guardrail standards.

When the removal and installation of guardrail is required, as a part of the Work, the following time restrictions shall apply unless modified by the special conditions:

From the time that the existing guardrail or temporary positive barrier protection is removed, the Contractor has fourteen (14) days to install the new guardrail and anchors. During the interim, the location without guardrail shall be protected with drums spaced at a maximum spacing of twenty feet (20'). The guardrail blunt end is to be treated as a fixed object and shall be protected. The maximum length of rail that can be removed at any time without being replaced with positive barrier protection is a total of 2000 linear feet of existing rail or the total length of one run of existing rail, whichever is less. Based on existing field conditions, the Engineer may review the Work and require that the guardrail be installed earlier than the maximum time allowed.

The Contractor shall install new guardrail, such that traffic exposure to fixed objects is minimized. Within the same workday, temporary attenuators, as defined in Subsection 150.2.10, should be installed on the approach to fixed objects that can't be protected with guardrail. Truck or trailer mounted attenuators may be used to shield exposed fixed objects for periods not to exceed fourteen (14) days. No separate payment will be made for truck or trailer mounted attenuators, attenuators, or other methods unless provided for in the Contract.

When the roadway is open to traffic, guardrail panels shall be lapped to comply with the directional flow of traffic. Should the staging of the Work require that the lap of the guardrail be changed, this Work shall be completed before the roadway is opened to traffic. The Work to change the lap of any guardrail shall be included in Traffic Control-Lump Sum.

The laps on anchors shall be in accordance with the manufacturer's recommendations and installation instructions. As a result, a trailing anchor may be lapped opposing the flow of traffic.

Failure to comply with the above time and quantity restrictions shall be considered as non-compliance under Subsection 150.7.01.

150.2.07 Interim Signs

A. Sign Blanks and Panels

All TTC sign blanks and panels should conform to Section 912 of the Specifications. Alternative sign blank materials (composites, polycarbonates, fiberglass reinforced plastics, recycled plastics, etc.) shall have a letter of approval from the Office of Materials and Testing for use as interim construction signs before these materials are allowed to be incorporated into the Work, unless these rigid sign blanks are currently approved as a crashworthy sign blank material under QPL- 34.
Unless specified elsewhere in the Contract, Specifications, Plans, and/or directed by the Engineer, sign sizes are according to the following:

1. All construction signs sizes shall follow the dimensions provided in the MUTCD Table 6G-1, GH-1, and 6I-1 "Temporary Traffic Control Zone Sign and Plaque Sizes" under the column for "Freeway or Expressway".

2. For all other signs used just for staging, the sign sizes shall follow the dimensions provided in the MUTCD Table 2B-1 "Regulatory Sign and Plaque Sizes" for the largest size.

3. Permanent signs used for staging shall be according to Plans.

Plywood blanks or panels will not be permitted.

The use of flexible signs will not be permitted.

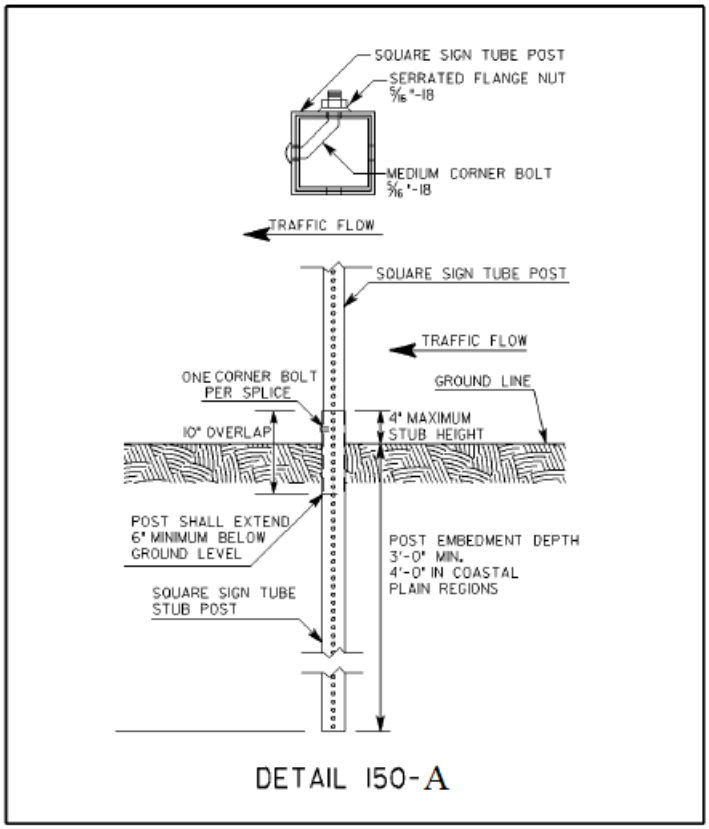
For utility work not included in the Contract, the utility Contractor may use flexible signs within the project limits.

B. Posts

Permanent mounting height to the bottom of sign shall be seven (7) feet to eight (8) feet measured vertically from the bottom of the sign to the elevation of the near edge of the pavement or from the walkway. Posts for all interim signs

should be square tubular post meeting the requirements of Section 911, QPL-35, and Construction Detail T-3A (Type 7, 8, and 9 Square Tube Post Installation Detail). Ground mounted sign(s) that are greater than 48" wide shall be mounted on two posts. For barrier mounted sign, single post mount is allowed. The post(s) shall not extend beyond the top of the sign(s). The sign(s) shall be substantially plumbed and leveled.

Unprotected interim posts shall be spliced as shown in Detail 150-A, unless full length unspliced posts are used. Unprotected post splices will not be permitted any higher than four inches above the ground line to lessen the possibility of affecting the undercarriage of a vehicle. Installation of posts may require establishment of openings in existing pavements, islands, shoulders, etc.



DETAIL 150-A

150.2.08 Pavement Markings

All temporary traffic striping shall conform to the applicable requirements of Section 652, Section 653, Section 657, Section 658, Section 659, and QPL-46.

A. All Traffic Striping for 45 Days or Less (≤45 Days)

All traffic striping that will be in place for 45 days or less shall be 4 inches or greater in width.

B. All Temporary Striping Beyond 45 days (>45 Days)

All traffic striping applied on intermediate surfaces shall be a minimum 5 inches in width or as shown on the Plans. On final surfaces when temporary striping will be overlaid or eradicated, the temporary striping shall be a minimum 5 inches in width.

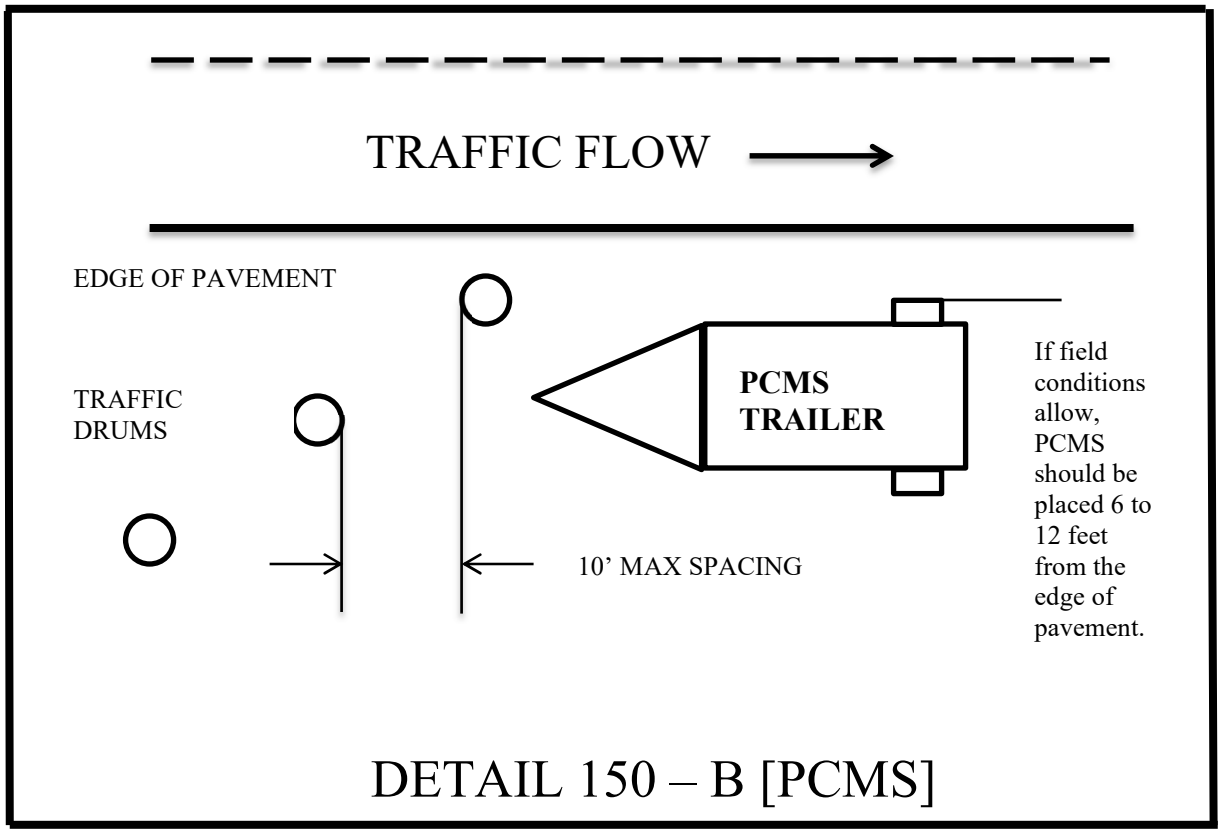
C. All Temporary Traffic Striping on Final Surface

All temporary traffic striping applied to final surfaces which will not be overlaid or grinded may be 4 inches in width or as shown on the Plans.

150.2.09 Portable Changeable Message Signs

When specified, a portable changeable message sign (PCMS) shall meet the minimum requirements of Section 632, MUTCD (6L.05) and be on QPL-82. The maximum amount of messages allowed to be flashed on one PCMS is two phases (flashes). The language and the timing of the messages shall comply with the MUTCD and Section 632. When used as an advanced device, the PCMS should typically be placed ahead of the construction activities. If the PCMS is used as a substitute for another device, then the requirements for the other device apply.

Any PCMS in use, which is not protected by positive barrier protection, shall be delineated by a minimum of three drums that meet the requirement of Subsection 150.2.04.B. The drum spacing shall not exceed a maximum of ten (10') feet as shown in Detail 150-B. When the PCMS is within twenty (20') feet of the opposing traffic flow, the trailing end of the PCMS shall be delineated with a minimum of three drums spaced in the same manner as the approach side of the PCMS.



DETAIL 150 – B [PCMS]

When not in use, the PCMS shall be removed from the roadway, unless protected by positive barrier protection. If the PCMS is protected by positive barrier protection, the sign panel shall be turned away from traffic when not in use.

150.2.10 Portable Impact Attenuators

This work consists of the furnishing (including spare parts), installation, maintenance, relocation, reuse as required, and removal of Portable Impact Attenuator Units/Arrays.

Portable Impact Attenuator Unit/Arrays installation shall conform to the requirements of Section 648, Manufacturer's recommendations and "(Georgia Standard 4960 "Temporary Barrier (End Treatment Options)" and shall be installed at locations designated by the Engineer, and/or as shown on the Plans. When gating attenuators are used, the Contractor shall maintain the appropriate recovery area in accordance with the manufacturers' recommendations.

Generic sand/water loaded modules are prohibited. Manufacturers' sand/water loaded modules with specific arrays that have been NCHRP 350/MASH approved can be used in appropriate locations.

The test level of protection provided shall equal or exceed the speed limit. Test level 3 shall be used for forty-five (45) mph or above.

150.2.11 Portable Temporary Traffic Control Signals

The use of Portable Temporary Traffic Control Signals shall meet the following minimum requirements:

Only two-lane, two-way roadways will be allowed to utilize Portable Temporary Traffic Control Signals.

All portable traffic control signals shall meet the physical display and operational requirements of conventional traffic signals described in the MUTCD.

Each signal face shall have at least three lenses. The lenses shall be red, yellow, and green in color and shall give a circular type of indication. All lenses shall be twelve (12") inches nominal in diameter. A minimum of two signal faces shall face each direction of traffic. A minimum of one signal head shall be suspended over the roadway travel lane in a manner that will allow the bottom of the signal head housing to be not less than seventeen (17') feet above and not more than nineteen (19') feet above the pavement grade at the center of the travel lane. The second signal head may be located over the travel lane with the same height requirements or the second signal head may be located on the shoulder. When the signal head is located on the shoulder, the bottom of the signal head housing shall be at least eight (8') feet but not more than (15') feet above the pavement grade at the center of highway.

Advance warning signage and appropriate pavement markings shall be installed as part of the spliceal operation.

The signals shall be operated in a manner consistent with traffic requirements. The signals may be operated in timed-mode or in a vehicle-actuated mode. The signals shall be interconnected in a manner to ensure that conflicting movements cannot occur. To ensure that the appropriate operating pattern, including timing is displayed to the traveling public, regular inspections, including the use of accurate timing devices shall be made by the WTCS. If, at any time, any part of the system fails to operate within these requirements then the use of the signal shall be suspended, and the appropriate flagging operation shall begin immediately.

The (WTCS) shall continuously monitor the portable traffic control signal to ensure compliance with the requirements for maintenance under the MUTCD. The signal shall be maintained in a manner consistent with the intention of the MUTCD, with emphasis on cleaning of the optical system. Timing changes shall be made only by the WTCS. The WTCS shall keep a written record of all timing changes.

The portable temporary traffic signal shall have two power sources and shall be capable of running for seven calendar days continuously.

The Contractor shall have an alternate temporary traffic control plan in the event of failure of the signal.

150.2.12 Raised Pavement Markers

Raised pavement markers (RPMs) shall meet the requirements of Section 654 and QPL-76 .

150.2.13 Rumble Strips

Rumble strips incorporated into the Work shall meet the requirements of Section 429 and the MUTCD. Existing rumble strips that are positioned in the traveled way to warn traffic of a stop condition shall be reinstalled prior to opening to traffic. Based on the following requirements:

Intermediate surfaces that will be in use for more than forty-five (45) calendar days shall have rumble strips reinstalled on the traveled way in the area of a stop condition. Non-refundable deductions in accordance with Subsection 150.7.01 will be assessed for any intermediate surface in place for greater than 45 days without rumble strips.

Rumble strips shall be installed on the final surface within fourteen (14) calendar days of the placement of the final surface in the area of the stop condition. Failure to install within fourteen (14) calendar days will result in assessment of non-refundable deductions in accordance with Subsection150.7.01.

Prior to the removal of any rumble strips located in the travel lane, stop ahead (W3-1) warning signs shall be double indicated ahead of the stop condition. These warning signs shall be a minimum of 48 inches by 48 inches. These warning signs shall remain in place until the rumble strips have been reinstalled on the traveled way. Any existing warning signs for the stop ahead condition shall be removed or covered while the 48" X 48" (W3-1) signs are in place. When the rumble strips have been reinstalled, these warning signs should be promptly removed, and any existing signage placed back in service.

150.2.14 Temporary Barriers

A. Design:

Temporary barriers shall meet the requirements of Sections 620. The lengths of advancement should be in accordance with Georgia Standard 4000W "Lengths of Advancement, Clear Zone Distances, and Fill Height Embankment". The approach end of the taper should have 10:1 or flatter ground slope. Temporary barriers shall not be used as a channelization device. Their use is in accordance with MUTCD (6K.09).

B. Application:

Temporary barriers shall be placed as required by the Plans, Standards, and as directed by the Engineer. When Temporary barrier is located twenty feet (≤ 20') or less from a travel lane, yellow reflectors shall be fixed to the top of the barrier at intervals not greater than forty feet (≤ 40') in the longitudinal section and twenty feet (20') in the taper section and shall be mounted approximately two inches (2") above the barrier. If both lanes of a two-lane two-way roadway are within twenty feet (≤ 20') or less of the barrier then the reflectors shall be installed for both directions of traffic.

The reflectors shall be one hundred (100) square inches (ASTM Type VII or VIII/ Type XI) reflective sheeting mounted on flat-sheet blanks. The reflectors shall be mounted approximately two inches above the top of the barrier. The reflectors shall be attached to the barrier with adhesive or by a drilled-in anchor type device. The reflectors shall not be attached to a post or board that is placed between the gaps in the barrier sections.

Approach end of Temporary barrier shall be protected according to Georgia Standard 4960 "Temporary Barrier (End Treatment Options)" or by a portable impact attenuator.

On interstates or other controlled access highways where lane shifts or crossovers cause opposing traffic to be separated by less than forty feet (<40'), portable barrier should be used as a separator.

150.2.15 Temporary Guardrail Anchorage- Type 12

This work consists of the furnishing, installation, maintenance, and removal of Temporary Guardrail Anchorage- Type 12 used for Portable Barrier or temporary guardrail end treatment. Materials used in the Temporary Guardrail Anchorage- Type 12 shall meet the requirements of Section 641 of the Specifications and current Georgia Standards and may be new or used. Materials salvaged from the Project, which meet the requirements of Standards, may be utilized if available. The use of any salvaged materials will require prior approval of the Engineer.

Installation of the Temporary Guardrail Anchorage- Type 12 shall conform to the requirements of the Plans, current Georgia Standards and Section 641 of the Specifications. Installation shall also include sufficient additional guardrail and appurtenances to effect the transition and connection to Temporary Concrete Barrier as required by the details in Georgia Standard 4960 "Temporary Barrier (End Treatment Options)".

150.2.16 Temporary Traffic Signals

Temporary traffic signals shall meet the requirements of Section 647 and the MUTCD.

150.3 Construction Requirements

150.3.01 General

A. Implementation Requirements

No work shall be started on any project phase until the appropriate traffic control devices have been placed in accordance with the Project requirements. Changes to traffic flow shall not commence unless all labor, materials, and equipment necessary to make the changes are available on the Project.

When any shift or change is made to the location of traffic or to the flow patterns of traffic, including pedestrian traffic, the permanent safety features shall be installed and fully operational before making the change. If staging or site conditions prevent the installation of permanent features, then the equivalent interim devices shall be utilized. This work shall also include any necessary removal and reinstallation of guardrail panels to achieve the required panel lap to accommodate the appropriate shift and traffic flow including the final traffic flow configuration. The cost of performing this work shall be included in Traffic Control-Lump Sum.

Any section of the Work that is on a new location shall have all permanent safety features installed and fully operational before the Work is opened to traffic. Safety features shall include, but are not limited to the following items:

Guardrails including anchors and delineation with properly lapped panels

1) Cable Barrier
2) Impact attenuators
3) Traffic signals
4) Warning devices
5) Pavement markings including, but not limited to, words, symbols, stop bars, arrows, hatching and crosswalks
6) Roadway signs including regulatory, warning, and guide

Outdoor lighting shall be considered as a safety feature for welcome centers, rest areas, and weigh station projects. For typical roadway type projects, new street lighting is not considered a safety feature, unless specifically noted in the Plans or in the special conditions.

B. Maintenance of Traffic Control Devices

Traffic control devices shall be in acceptable condition when first erected on the Project and shall be maintained in accordance with Section 104 throughout the construction period. All unacceptable traffic control devices shall be replaced within twenty-four (24) hours. When not in use, all traffic control devices shall be removed, placed or covered so as not to be visible to traffic.

C. Traffic Interruption Restrictions

The Department reserves the right to restrict construction operations when, in the opinion of the Engineer, the continuance of the Work would seriously hinder traffic flow, be needlessly disruptive or unnecessarily inconvenience the traveling public. The Contractor shall suspend and/or reschedule any work when the Engineer deems that conditions are unfavorable for continuing the Work.

Advanced notification requirements to the Contractor to suspend work will be according to the events and the time restrictions outlined below:

Incident management - No advanced notice required

Threatening/Inclement weather - twenty-four (24) hours

Holiday, sporting events, unfavorable conditions - Three (3) calendar days

If the Work is suspended, the Contractor may submit a request for additional Contract time as allowed under Section 108. The Department will review the request and may grant additional Contract time as justified by the impact to the Contractor's schedule. Compensation for loss of productivity, rescheduling of crews, rental of equipment or delays to the Contractor's schedule will not be considered for payment. Additional Contract time will be the only consideration granted to the Contractor.

D. Work Zone Restrictions

1. Interstate

The Contractor should not simultaneously perform work on both the inside shoulder and outside shoulder on either direction of traffic flow when the Work is within 12 feet of the travel-way. Shoulders can be alternated if areas are separated by at least one-half mile of distance.

2. Non-Interstate Divided Highways

The Contractor should not simultaneously perform work on both the inside shoulder and outside shoulder on either direction of traffic flow when the Work is within 12 feet of the travel-way. Shoulders can be alternated if areas are separated by at least one-half mile distance in rural areas or at least 500 feet of distance in urban areas.

3. Non-Divided Highways

a. The Contractor should not simultaneously perform work on opposite sides of the roadway when the Work is within 12 feet of the travel-way. Shoulders can be alternated if areas are separated by at least one-half mile of distance in rural areas or at least 500 feet of distance in urban areas.

b. On two-lane projects where full width sections of the existing subgrade, base or surfacing are to be removed, and new base, subgrade, or surfacing are to be constructed, the Contractor should maintain one-lane of traffic through the construction area by removing and replacing the undesirable material for half the width of the existing roadway at a time. Replacement should be made such that paving is completed to the level of the existing pavement in the adjacent lane by the end of the workday or before opening all the roadway to traffic.

E. Work Zone Geometric Restrictions

There should be no reduction in the total number of available traffic lanes including turning lanes that existed prior to construction, except as specifically allowed by the Contract and as approved by the Engineer.

Travel lane Clearances: All portions of the Work should maintain the following minimum requirements:

Horizontal: The combined dimensions of the paved shoulder and the roadway surface remaining outside the Work Zone should be no less than sixteen feet (≥ 16') in width at any location.

Vertical: The overhead clearance should not be reduced to less than fifteen feet (≥ 15') at any location.

The restrictions above apply to all shifts, lane closures, on-site detours and off-site detours whether shown in the Contract or proposed by the Contractor. It shall be the responsibility of the Contractor to verify that these minimum requirements have been met before proceeding with any phase of the Work. Two-lane, two-way roadways may have temporary horizontal restrictions of less than sixteen feet (≥ 16') during flagging operations. The minimum horizontal clearance should be restored before the flagging operation is removed.

F. Clear Zone

At the end of the workday, all equipment, materials, and TTC devices not in use should be moved out of the clear zone or behind positive protection. The clear zone is defined by Georgia Standard 4000W "Lengths of Advancement, Clear Zone Distances, Fill Height Embankment". For urban roadway with curb, the minimum set back is six (6') feet from the curb face. If stored behind positive protection, proper lengths of advancement should be maintained. If stored behind guardrail the items shall be a minimum five feet (≥ 5') from the face of the guardrail and not in the recovery zone of the anchor.

The WTCS shall monitor the Work to ensure that all the rocks, boulders, construction debris, stockpiled materials, equipment, tools, and other potential hazards are kept clear of the travel lane.

G. Milled Surface Restrictions

1. Non – Resurfacing Projects

Unless modified by the special conditions, a milled surface on any non-resurfacing project shall not be allowed to remain open for a period of time that exceeds thirty (**30)** calendar days.

2. Resurfacing Projects

A. Unless modified by the special conditions, a milled surface (excluding micro-mill) on an interstate or limited access highway resurfacing project shall be covered prior to opening to traffic.

B. Unless modified by the special conditions, a milled surface on any other resurfacing project not specified above shall not be allowed to remain open for a period of time that exceeds three **(3)** calendar days.

Failure to cover milled areas as specified above will result in liquidated damages to be assessed in accordance with Special Provision Section 150.7.01 Enforcement and Adjustments.

H. Construction Vehicles

The Contractor's vehicles shall travel in the direction of normal roadway traffic and shall not reverse direction except at intersections, interchanges, or approved temporary crossings. The Contractor may submit a plan requesting that construction traffic be allowed to travel in the opposite direction of normal traffic when it would be desirable to modify traffic patterns to accommodate specific construction activities.

Prior approval of the Engineer shall be obtained before any construction traffic is allowed to travel in a reverse direction. If the Contractor's submittal is approved, the construction traffic shall be separated from normal traffic by appropriate traffic control devices.

The parking of Contractor's and/or workers' personal vehicles within the work area or adjacent to traffic is prohibited. It shall be the responsibility of the WTCS to ensure that any vehicle present at the worksite is necessary for the completion of the Work.

I. Environmental Impacts

The Contractor shall ensure that dust, mud, and other debris from construction activities do not interfere with normal traffic operations or adjacent properties.

J. Existing Street Lights

Existing street lighting shall remain lighted as long as practical and until removal is approved by the Engineer.

K. Nighttime Work Lighting

Adequate temporary lighting shall be provided at all nighttime work sites where workers will be immediately adjacent to traffic.

L. Removal/Reinstallation of Miscellaneous Items

In the prosecution of the Work, if it becomes necessary to remove any existing signs, markers, guardrail, etc. not covered by specific pay item, they shall be removed, stored and reinstalled, when directed by the Engineer, to line and grade, and in the same condition as when removed.

150.3.02 Personnel – Worker Safety Apparel

In accordance with MUTCD (6D.03) (6C.04) all workers, within the right-of-way who are exposed either to traffic or to work vehicles and construction equipment within the TTC zone, shall wear high-visibility safety apparel that meets the Performance Class 2 or better.

150.3.03 Signage - General

A. Signing Requirements of the Temporary Traffic Control (TTC) Plan

When existing regulatory, warning or guide signs are required for proper traffic and pedestrian control, the Contractor shall maintain these signs in accordance with the TTC plan. The Contractor shall review the status of all existing signs, interim signs added to the Work, and permanent sign installations that are part of the work to eliminate any conflicting or non-applicable signage in the TTC Plan. The Contractor's review of all signs in the TTC Plan shall establish compliance with the requirements of the MUTCD and Section 150. Any conflicts shall be reported to the Engineer immediately and the WTCS shall take the necessary measures to eliminate the conflict.

The Contractor shall make every effort to eliminate the use of interim signs as soon as the Work allows for the installation of permanent signs.

All existing illuminated signs shall remain lighted and be maintained by the Contractor.

Existing street name signs shall be maintained at street intersections.

Refer to section 150.2.05.B. Sign Blanks and Panels for size and material requirements**.**

B. Conflicting or Non-Applicable Signs

Any sign(s) or portions of a sign(s) that are not applicable to the TTC plan shall be covered so as not to be visible to traffic or shall be removed from the roadway when not in use. The WTCS shall review all traffic shifts and changes in the traffic patterns to ensure that all conflicting signs have been removed. The review shall confirm that the highest priority signs have been installed and that signs of lesser significance are not interfering with the visibility of the high priority signs. High priority signs include signs for road closures, shifts, detours, lane closures and curves. Any signs, such as speed zones and speed limits, passing zones, littering fines and litter pick up, that reference activities that are not applicable due to the presence of the Work shall be removed, stored and reinstalled when the Work is completed.

Failure to promptly eliminate conflicting or non-applicable signs shall be considered as non-performance under Subsection 150.7.01.

C. Removal of Existing Signs and Supports

The Contractor shall not remove any existing signs and supports without prior approval from the Engineer. All existing signs and supports which are to be removed shall be stored and protected if this material will be required later in the Work as part of the TTC plan. If the signs are not to be utilized in the Work, then the signs will become the property of the Contractor unless otherwise specified in the Contract documents.

D. Interim Guide, Warning and Regulatory Signs

Interim guide, warning, or regulatory signs required to direct traffic and pedestrians shall be furnished, installed, reused, and maintained by the Contractor in accordance with the MUTCD, the Plans, Special Provisions, Special Conditions, or as directed by the Engineer. These signs shall remain the property of the Contractor. When the signs are used for long-term stationary operations as defined MUTCD (6G.02), the bottom of all interim signs shall be mounted seven feet (7') to eight feet (8') above the level of the pavement edge or sidewalk. The signs offset should be six feet (6') to twelve feet (12') from the pavement edge or two feet (≥ 2') minimum for sidewalks according to MUTCD (6F-1) (6G-1, 6H-1, and 6I-1). Special Conditions under Subsection 150.6 may modify this requirement.

Portable signs may be used when the duration of the Work is less than three (3) days or as allowed by the special conditions in Subsection 150.6. Portable interim signs shall be mounted a minimum of one foot (≤ 1') above the level of the pavement edge for directional traffic of two (2) lanes or less and at seven feet (7') for directional traffic

of three (3) or more lanes according to MUTCD (6F-2). Signs shall be mounted at the height recommended by the manufacturer's crashworthy testing requirements.

All sign blanks shall be rigid whether the sign is mounted as a portable sign, on a Type III barricade or as a permanent mount height sign. Utilities and their subcontractors working in the project limits, and not included in the project Contract, may use non-rigid signs.

E. Existing Special Guide Signs

Existing special guide signs on the Project shall be maintained until conditions require a change in location or legend content. When change is required, existing signs shall be modified and continued in use if the required modification can be made within existing sign borders using design requirements (legend, letter size, spacing, border, etc.) equal to that of the existing signs, or of Subsection 150.3.E.2. Differing legend designs shall not be mixed in the same sign.

1. Special Guide Signs

   Special guide signs are those expressway or freeway guide signs that are designed with message content (legend) that applies to a particular roadway location. When an existing special guide sign is in conflict with work to be performed, the Contractor shall remove the conflicting sign and reset it in a new, non-conflicting location which has been approved by the Engineer.

2. Interim Special Guide Signs

   When it is not possible to utilize existing signs, either in place or relocated, the Contractor shall furnish, erect, maintain, modify, relocate, and remove new interim special guide signs in accordance with the Plans or as directed by the Engineer. Interim special guide signs that may be required in addition to, or a replacement for, existing expressway and freeway (interstate) signs shall be designed and fabricated in compliance with the minimum requirements for guide signing contained in Chapter 2E "Guide Signs – Freeway and Expressway" of the MUTCD. All interstate shields on these signs shall be 48 inches and 60 inches for two-numeral and three-numeral routes, respectively.

   The road name of the exit or route shield shall be placed on the exit gore sign.

3. Interim Overhead Guide Sign Structures

   Interim overhead special guide sign structures are not required to be lighted unless specifically required by the Plans. If lighting is required, the sign shall be lighted as soon as erected and shall remain lighted, during the hours of darkness, until the interim sign is no longer required. The Contractor shall notify the Power Company at least thirty (30) days prior to desire connection to the power source.

4. Permanent Special Guide Signs

   The installation of new permanent special guide signs and the permanent modification or resetting of existing special guide signs, when included in the Contract, shall be accomplished as soon as practical to minimize the use of interim special guide signs. If lighting is required by the Plans, all new permanent overhead special guide signs shall be lighted as soon as erected.

F. Stop Sign Regulated Intersections

For intersections that utilize stop sign(s) to control the flow of traffic and to restrict the movement of vehicles, the stop sign(s) shall be maintained for the duration of the Work or until such time that the stop condition is eliminated or until an interim or permanent traffic signal can be installed to provide proper traffic control. The traffic signal shall be installed and properly functioning before the removal of the existing stop sign(s) is permitted. If the existing intersection is enhanced traffic control features, such as stop lines, double indicated stop signs, oversized signs, advanced warning stop ahead signs, rumble strips on the approaches or flashing beacons located overhead or on the shoulders then these features shall be maintained for the duration of the project or until the permanent traffic control plan has been implemented.

Whenever the staging of the Work requires that the traveled way be relocated or realigned the Contractor shall reinstall all enhanced traffic control features noted above on the newly constructed sections of the Work. The cost of relocating the stop lines, stop signs, advanced warning signs, the rumble strips and the flashing beacons shall be included in the price bid for Traffic Control - Lump Sum unless individual pay items are included in the Contract for rumble strips and/or flashing beacons. When pay items are included in the Contract for rumble strips or flashing beacons then these items will be paid per each.

When staging requires the relocation or realignment of an existing stop condition, it may be necessary to consider the addition of enhanced traffic control features even though none existed at the original location. Horizontal and vertical alignment changes at a new location may have decreased or restricted sight distance or the stop condition may occur sooner than in the previous alignment. If these conditions occur, then the Engineer and/or the WTCS should consider additional measures to enhance the motorist's awareness of the changes even though the staging plans may not address enhanced features. Stop signs should be a minimum of thirty-six (36") inches for interim situations. The use of forty-eight (48") inch stop signs may be warranted under project specific conditions. Flags may be used on interim/permanent stop signs that are mounted at seven (7') feet in height for a short duration in order to direct additional attention to a new or relocated stop sign(s). Flags should not be used for durations exceeding two weeks unless unusual or site-specific conditions warrant a longer period of time. The use of Type "A" flashing red light(s) attached to the stop sign(s) may be appropriate during the same period that the flags are in use to increase attention.

The use of rumble strips and/or PCMS may be considered. The use of new rumble strips, where none previously existed, shall have the prior approval of District Traffic Operations before being included as part of the temporary traffic control plan. The message(s) displayed on any PCMS shall have the prior approval of the Engineer and the message(s) shall be included as part of the TTC plan for the interim staging.

The placement of any additional interim ground mounted signs and posts or stop lines shall be considered as incidental to the price bid for Traffic Control - Lump Sum. The installation of rumble strips, flashing beacons or the use of Portable Changeable Message Signs (PCMS) shall be considered as Extra Work unless pay items are included in the Contract.

G. Low Shoulder Signage

1. Low Shoulder for Construction/Reconstruction/Resurfacing Projects

"Low Shoulder" (W8-9) signs shall be erected when a difference in elevation less than four (< 4') feet from the traveled way, exceeds one inch (> 1") but does not exceed three inches (≤3") between the travel lane and any type of shoulder. "Low Shoulder" (W8-9) signs shall be a minimum dimension of forty-eight inches by forty-eight inches (48"x48")

The spacing of the signs shall not exceed one (1) mile and the signs shall be placed immediately past each crossroad intersection. The "Low Shoulder" signs shall remain in place until the difference in elevation is eliminated and the shoulder has been dressed and permanently grassed for a minimum of thirty (30) calendar days. These signs shall be furnished, installed, maintained, and removed by the Contractor as part of Traffic Control-Lump Sum. These signs shall be fluorescent orange with black borders.

2. Shoulder Drop-Off for Construction/Reconstruction/Resurfacing Project

"Shoulder Drop-Off" (W8-17) signs shall be used when a difference in elevation, less than four feet (< 4') from the traveled way, exceeds three inches (> 3") and is not protected by positive barrier protection. These warning signs shall be placed in advance of the drop-off. "Shoulder Drop-Off" (W8-17) shall be a minimum dimension of forty-eight inches by forty-eight inches (48"x48")

The spacing of the signs shall not exceed one (1) mile and the signs shall be placed immediately past each crossroad intersection. The "Shoulder Drop-Off" signs shall remain in place until the difference in elevation is eliminated and the shoulder has been dressed and permanently grassed for a minimum of thirty (30) calendar days. These signs shall be furnished, installed, maintained, and removed by the Contractor as part of Traffic Control-Lump Sum. These signs shall be black borders on fluorescent orange background.

H. Bump Signage

A bump sign (W8-1) shall be utilized when a transverse joint in the pavement structure has a vertical difference in elevation of three quarters (≥ 3/4”) of an inch or greater in depth with no horizontal taper to ramp the traffic from one elevation to the other. This condition typically occurs at approach slabs during pavement milling operations and at transverse joints in asphaltic pavement lifts. Other conditions include utility and storm drainage repairs that require concrete placement for patching and/or steel plating. "Bump" sign (W8-1) shall be a minimum dimension of forty-eight inches by forty-eight inches (48"x48")

The W8-1 sign shall be placed sufficiently in advance to warn the motorist of the condition.

I. Sign Visibility

All existing, interim, and new permanent signs shall be installed to be completely visible and legible for an advance distance in compliance with the MUTCD. Any clearing required for maintaining the line of sight to existing, interim or permanent signs shall be done as part of the requirements of the TTC plan. The clearing shall include any advance warning signs, both interim and permanent, that are installed as a part of the Work including advance warning signs that are installed outside the limits of the project. Limbs, brush, construction equipment and materials shall be kept clear of the driver’s line of sight to all signs that are part of the TTC plan.

150.3.04 Advance Warning Signs

A. Project Signs - All Type of Highways

Advance warning signs shall be placed ahead of the work area in accordance with Part 6 of the MUTCD and unless noted below shall include a series of at least three advance road work (W20-1) signs placed at the termini of the project. The series shall have the legend ROAD WORK (1500 FEET, 1000 FEET, AND 500 FEET).

At grade intersecting roadways and on-ramps shall be signed with a minimum of one ROAD WORK AHEAD sign.

When work terminates at a “T” intersection, a minimum of one “ROAD WORK AHEAD” sign shall be placed in advance of the intersection and one “END ROAD WORK” sign shall be placed at the termination end of the intersection. Field conditions may require the use of additional warning signage.

1. State Routes

   Advanced Warning Signs on State Routes shall be a minimum dimension of forty-eight inches by forty-eight inches (48” x 48”). When a State Route intersects a project which consists of adding travel lanes, reconstructing an existing roadway or new location work, the State Route approaches shall have a minimum of three (W20-1) advanced warning signs (1500 ft., 1000 ft., 500 ft.). The termination end of an intersecting State Route shall have END ROAD WORK signage.

   The W20-1 signs shall be placed at the termini of the project or sufficiently in advance of the termini to allow for lane shifts, lane closures and other activities which may also require advanced warning signs. The advanced warning signs for the project should not overlap with the advanced warning signs for lane shifts, lane closures, etc.

   The length of a work zone should be held to the minimum length required to accomplish the Work. If a project has multiple individual worksites within the overall limits of the project, each site should be signed individually if the advance warning signs for each site can be installed without overlapping an adjacent worksite. As soon as the work is completed at any individual site, the warning signs shall be removed from that site. Clean-up work shall be performed with portable signage.

   Project mileage indicated on the G20-1 sign shall be the actual project mileage rounded up to the nearest whole mile. Projects less than two (< 2) miles in length or individual worksites that are part of a multiple worksite project may delete this sign. The G20-1 sign shall be forty-eight inches by twenty-four inches (48” x 24”) and the G20-2 sign shall be forty-eight inches by twenty-four inches (48” x 24”).

2. Interstate, Limited Access and Multilane Divided Highways

In addition to the W20-1 signs required at 500 ft., 1000 ft. and 1500 ft., multi-lane divided highways shall also have additional advanced warning signs installed with the legend "ROAD WORK (2 MILES, 1 MILE and 1/2 MILE). All construction warning signs on divided highways shall be double indicated (i.e., on the left and right sides of the roadway.) If the use of the half (½) mile, one (1) mile and two (2) mile advanced warning signs cause an overlap with other work or do not benefit field conditions then the Engineer may review the use of these signs and eliminate their installation. When the posted speed limit is fifty (≤ 50) mph or less, the one-half (½) mile, one (1) mile and two (2) mile signs should be eliminated especially in urban areas.

The W20-1 advance warning signs for ROAD WORK 500 FEET; 1000 FEET; and 1500 FEET shall be temporarily covered when work involving the advanced warning signs for lane shifts and lane closures overlap these signs. The ROAD WORK ½ MILE, ROAD WORK 1 MILE, and ROAD WORK 2 MILES shall be in place when the 500, 1000 and 1500 feet signs are temporarily covered.

When the Temporary Traffic Control zone already has advanced warning (W20-1) signs installed the W20-1 signs required for lane closures under Standard 9106 should be eliminated.

3. Ramp Work on Limited Access Highways

The work zone shall not be signed for the entire length of the mainline of a limited access highway when only short individual worksites, interchange or ramp work is being performed.

When work is restricted to ramp reconstruction or widening activities, the advance warning signs on the mainline section of the limited access highway shall be limited to the use of portable advance warning signs. These portable advance warning signs shall only be utilized when work activity is within the gore point of the ramp and the mainline traveled way or work is active in the acceleration/deceleration lane adjacent to the mainline traveled way. Portable advance warning signs (W20-1: 1500 ft. /1000 ft. /500 ft.) shall be installed on the traveled way of the limited access highway when the above conditions are present. The advance warning signs shall be installed only in one direction where work is active. All portable signs shall be double indicated. When work is not active, the ramp work shall be advanced warned by the use of a single forty-eight inches by forty-eight inches (48" x 48") "ROAD WORK AHEAD" (W20-1) with an "ON RAMP" plaque (W13-4p) sign along the right shoulder of the mainline traveled way prior to the beginning of the taper for the deceleration lane. Differences in elevation shall be in compliance with the requirements of Subsection 150.3.11 prior to the removal of the portable (W20-1) advanced warning signs from the mainline.

B. Highway Work Zone

In accordance with Georgia Code, O.C.G.A. § 40-6-188, all sections or segments of the roadway under construction or reconstruction shall be signed as a Highway Work Zone except non-state highway two-lane two-way resurfacing projects. Two conditions can be applied to a Highway Work Zone. Condition 1 is when no reduction in the existing speed limit is required. Condition 2 is when worksite conditions require a reduction of the speed limit through the designated Work Zone. Properly marking a Highway Work Zone shall include the following minimum requirements:

1. No Reduction in the Existing Posted Speed Limit in Highway Work Zone

a. Signage shall be posted at the beginning point of the Highway Work Zone warning the traveling public that increased penalties for speeding violations are in effect. The beginning point of Highway Work Zone is at the project limits, start of work zone, or at the start of the first taper. The HWZ-2 sign shall be placed a minimum of 600 feet in advance of the Highway Work Zone and shall not be placed more than 1000 feet in advance of the Work Zone. If no speed reduction is required, it is recommended that the HWZ-2 be placed at 750 feet from the work area between the ROAD WORK 500 FT. and the ROAD WORK 1000 FT. signs.

HWZ-2 signs shall be placed at intervals not to exceed one mile for the length of the project. HWZ-2 signs should be placed on the mainline after all major intersections except State Routes. State Routes shall be signed as per the requirements for intersecting roadways below.

b. The existing speed limit shall be posted at the beginning of the Work Zone. Existing Speed Limit signs (R2-1) shall be maintained.

c. Intersecting state routes shall be signed in advance of each intersection with the Work Zone with an HWZ-2 sign to warn motorists that increased fines are in effect. All other intersecting roadways that enter into a designated Highway Work Zone may be signed in advance of each intersection with the Work Zone. When construction equipment and personnel are present in the intersection on the mainline of a multi-lane roadway, the intersecting side roads shall be signed in advance with HWZ-2 signs. As soon as the work operation clears the intersection, the signage may be removed.

d. Sign HWZ-3 shall be posted at the end of the Highway Work Zone indicating the end of the zone and indicating that increased penalties for speeding violations are no longer in effect.

e. When a designated Highway Work Zone is no longer necessary, all signs shall be removed immediately.

2. Reducing the Speed Limit in a Highway Work Zone

Highway Work Zone signs shall be posted as required in Condition 1 above and in accordance with Detail 150-C.

A "Reduced Speed Ahead" sign shall be posted 600 feet prior to the reduced speed limit.

Then a "Speed Limit" signage (R2-1) for the reduced speed limit shall be erected at the beginning of the Work Zone. Additional signs shall be placed at whichever is least:

a. on non-interstate roads after every junction with a numbered (state or U.S.) route.

b. on interstates entrance ramp 1,500 feet from the end of the entrance taper. Detail 150-D

c. on non-interstate and interstate, a maximum spacing of no greater than one (1) mile apart.

On interstates and multi-lane divided highways, the speed limit signs shall be double indicated when the reduced speed is in use.

Additional signs may be necessary to adjust for actual field conditions.

For limited access (interstate) highways and controlled access multi-lane divided highways, the posted speed limit shall be reduced as required below.

When any one or more of the following conditions exist and the existing speed limit is sixty-five (65) mph or seventy (70) mph, the speed limit shall be reduced by ten (10) mph. If the existing speed limit is sixty (60) mph, the speed limit should be reduced by five (5) mph. If the existing speed limit is fifty-five (≤ 55) mph or less, the Contractor can only reduce the speed limit with the prior approval of the Engineer. The reduction in the speed limit shall be no greater than ten (10) mph:

a) Lane closure(s) of any type and any duration.
b) The difference in elevation exceeds two inches (> 2") adjacent to a travel lane as shown in Subsection 150.3.11, Detail 150-E, Detail 150-F.
c) Any areas where equipment or workers are within ten feet (10') of a travel lane.
d) Temporary portable concrete barriers located less than two feet (2') from the traveled way.
e) As directed by the Engineer for conditions distinctive to this project.

When the above conditions are not present, the speed limit shall be immediately returned to the existing posted speed limit. A speed reduction shall not be put in place for the entire length of the project unless conditions warranting the speed reduction are present for the entire project length. All existing speed limit signs within the temporary speed reduction zone shall be covered or removed while the temporary reduction in the speed limit is in effect. All signs shall be erected to comply with the minimum requirements of the MUTCD.

At a minimum, the following records shall be kept by the WTCS:

a) Identify the need for the reduction.
b) Record the time of the installation and removal of the temporary reduction.
c) Fully describe the location and limits of the reduced speed zone.
d) Document any accident that occurs during the time of the reduction.

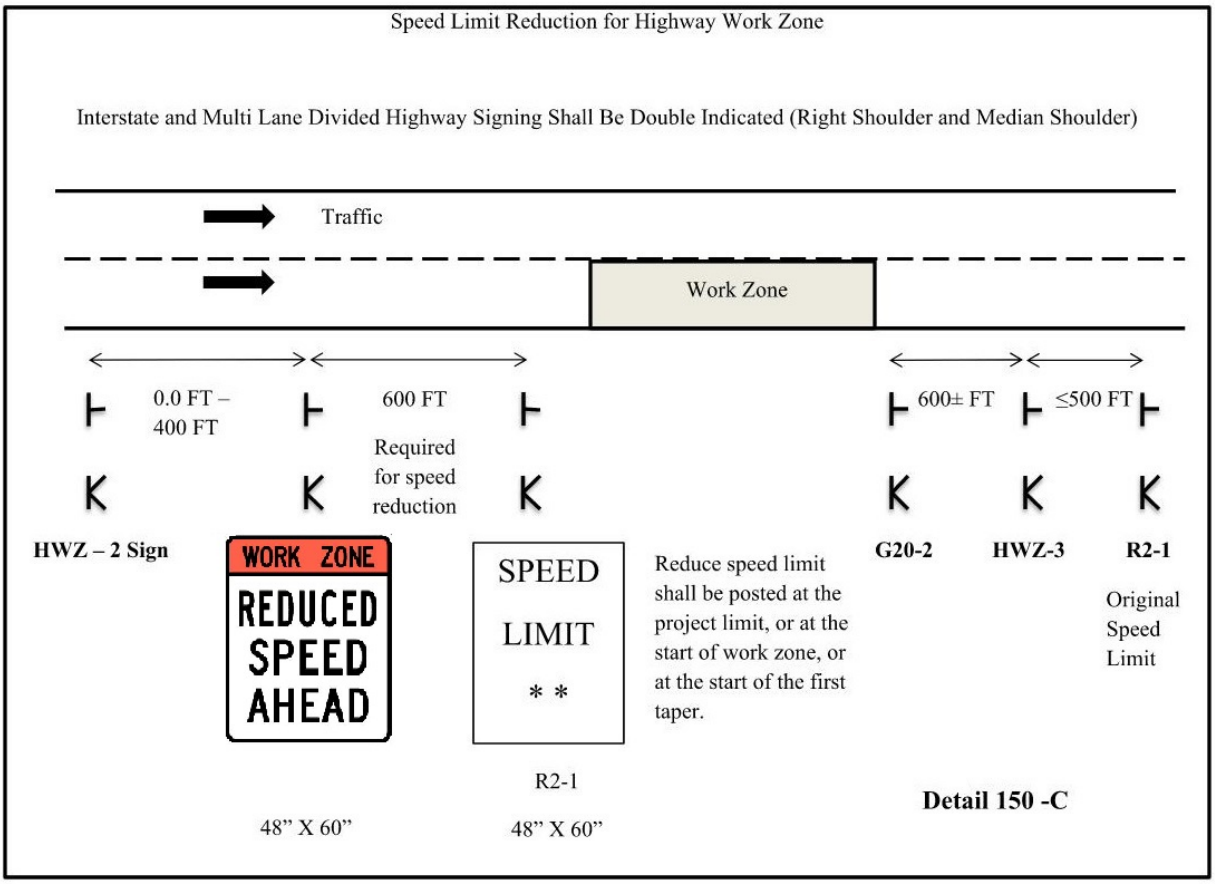
A copy of the weekly records for reduced speed zones shall be submitted to the Engineer.

When a pilot vehicle is used on a two-lane two-way roadway, the speed limit should not be reduced. For special conditions specific to the Work, on two-lane two-way roadways or multi-lane highways, the Contractor may reduce the posted speed limit with the prior approval of the Engineer.

3. Variable Speed Limit Zones

Projects that are within or extends into variable speed limit zones shall be posted according to condition 1 with HWZ-1, HWZ-2, and HWZ-3 signs. No additional "speed limit" signs, (R2-1), shall be posted. Any reduction or increase in speed limits will be controlled by the normal operation of the variable speed limit system.

Upon request, a maximum speed limit of fifty-five (55) mph may be set for the project limits.





HWZ-2;

3" Radius, 1" Border, 1" Indent, Black on Fluorescent orange;
"WORK ZONE", C 2K specified length;

3" Radius, 1" Border, 1" Indent, Black on White;
"SPEEDING", C 2K specified length; "FINES", C 2K specified length;
"INCREASED", C 2K specified length;

3" Radius, 1" Border, 1" Indent, Black on White;
"MINIMUM", D 2K specified length; "FINE $100", D 2K specified length;

HWZ-2

1. All HWZ-2 sign panels shall be rigid.
2. The size of the HWZ-2 sign shall not be reduced for use on two-lane roadways.



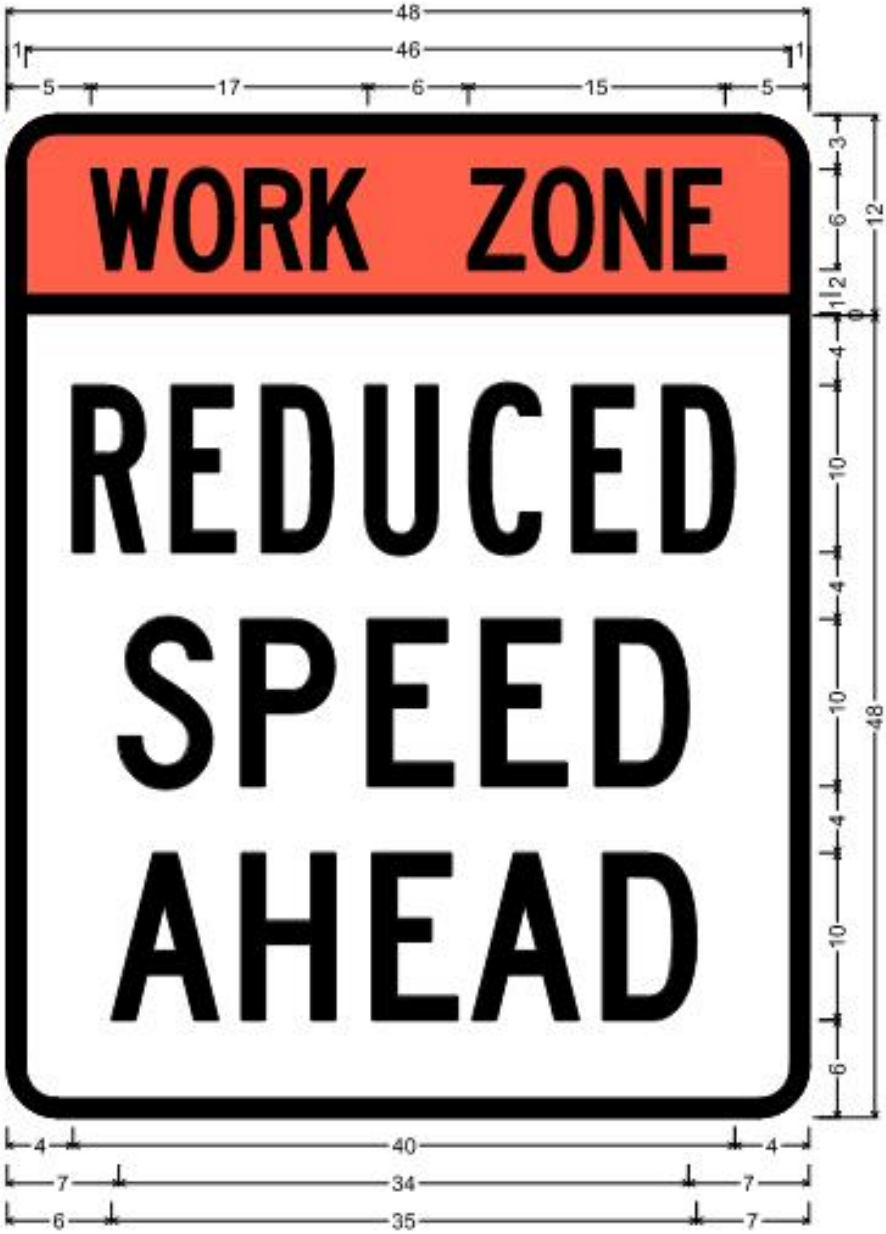
HWZ-3;

3" Radius, 1" Border, 1" Indent, Black on Fluorescent orange;
"WORK ZONE", C 2K specified length;

3" Radius, 1" Border, 1" Indent, Black on White;
"END", C 2K specified length; "INCREASED", C 2K specified length;
"SPEEDING", C 2K specified length; "FINES", C 2K specified length;

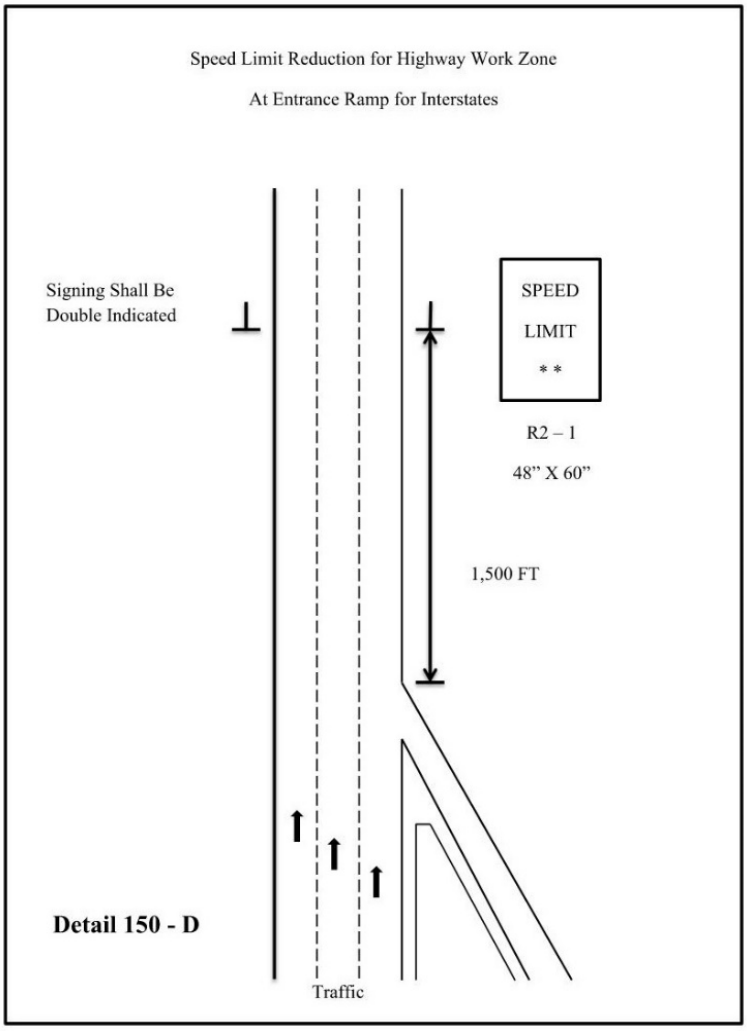
HWZ-3

1. All HWZ-3 sign panels shall be rigid.
2. The size of the HWZ-3 sign shall not be reduced for use on two-lane roadways.



3" Radius, 1" Border, Black on Fluorescent orange;
"WORK", C 2K 60% spacing; "ZONE", C 2K 60% spacing;

3" Radius, 1" Border, Black on White;
"REDUCED", B 2K; "SPEED", C 2K; "AHEAD", C 2K;



C. Installation/Removal of Work Area Signage

No payment will be made for Traffic Control-Lump Sum until the Work has actually started on the Project. The installation of traffic control signage does not qualify as the start of work. Advanced warning signs shall not be installed until the actual beginning of work activities. Any permanent mount height signs installed as the work is preparing to start shall be covered until all signs are installed unless all signs are installed within seven (≤ 7) calendar days after beginning installation.

All temporary traffic control devices shall be removed as soon as practical when these devices are no longer needed. When work is suspended for short periods of time, temporary traffic control devices that are no longer appropriate, shall be removed or covered.

All construction warning signs shall be removed within seven (≤ 7) calendar days after time charges are stopped or pay items are complete. If traffic control devices are left in place for more than ten (> 10) calendar days after completion of the Work, the Department shall have the right to remove such devices, claim possession thereof, and deduct the cost of such removal from any monies due, or which may become due, the Contractor.

CORRECTIVE LIST WORK: Portable signs shall be utilized to accomplish the completion of all corrective list items, if the corrective list is the only work being performed. The portable signs shall be removed daily. All permanent mount height signs shall be removed prior to the beginning of the corrective list only work, except "Low/Soft Shoulder" signs and any signs that have the prior written approval of the Engineer to remain in place while the corrective list work is in progress.

Failure to promptly remove the construction warning signs within the seven (7) calendar days after the completion of the Work or failure to remove or cover signs when work is suspended for short periods of time shall be considered as non-performance under Subsection 150.7.01.

150.3.05 Shoulder/Lane Closures

A. Approval/Restrictions

All shoulder closures and lane closures of any type or duration shall have the prior approval of the Engineer.

1. Closure Length

The length of a shoulder closure and a lane closure shall not exceed two (2) miles in length excluding the length of the tapers unless the prior approval of the Engineer has been obtained. The Engineer may extend the length of the closure based upon field conditions; however, the length of a work zone should be held to the minimum length required to accomplish the Work. Shoulder closure and Lane Closures shall not be spaced closer than one mile. The advanced warning signs for the Project should not overlap with the advanced warning signs for lane shifts, lane closures, etc.

2. Duration

The first (7) calendar days in an Urban area and the first three (3) calendar days in a Rural area of any lane closure shall be signed and marked as per Georgia Standard 9106 "Traffic Control Detail for Lane Closure on Multi-Lane Divided Highway" or Georgia Standard 9107 "Traffic Control Detail for Lane Closure on Multi-Lane Undivided Highway". However, lane closures that exist for a duration longer than three (> 3) calendar days may be signed and marked as per the details in Georgia Standard 9121 "Tapers, Signs, and Markings for Passing Lanes", provided the prior approval of the Engineer is obtained. The approved lane drop shall utilize a PCMS and only the signs and markings shown for the termination end of the lane drop in Georgia Standard 9121. All warning signs in the lane drop sequence shall be used. Drums may be substituted for the Type I Crystal Delineators at the same spacing.

B. Shoulder Closures

In accordance with MUTCD (6N.06), when paved shoulders, having a width of eight feet (≥ 8') or more are closed, at least one (1) advance warning sign shall be used. The sign(s) should read SHOULDER CLOSED (W21-5a). The signs are only posted on the side with the shoulder closure. Where the downstream end of the shoulder closure extends beyond the distance that can be perceived by road users, a supplementary plaque bearing the message NEXT XX FEET(W16-4P) or MILES (W7-3aP) should be placed below the SHOULDER CLOSED (W21-5a) sign. These signs shall be placed 500 feet prior to the shoulder closure. For multi-shoulder closures, the Shoulder Closed sign shall be repeated after two (2) miles at 500 feet prior to the next shoulder closure.

A shoulder closure will require a shoulder taper of (1/3) L (L=merging taper length). Traffic drums shall be used for the taper. Arrow boards are not required.

If positive barriers are used to close the shoulder, the taper and drums shall be in accordance with Standard 4960, Temporary Barrier (End Treatment Options). The approach end of the barrier taper should be 10:1 or flatter slope.

C. Lane Closure

1. Advance Warning Signs

The Advance Warning signs shall be in accordance with MUTCD and Georgia Standard 9106 "Traffic Control Detail for Lane Closure on Multi-Lane Divided Highway" and Georgia Standard 9107 "Traffic Control Detail for Lane Closure on Multi-Lane Undivided Highway".

When the Temporary Traffic Control zone already has advanced warning (W20-1) signs installed the W20-1 signs required for lane closures under Standard 9106 and 9107 should be eliminated.

For Interstate, Limited Access and Multi-lane Divided Highways, an additional PCMS shall be placed one (1) mile in advance of a lane closure with a message denoting the appropriate lane closure one (1) mile ahead. No other message shall be displayed on this PCMS. The PCMS shall be placed on the outside shoulder in accordance with Detail 150-B [PCMS]. This is in addition to the other traffic control devices required by Standard 9106.

At the discretion of the Engineer, the Contractor may start placing advance warning signs a half-hour (1/2 hr.) prior to the lane closure.

2. Transition Area – Taper

Drums shall be used on all transition tapers. If traffic drums with retroreflectivity of less than type VI are used for a merge taper that exists into the night, all drums located in the taper shall have, for the length of the taper only, a six inch (6") fluorescent orange (ASTM Type VI, VII, VIII, IX or X) reflectorized top stripe on each drum. The top six inch (6") stripe may be temporarily attached to the drum while in use in a taper. The Engineer may allow the fluorescent orange reflectorized six inch (6") top stripe on each drum in a merging taper to remain in place during daylight hours provided there is a lane closure(s) with a continuous operation that begins during one nighttime period and ends during another nighttime period. All drums that have the six inch (6") top stripe permanently attached shall not be used for any other conditions.

In accordance with MUTCD (6B.08), the minimum length for a merging taper for a lane closure on the travel way shall be as shown in Table 150-1:

TABLE 150-1

Posted Speed Limit, MPH	Lane Width 9 Feet	Lane Width 10 Feet	Lane Width 11 Feet	Lane Width 12 Feet	Maximum Drum Spacing in Tapers, (Feet)
	Minimum Taper Length (L) in Feet				
20	60	70	75	80	20
25	95	105	115	125	25
30	135	150	165	180	30
35	185	205	225	245	35
40	240	270	295	320	40
45	405	450	495	540	45
50	450	500	550	600	50
55	495	550	605	660	55
60	540	600	660	720	60
65	585	650	715	780	65
70	630	700	770	840	70
75	675	750	825	900	75

If site conditions require a longer taper, then the taper shall be lengthened to fit particular individual situations.

The length of shifting tapers should be at least one-half (1/2) L.

Multiple Lane Closures:

a. A maximum of one (1) lane at a time shall be closed with each merging taper.

b. A minimum tangent length of two (≥ 2) L shall be installed between each individual lane closure taper. The tangent length is part of the transition area. Therefore, only traffic drums can be used in the tangent.

3. Activity Area

The activity area consists of a buffer and the work space. Georgia Standard 9106 "Traffic Control Detail for Lane Closure on Multi-Lane Divided Highway" states "Buffer zones of 300' minimum, 500' desirable are required for tangent sections and shall be increased for horizontal or vertical curves due to sight distance considerations"

Georgia Standard 9107 "Traffic Control Detail for Lane Closure on Multi-Lane Undivided Highway" requires a fifty feet (50') buffer. The buffer shall be increased for horizontal or vertical curves due to sight distance considerations"

The channelization devices are spaced at a maximum of eighty feet (80').

4. Termination Area

Georgia Standard 9106 "Traffic Control Detail for Lane Closure on Multi-Lane Divided Highway" requires a 150 feet buffer and a minimum 200 feet downstream taper.

Georgia Standard 9107 "Traffic Control Detail for Lane Closure on Multi-Lane Undivided Highway" requires 150 feet downstream taper.

D. Removal of Lane Closures

To provide the greatest possible convenience to the public in accordance with Section 107, the Contractor shall remove all signs, lane closure markings, and devices immediately when lane closure work is completed or temporarily suspended for any length of time or as directed by the Engineer. All portable signs and portable sign mounting devices shall be removed from the roadway to an area which will not allow the sign to be visible and will not allow the sign or sign mounting device to be impacted by traffic. All devices shall be stored beyond the clear zone or behind positive protection.

E. Exit and Entrance Ramps

On multi-lane highways, where traffic has been shifted to the inside lanes, the exit and entrance ramps shall have drums placed on both sides of the ramp. This requirement will apply to any situation where traffic is shifted to contra flows or inside staging lanes to facilitate reconstruction work in the vicinity of exit and entrance ramps. The temporary ramp taper length should be greater than, or equal to, the existing taper length. Interim EXIT gore signs shall be placed at the ramp divergence. The "EXIT OPEN" sign shown in Figure TA-42 of the MUTCD shall be utilized. For exit ramps, drums spacing shall be decreased to ten feet (10') for 200 feet in advance of the temporary gore and be decreased to ten feet (10') for the first 100 feet of the temporary gore, and throughout the exit ramp. For on-ramps, drums should be used 200 feet prior to the ramp and end 100 feet past the merge taper. The drum spacing for the on ramp may be decreased but should not obstruct the view of the drivers i.e. for the ramp vehicles.

150.3.06 Traffic Pacing Method

A. Pacing of Traffic

With prior approval from the Engineer, traffic may be paced allowing the Contractor up to twenty (20) minutes maximum to work in or above all lanes of traffic for the following purposes:

1. Placing bridge members or other bridge work.

2. Placing overhead sign structures.

3. Other work items requiring interruption of traffic.

The Contractor shall provide a uniformed law enforcement officer with patrol vehicle and blue flashing light for each direction of pacing. The law enforcement officer, Engineer, and flaggers at ramps shall be provided with a radio which will provide continuous contact with the Contractor.

When ready to start the work activity, the law enforcement vehicle will act as a pilot vehicle slowing the traffic, thereby providing a gap in traffic allowing the Contractor to perform the Work. Any on-ramps between the pace and the work area shall be blocked during pacing of traffic, with a flagger properly dressed and equipped with a Stop/Slow paddle. Each ramp should be opened after the law enforcement vehicle has passed.

Pilot vehicles shall travel at a safe pace speed. The Contractor shall provide a vehicle to proceed in front of the law enforcement vehicle and behind the other traffic in order to inform the Contractor's work force when all vehicles have cleared the area.

Traffic should not be permitted to stop during pacing unless approved by the Engineer.

B. Methods of Signing for Traffic Pacing

At a point not less than 1,000 feet in advance of the beginning point of the pace, the Contractor shall place a PCMS sign with the message "TRAFFIC SLOWED AHEAD EXPECT SHORT DELAY".

150.3.07 Flagging Operations

A. Flaggers

Flaggers shall be provided as required to handle traffic, as specified in the Plans or Special Provisions, and as required by the Engineer.

B. Flagger Certification

All flaggers shall meet the requirements of the MUTCD and shall have received training and a certificate upon completion of the training from one of the following organizations:

National Safety Council
American Traffic Safety Services Association (ATSSA)

On-line classes are not accepted.

Failure to provide certified flaggers as required above shall be reason for the Engineer suspending work involving the flagger(s) until the Contractor provides the certified flagger(s). Flaggers shall have proof of certification and valid identification (photo I.D.) available any time they are performing flagger duties.

C. Flagger Appearance and Equipment

Flaggers shall wear Performance Class 2 or better for daytime activities. Flaggers shall wear Performance Class 3 or better high-visibility clothing for nighttime activities. Flagger stations shall be illuminated at night according to MUTCD (6M.08). They shall use a Stop/Slow paddle meeting the requirements of the MUTCD (6D.02) for controlling traffic. The Stop/Slow paddles shall have a shaft length of seven feet (≥ 7') minimum. The Stop/Slow paddle shall be retroreflectorized for both day and night usage. In addition to the Stop/Slow paddle, a flagger may use a flag as an additional device to attract attention. This flag shall meet the minimum requirements of the MUTCD (6D.02). The flag shall, as a minimum, be twenty-four inches (≥ 24") square and red or red/orange in color.

D. Flagger Warning Signs

Signs for flagger traffic control shall be placed in advance of the flagging operation, in accordance with the MUTCD and Georgia Standard 9102 "Traffic Control Detail for Lane Closure on Two-Lane Highway". In addition, signs at regular intervals, warning of the presence of the flagger shall be placed beyond the point where traffic can reasonably be expected to stop under the most severe conditions for that day's work.

E. Pilot Vehicle Requirements

Pilot vehicles should be required during placement of bituminous surface treatment or asphaltic concrete on two-lane roadways unless otherwise specified. Pilot vehicles shall meet the requirements of the MUTCD (6E.04).

F. Automated Flagger Assistance Devices

The Contractor may request, in writing, the use of Automated Flagger Assistance Devices (AFAD). The equipment shall meet the requirements of MUTCD (6L.02). As a part of this request, the Contractor shall also submit an alternate temporary traffic TTC plan in the event of a failure of the AFAD. Any alternate plan that requires the use of flaggers shall include the use of certified flaggers. The Contractor shall obtain the approval of the Engineer before the use of any AFAD will be permitted.

G. Portable Temporary Traffic Control Signals

The Contractor may request, in writing, the substitution of portable temporary traffic control signals for flaggers on two-lane two-way roadways provided the temporary signals meets the requirements of the MUTCD, Section 647, and subsection 150.2.11. As a part of this request, the Contractor shall also submit an alternate TTC plan in the event of a failure of the signals. Any alternate plan that requires the use of flaggers shall include the use of certified flaggers. The Contractor shall obtain the approval of the Engineer before the use of any portable temporary traffic control signals will be permitted.

150.3.08 Traffic Signals

A. Responsibility/Cost

If the sequence of operations, staging, or the TTC plan requires the relocation or shifting of any components of an existing traffic signal system then any work on these traffic signals will be considered as part of Traffic Control – Lump Sum.

B. Law Enforcement Officer Requirement

In accordance with Georgia law § 40-6-20, law enforcement officers shall be used to regulate and maintain traffic control at functioning signalized intersections when lane closures or traffic shifts block or restrict movements causing interference with road user flows and will not allow the activated traffic signal to guide the traffic through the signal site.

150.3.09 Mobile Operations

A mobile operation is defined by a minimum speed of three (3) mph. When pavement markings (centerlines, lane lines, and edge lines) are applied in a continuous operation by moving vehicles and equipment, the following minimum equipment and warning devices shall be required. These devices and equipment are in addition to the minimum requirements of the MUTCD.

All vehicles shall be equipped with the official slow moving vehicle symbol sign. All vehicles shall have a minimum of two (2) flashing or rotating beacons visible in all directions. All protection vehicles shall have an arrow panel mounted on the rear. All vehicles requiring an arrow panel shall have, as a minimum, a Type B panel. All vehicle mounted signs shall be mounted with the bottom of the sign a minimum height of forty-eight inches (48”) above the pavement. All sign legends shall be covered or removed from view when work is not in progress.

The lead vehicle may be a separate vehicle or the work vehicle applying the pavement markings may be used as the lead vehicle. The lead vehicle shall have an arrow panel mounted so that the panel is easily visible to oncoming (approaching) traffic. The arrow panel should operate in the caution mode.

The work vehicle(s) applying markings shall have an arrow panel mounted on the rear. The arrow panel should typically operate in the caution mode. The work vehicle placing cones shall follow directly behind the work vehicle applying the markings.

A protection vehicle shall follow the last work vehicle at all times and shall be equipped with a truck or trailer mounted attenuator that shall be certified for impacts not less than sixty-two (62) mph in accordance with MASH/NCHRP350 Test Level Three (3).

150.3.10 Pavement Markings

A. General

Full pattern pavement markings in conformance with Chapter 3A and 3B, except 3B.0 3, of the MUTCD are required on all courses before the roadway is opened to traffic, unless noted in this section. No passing zones shall be marked to conform to Subsection 150.3.10.D.1.b.. During construction and maintenance activities on all highways open to traffic, both existing markings and markings applied under this Section shall be fully maintained until Final Acceptance. If the pavement markings are, or become, unsatisfactory in the judgment of the Engineer due to wear, weathering, or construction activities, they shall be restored immediately.

Markings on the final surface course, which must be removed, shall be a removable type. The Contractor will be permitted to use paint, thermoplastic, or tape on pavement which is to be overlaid as part of the Project, unless otherwise directed by the Engineer. Partial (skip) reflectorization (i.e. reflectorizing only a portion of a stripe) will not be allowed.

1. Resurfacing Projects

   Pavement markings shall be provided on all surfaces that are placed over existing markings. Interim and final markings shall conform in type and location to the markings that existed prior to resurfacing unless changes or additions are noted in the Contract. The replacement of parking spaces will not be required unless a specific item or note has been included in the Contract. Any work to make additions to the markings that existed prior to resurfacing is to be considered as extra work.

2. Widening and Reconstruction Projects

   If the lane configuration is altered from the preconstruction layout then pavement markings will be as required by the Plans or the Engineer.

3. New Location Construction Projects

   Pavement marking plans will be provided.

B. Installation and Removal of Pavement Markings

1. Installation

   All pavement markings, both interim and permanent, shall be applied to a clean surface. The Contractor shall furnish the layout and preline the roadway surface for the placement of pavement markings applied as part of the TTC plan. All interim marking tape and RPM's on the final surface shall be removed prior to the placement of the final markings.

   The Contractor shall sequence the Work in such a manner as to allow the installation of markings in the final lane configuration at the earliest possible stage of the Work.

2. Removal

   Markings no longer applicable shall be removed in accordance with Section 656.
   The elimination of conflicting pavement markings by overpainting with unapproved paint or any type of liquid asphalt is not acceptable.

3. Intermediate Surface

   Interim markings shall be removed by methods that will cause minimal damage to the pavement surface, while also ensuring that traveling public will not be confused or misdirected by any residual markings remaining on the intermediate surface. The use of approved black-out tape and black-out paint (manufactured for the sole purpose of covering existing pavement markings) may be permitted on some interim surfaces, provided the results are satisfactory to the Engineer.

4. Final Surface

   No interim paint or thermoplastic markings will be permitted on any final surface unless the interim markings are in alignment with the location of the permanent markings and the interim marking will not interfere or

adversely affect placement of the permanent markings. The proposed method of removal for layout errors that require markings to be removed from the final surface shall have the prior approval of the Engineer. Any damage to the final pavement surface caused by the pavement marking removal process shall be repaired at the Contractor's expense by methods acceptable and approved by the Engineer. Section 400 shall apply when corrective measures are required. The use of black-out tape or black-out paint will not be permitted under any circumstance to correct layout errors on any final surface.

Traffic shifts that are done on the final surface shall be accomplished using interim traffic marking tape that can be removed without any blemishing of the final surface. Interim traffic marking tape shall be used on any of the following final surfaces: asphaltic concrete, Portland cement concrete, and bridge deck surfaces. The Contractor may propose alternate traffic markings and removal methods on the final surface. Submitted proposals shall include the type of material, method of removal and a cost comparison to the traffic marking tape method. Prior to any approval, the Contractor shall field demonstrate to the satisfaction of the Engineer that the proposed traffic markings can be removed without any blemishing of the final surface. If the proposal is determined to be acceptable, a supplemental agreement will be executed prior to the installation of the proposed alternate traffic markings. The supplemental agreement shall denote the type of traffic marking materials, method of removal and any cost and/or time savings to the Department. The Department will not consider or participate in any cost increase that may result from implementing the proposed alternate method.

5. Pay Factor Reduction for Asphaltic Concrete Final Surfaces

When the correction of an error in the layout of the final pavement markings requires the final surface to be grounded, blemished, scarred, or polished the pay factor shall be reduced to 0.95 for the entire surface area of the final topping that has a blemish, polished or a scarred surface. The reduced pay factor shall not be confined to only the width and length of the stripe or the dimensions of the blemished areas, the whole roadway surface shall have the reduced pay factor applied. The area of the reduced pay factor shall be determined by the total length and the total width of the roadway affected. If the affected area is not corrected, the reduction in pay shall be deducted from the final payment for the topping layer of asphaltic concrete. The Engineer shall make the final determination whether correction or a reduced pay factor is acceptable.

The eradication of pavement markings on intermediate and final concrete surfaces shall be accomplished by a method that does not grind, polish, or blemish the surface of the concrete. The method used for the removal of the interim markings shall not spall chip the joints in the concrete and shall not damage the sealant in the joints. Any joint or sealant repairs shall be included in the bid price for Traffic Control-Lump Sum. The proposed method of removal shall have the prior approval of the Engineer.

Failure to promptly remove conflicting or non-applicable pavement markings shall be considered as non-performance under Subsection 150.7.01.

6. Preparation and Planning for Traffic Shifts

When shifting of traffic necessitates removal of centerline, lane lines, or edge lines, all such lines shall be removed prior to, during, or immediately after any change to present the least interference with traffic. Interim traffic marking tape shall be used as a temporary substitute for the traffic markings being removed.

Before any change in traffic lane(s) alignment, marking removal equipment shall be present on the project for immediate use. If marking removal equipment failures occur, the equipment shall be repaired or replaced (including leasing equipment if necessary), so that the removal can be accomplished without delay.

Except for the final surface, markings on asphaltic concrete may be obliterated by an overlay course, when approved by the Engineer. When an asphaltic concrete overlay is placed for the sole purpose of eliminating conflicting markings and the in place asphaltic concrete section will allow, said overlay will be eligible for payment only if designated in the Plans. Overlays to obliterate lines will be paid for only once and further traffic shifts in the same area shall be accomplished with removable markings. Only the minimum asphaltic concrete thickness required to cover lines will be allowed. Excessive build-up will not be permitted. When an overlay for the sole purpose of eliminating conflicting markings is not allowed, the markings no longer applicable shall be removed in accordance with Section 656.

C. Raised Pavement Markers

Retroreflective raised pavement markers (RPMs) shall be placed as listed below for all asphaltic concrete pavements before the roadway is open to traffic, unless noted this section. On the final surface, RPMs shall be placed according to the timeframes specified in Subsection 150.3.10.D for full pattern pavement markings. When Portland Cement Concrete is an intermediate or final surface and is open to traffic, one (1) calendar day is allowed for cleaning and drying before the installation of RPMs is required.

Raised pavement markers are not allowed on the right edge lines under any situation.

Retroreflective raised pavement markers (RPMs) shall be placed and/or maintained on intermediate pavements surfaces on all highways that the final ride surface is not completed within 45 calendar days which is open to traffic. This includes all resurfacing projects along with widening and reconstruction projects. The RPMs shall be placed as follows:

1. Supplementing Lane Lines:
    a. Eighty foot (80') center on skip lines with curvature less than three degrees. (Includes tangents)
    b. Forty foot (40') centers on solid lines and all lines with curvature between three degrees and six degrees.
    c. Twenty foot (20') centers on curves over six degrees.
    d. Twenty foot (20') centers on lane transitions or shifts.
2. Supplementing Ramp Gore Lines:
    a. Twenty foot (20') centers, two each, placed side by side.
3. Other Lines:
    a. As shown on the Plans or directed by the Engineer.

D. Exceptions for Interim Markings

Some exceptions to the time of placement and pattern of markings are permitted as noted below; however, full pattern pavement markings are required for the completed project.

1. Two-Lane, Two-Way Roadways
    a. Skip Lines

        If used, interim temporary tape or paint skip (broken) stripe may only be used for a maximum of three (3) calendar days. The stripes shall be at least two feet (> 2') long with a maximum gap of thirty-eight feet (≤ 38'). On curves greater than six degrees (>6º), a one foot (1') stripe with a maximum gap of nineteen feet (≤ 19') shall be used. In lane shift areas, solid lines will be required.

        Interim raised pavement markers may be substituted for the interim skip (broken) stripes. If raised pavement markers are substituted for the two foot (2') interim skip stripe, three (3) markers spaced at equal intervals over a two feet (2') distance will be required. No separate payment will be made if the interim raised pavement markers are substituted for interim skip lines.

        Interim raised pavement markers shall be retro-reflective, shall be the same color as the pavement markers for which they are substituted, and shall be visible during daytime.

        The type of interim marker and method of attachment to the pavement shall be approved by the Office of Materials and Testing but in no case will the markers be attached by the use of nails. Flexible reflective markers, Type 14 or Type 15, may be used for a maximum of three (3) calendar days as an interim marker. Any flexible reflective markers in use shall be from the QPL-76.

The interim raised pavement markers shall be maintained until the full pattern pavement markings are applied. At the time full pattern markings are applied the interim raised markers shall be removed in a manner that will not interfere with application of the full pattern pavement markings.

b. No Passing Zones Two-Lane, Two-Way Roadways

Passing zones shall be re-established in the locations existing prior to resurfacing unless otherwise noted in the Contract. No changes to the location of passing zones shall be done without the written approval of the Engineer. For periods not to exceed three (3) calendar days where interim skip centerlines are in place, no-passing zones shall be identified by using post or portable mounted DO NOT PASS regulatory signs (R4-1) twenty-four inches by thirty inches (24" x 30") at the beginning and at intervals not to exceed one-half (≤½) mile within each no-passing zone. A post or portable mounted PASS WITH CARE regulatory sign (R4-2) twenty-four inches by thirty inches (24" x 30") shall be placed at the end of each no-passing zone. Post mounted signs shall be placed in accordance with the MUTCD. Portable signs shall be secured in such a manner to prevent misalignment and minimize the possibility of being blown over by weather conditions or traffic.

On new location projects and on projects where either horizontal or vertical alignments has been modified; the location of No-Passing Zones will be identified by the Engineer.

c. Edge lines

- Bituminous Surface Treatment Paving
  Edge lines will not be required on intermediate surfaces (including asphaltic concrete leveling for bituminous surface treatment paving) that are in use for a period of less than sixty (<60) calendar days except at bridge approaches, on lane transitions, lane shifts, and in such other areas as determined by the Engineer. On the final surface, edge lines shall be placed within thirty (≤30) calendar days of the time that the final surface was placed.

- All Other Types of Pavement
  Edge lines will not be required on intermediate surfaces that are in use for a period of less than thirty (<30) calendar days except at bridge approaches, on lane transitions, lane shifts, and in such other areas as determined by the Engineer. On the final surface, edge lines shall be placed within fourteen (≤ 14) calendar days of the time that the surface was placed.

2. Multi-Lane Highways – With No Paved Shoulder(s) or Paved Shoulder(s) Four Feet or Less (≤ 4')

a. Undivided Highways (Includes Paved Center Turn Lane)

- Centerlines and No-Passing Barrier-Full Pattern centerlines and no-passing barriers shall be restored before opening to traffic.

- Lane lines- Interim skip (broken) stripe as described in Subsection 150.3.10.D.1.a. may be used for periods not to exceed three (≤ 3) calendar days. Skip lines are not permitted in lane shift areas. Solid lines shall be used.

- Edge lines- Edge lines shall be placed on intermediate and final surfaces within three (3) calendar days of obliteration.

b. Divided Highways (Grass or Raised Median)

- Lane lines- Full pattern skip stripe shall be restored before opening to traffic. Skip lines are not permitted in lane shift areas. Solid lines shall be required.

- Centerline/Edge line- Solid lines shall be placed on intermediate and final surfaces within three calendar days of obliteration.

3. Limited Access Roadways and Roadways with Paved Shoulders Greater Than Four Feet (> 4')

   a. Same as Subsection 150.3.10.D.2 except as noted in (b) below.

   b. Edge lines-

      - Asphaltic Concrete Pavement- Edge lines shall be placed on intermediate and final surfaces prior to opening to traffic.

      - Portland Cement Concrete Pavement- Edge lines shall be placed on any surface open to traffic no later than one calendar day after work is completed on a section of roadway. All water and residue shall be removed prior to daily striping.

4. Ramps for Multi-Lane Divided Highways

   A minimum of one solid line edge stripe shall be placed on any intermediate surface of a ramp prior to opening the ramp to traffic. The other edge stripe may be omitted for a maximum period of three (3) calendar days on an intermediate surface. Appropriate channelization devices shall be spaced at a maximum of twenty-five feet (25') intervals until the other stripe has been installed.

   The final surface shall have both stripes placed prior to opening the ramp to traffic.

5. Miscellaneous Pavement Markings

   a. Final Surface

      School zones, railroads, symbols, words, arrows, and other similar markings shall be placed on final surfaces conforming to Section 652 within fourteen (14) calendar days of completion of the final surface. Final markings shall conform to the type of pay item in the Plans. When no pay item exists in the Plans the final markings shall conform to Section 652 for painted markings.

   b. Intermediate Surface

      Intermediate surfaces that will be in use for more than forty-five (45) calendar days shall have the miscellaneous pavement markings installed to conform to the requirement of Section 652. Under Subsection 150.6, Special Conditions, or as directed by the Engineer these markings may be eliminated.

   c. Stop Line

      All stop signs and traffic signals shall have temporary twelve inch (12") stop lines placed in accordance with MUTCD (3B. 19) on all surfaces prior to opening to traffic. Temporary tape may be used.

150.3.11 Differences in Elevations Between Travel Lanes and Shoulders

All time frames and requirements may be changed with the Engineer's approval.

A. Differences in Elevations

Difference in elevations due to construction between travel lanes and/or shoulders within the clear zone should be limited to the following:

1. Difference of two inches (≤ 2") or less between adjacent travel lanes should remain for a maximum period of fourteen (14) calendar days.

2. Difference of two inches (≤ 2") or less between adjacent travel lane and paved shoulder should remain for a maximum of thirty (30) calendar days. Traffic control devices shall be in accordance with Detail 150-G.

3. Difference of greater than two inches (> 2") is permitted for continuous operations. Traffic control devices shall be in accordance with Detail 150-E.

4. Difference of greater than two inches (> 2") between travel lanes and/or shoulders for non-continuous operations will not be allowed for more than a twenty-four (24) hour period. For the first twenty-four (24) hours, traffic control shall be in accordance with Detail 150-E. After twenty-four (24) hours the section should be healed according to Detail 150 – H. This condition can exist for a maximum sixty (60) calendar days.

   a. A single length of area that does not exceed 1000 feet total length may be left open as a startup area for periods not to exceed forty-eight (48) hours provided the Contractor can demonstrate the ability to complete the Work in a proficient manner. Prior approval of the Engineer shall be obtained before any startup area may be allowed.

   b. For cement stabilized base, work adjacent to the travel lane and/or shoulders shall be healed as per Detail 150-H within forty-eight (48) hours after the seven (7) calendar day curing period is complete for each section placed. During the placement and curing period, traffic control shall be in accordance Detail 150 E.

Failure to meet these requirements shall be considered as non-performance of Work under Subsection 150.7.01.

B. Healed Section

Healed section and traffic control devices should be placed in accordance with Detail 150-H. If crushed stone materials are used to provide a healed section no separate payment will be made for the material used to heal any section. The Contractor may submit a plan to utilize existing pay items for crushed stone provided the plan clearly demonstrates that the materials used to heal an area will be incorporated into the Work with minimal waste. Handling and hauling of any crushed stone used to heal shall be kept to a minimum. The Engineer shall determine if the crushed stone used to heal meets the Specifications for gradation and quality when the material is placed in the final location.

C. Emergency Situations

Inclement weather, traffic accidents, and other events beyond the control of the Contractor may prevent the Work from being completed as required above. The Contractor shall notify the Engineer in writing stating the conditions and reasons that have prevented the Contractor from complying with the time limitations. The Contractor shall also outline a plan detailing immediate steps to complete the Work. Failure to correct these conditions on the first calendar day that conditions will allow corrective work shall be considered as non-performance of Work under Subsection 150.7.01.

D. Plating

Plating for drainage structures, utility facilities, etc. is prohibited on the interstates. Plating on State Routes and secondary roads will require the prior approval of the project Engineer. Steel plates shall not be used on highways with a posted speed greater than forty-five (45) mph. The plate shall completely cover the pavement cut or excavation. The plate shall be adequately secured and shall provide a safe and reasonable transition to the adjoining roadway surface. An asphalt wedge can be used to provide a smooth transition over the plate(s). Temporary traffic control warning signs W8-24 shall be posted in advance warning motorist about plates in roadway in accordance with the MUTCD. Plating should not remain in place for more than four (4) calendar days.

E. Asphaltic Concrete Resurfacing Projects

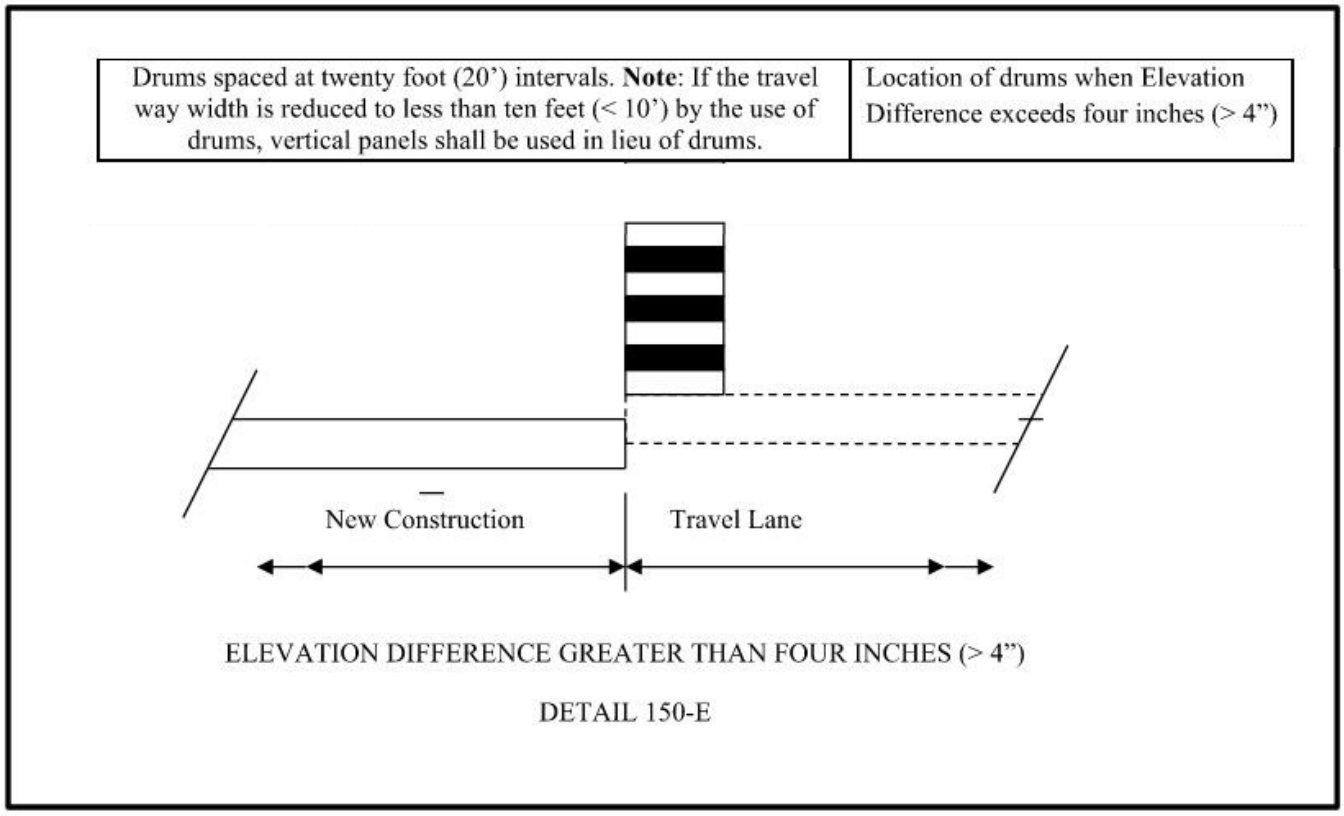
1. Shoulder Construction Included as a Part of the Contract

When the placement of asphaltic concrete materials creates a difference in elevation greater than two inches (> 2") between the earth shoulder (grassed or un-grassed) and the edge of travel lane or between the earth shoulder and a paved shoulder that is less than four feet (< 4') in width, the Contractor shall place and maintain drums in accordance with the requirements of Subsection 150.2.04.B.3. When the edge of the paved surface is tapered with a safety edge, drums may be spaced at two (2) times the speed limit in MPH. Drums shall remain in place

and be maintained until the difference in elevation has been eliminated by the placement of the appropriate shoulder materials.

2. Shoulder Construction Not Included as a Part of the Contract

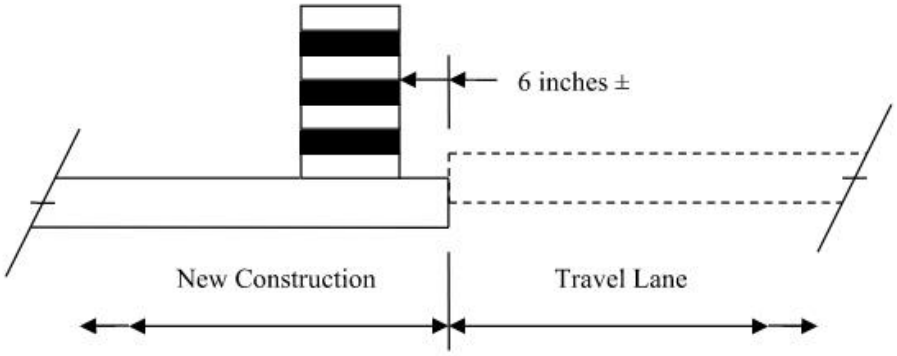
When the placement of asphaltic concrete materials creates a difference in elevation greater than two inches (> 2") between the earth shoulder (grassed or un-grassed) and the edge of travel lane or between the earth shoulder and a paved shoulder that is less than four feet (< 4') in width, the Contractor shall notify the Engineer, in writing, when the resurfacing work including all corrective list items has been completed.



ELEVATION DIFFERENCE GREATER THAN FOUR INCHES (> 4")

DETAIL 150-E

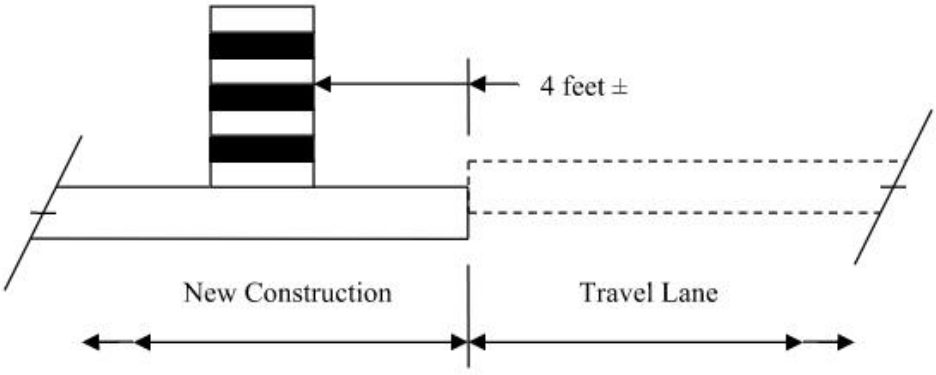
Drums spaced at forty foot (40') intervals.	Location of drums when Elevation Difference is greater than two inches (> 2") to four inches (4")



ELEVATION DIFFERENCE GREATER THAN TWO INCHES (> 2") TO FOUR INCHES (4")

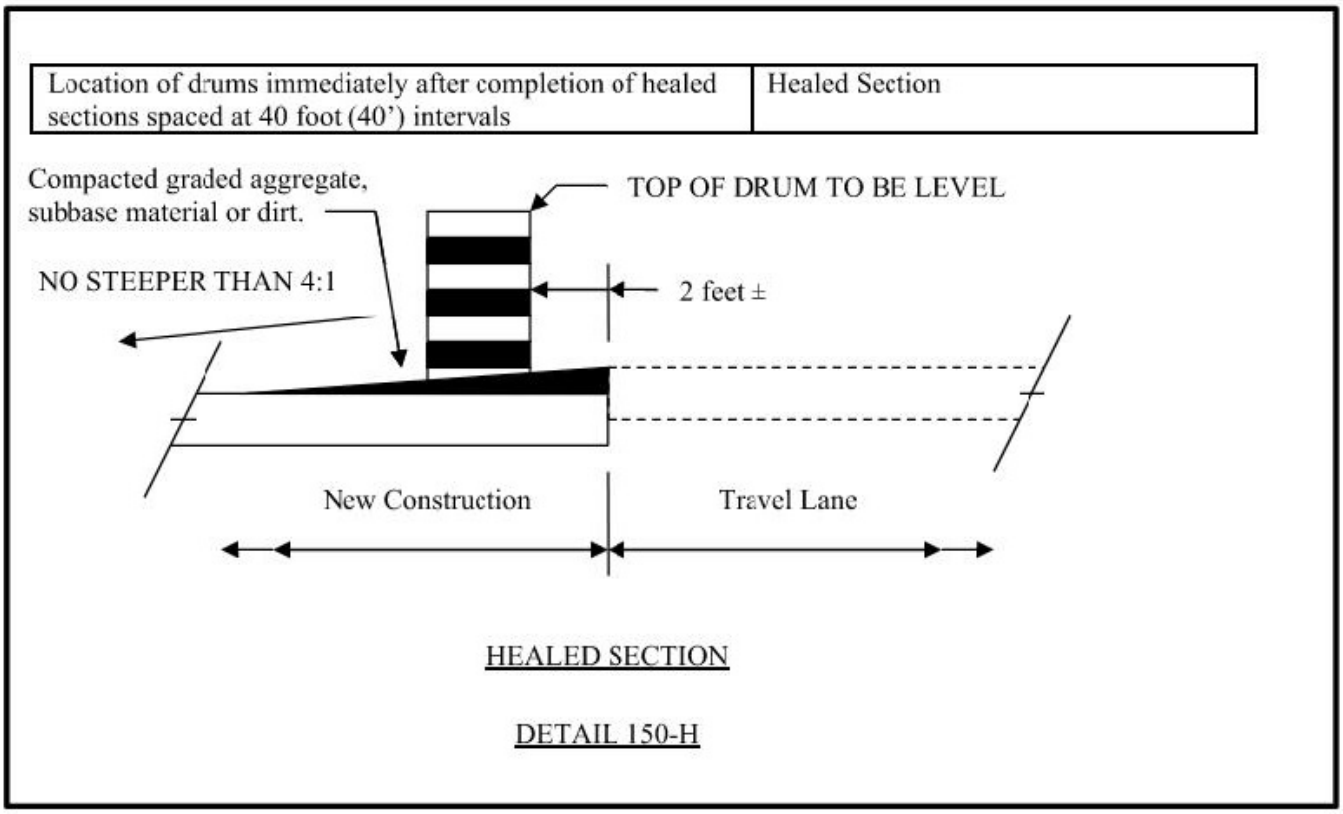
DETAIL 150-F

Drums spaced at eighty foot (80') intervals.	Location of drums when Elevation Difference is two inches (≤ 2") or less.



ELEVATION DIFFERENCE OF TWO INCHES (≤ 2") OR LESS

DETAIL 150-G



150.3.12 Work Zone Law Enforcement

Work zone law enforcement consists of utilizing a uniformed law enforcement officer equipped with patrol vehicle and blue flashing lights to enforce traffic laws in construction work zones and the administration of this service. Payment for work zone law enforcement will be made only for the utilization in work zones during lane closures, traffic pacing, or other activities that occur within travel lanes. The Contractor will be responsible for negotiating a rate of reimbursement and making reimbursement to that law enforcement agency.

The Contractor will be responsible for coordinating and scheduling the utilization of the work zone law enforcement. The Engineer may require the use of work zone law enforcement at specific times and locations.

Work zone law enforcement will be required in all work zones during lane closures, traffic pacing, or other activities that occur within travel lanes on the interstate.

150.4 Measurement

150.4.01 Traffic Control Items

A. Traffic Control

When listed as a pay item in the Proposal, payment will be made at the lump sum price bid, which will include all traffic control not paid for separately, and will be paid as follows:

When the first Construction Report is submitted, a payment of twenty-five percent (25%) of the lump sum price will be made. For each progress payment thereafter, the total of the Project percent complete shown on the last pay statement plus twenty-five percent (25%) will be paid (less previous payments), not to exceed one hundred percent (100%).

When no payment item for Traffic Control-Lump Sum is shown in the Proposal, all of the requirements of Section 150 and the Temporary Traffic Control Plan shall be in full force and effect. The cost of complying with these requirements will not be paid for separately but shall be included in the overall bid submittal.

B. Changeable Message Sign, Portable

Portable changeable message sign will be measured as specified in Section 632.

C. Flashing Beacon Assembly

Flashing beacon assemblies will be measured as specified in Section 647.

D. Pavement Markings

Pavement markings will be measured as specified in Section 150.

E. Portable Impact Attenuators

Each portable impact attenuator will be measured by the unit/array which shall include all material components, hardware, incidentals, labor, site preparation, and maintenance, including spare parts recommended by the manufacturer for repairing accident damage. Each unit will be measured only once regardless of the number of locations installed, moves required, or number of repairs necessary because of traffic damage. Upon completion of the project, the units shall be removed and retained by the Contractor.

F. Signs

When shown as a pay item in the Contract, interim special guide signs will be paid for as listed below. All other regulatory, warning, and guide signs, as required by the Contract, will be paid for under Traffic Control Lump Sum or included in the overall bid submitted.

1. Interim ground mounted or interim overhead special guide signs will be measured for payment by the square foot. This payment shall be full compensation for furnishing the signs, including supports as required, erecting, illuminating overhead signs, maintaining, removing, re-erecting, and final removal from the Project. Payment will be made only one time regardless of the number of moves required.

2. Remove and reset existing special guide signs, ground mount or overhead, complete, in place, will be measured for payment per each. Payment will be made only one time regardless of the number of moves required.

3. Modify special guide signs, ground mount or overhead, will be measured for payment by the square foot. The area measured shall include only that portion of the sign modified. Payment shall include materials, removal from posts or supports when necessary, and remounting as required.

G. Temporary Audible Information Device

Temporary audible information devices are measured as the actual number furnished and installed in accordance with the manufacturer's recommendations, which shall include all necessary materials, equipment, labor, site preparation, maintenance, and removal. Each temporary audible information device will be paid for only one time regardless of the number of times it's reused during the duration of the Work. These devices shall remain the property of the Contractor.

H. Temporary Barrier

Temporary barrier shall be measured as specified in Sections 620.

I. Temporary Curb Cut Wheelchair Ramps

Temporary curb cut wheelchair ramps are measured as the actual number formed and poured, complete and accepted, which shall include all necessary materials, equipment, labor, site preparation, maintenance, and removal.

No additional payment will be made for sawing existing sidewalk and removal and disposal of removed material for temporary wheelchair ramp construction. No additional payment will be made for constructing the detectable warning surface.

J. Temporary Guardrail Anchorage, Type 12

Temporary guardrail anchorage- Type 12 will be measured by each assembly, complete in place and accepted according to the details shown in the Plans, which shall also include the additional guardrail and appurtenances necessary for transition and connection to temporary concrete barrier. Payment shall include all necessary materials, equipment, labor, site preparation, maintenance, and removal.

K. Temporary Walkways with Detectable Edging

Temporary walkways with detectable edging will be measured in linear feet (meters), complete in place and accepted, which shall include all necessary materials, equipment, labor, site preparation, temporary pipes, passing spaces, maintenance, and removal. Excavation and backfill are not measured separately for payment. No payment will be made for temporary walkways where existing pavements or existing edging (that meets the requirements of MUTCD) are utilized for the temporary walkway. Payment for temporary detectable edging, including approved barriers and channelizing devices, installed on existing pavement shall be included in Traffic Control-Lump Sum.

L. Traffic Signal Installation- Temporary

Temporary traffic signal installation will be measured as specified in Section 647.

M. Work Zone Law Enforcement

When work zone law enforcement is shown as a pay item, work zone law enforcement will be measured for payment by the hour. The Contractor shall provide a daily work record containing the actual number of hours charged by the law enforcement officer. The daily work record shall be complied on a form provided by the Department, signed by the law enforcement officer, signed by the Contractor's Worksite Traffic Control Supervisor attesting that the law enforcement was utilized during the time recorded, and then submitted to the Engineer.

Work zone law enforcement will be measured for payment by the hour up to the maximum number of hours included in the Contract. The Engineer may at their discretion increase the maximum number of hours.

Payment shall be full compensation for reimbursing the law enforcement agency and for all cost incurred by the Contractor in coordinating, scheduling, and administering the item work zone law enforcement.

If no work zone law enforcement pay item is included in the Contract, then all work zone law enforcement cost shall be included in Traffic Control – Lump Sum.

150.5 Reserved

150.6 Special Conditions

Special Conditions, if used, will be included elsewhere in the Contract.

150.7 Payment

When shown in the Schedule of Items in the Proposal, the following items will be paid for separately. Payment will be made under:

Item No. 150	Traffic control -	Lump Sum
Item No. 150	Traffic control, solid traffic stripe __ inch, (color)	Per linear mile
Item No. 150	Traffic control, skip traffic stripe __ Inch, (color)	Per linear mile
Item No. 150	Traffic control, solid traffic stripe, thermoplastic 24 inch, color	Per linear mile
Item No. 150	Traffic control, raised pavement markers –all types	Per each
Item No. 150	Remove and reset, existing special guide signs, overhead, complete-in-place	Per each
Item No. 150	Temporary walkways with detectable edging	Per linear foot
Item No. 150	Temporary curb cut wheelchair ramps	Per each
Item No. 150	Temporary audible information device	Per each
Item No. 150	Work Zone Law Enforcement	Per hour

150.7.01 Enforcement and Adjustments

The safe passage of pedestrians and traffic through and around the temporary traffic control zone, while minimizing confusion and disruption to traffic flow, shall have priority over all other Contractor activities. Continued failure of the Contractor to comply with the requirements of Section 150 - Traffic Control will result in non-refundable deductions of monies from the Contract as shown in this Subsection for non-performance of Work.

Failure of the Contractor to comply with this Specification shall be reason for the Engineer suspending all other work on the Project except erosion control and traffic control, taking corrective action as specified in Section 105, and/or withholding payment of monies due to the Contractor for any work on the Project until traffic control deficiencies are corrected. These other actions shall be in addition to the deductions for non-performance of traffic control.

SCHEDULE OF DEDUCTIONS FOR EACH CALENDAR DAY OF DEFICIENCIES OF TRAFFIC CONTROL INSTALLATION AND/OR MAINTENANCE		
ORIGINAL TOTAL CONTRACT AMOUNT		
From More Than	To and Including	Daily Charge
$0	$100,000	$250
$100,000	$1,000,000	$650
$1,000,000	$5,000,000	$1,300
$5,000,000	$20,000,000	$2,000
$20,000,000	$40,000,000	$2,600
$40,000,000	$----------	$4,000

October 12, 2026

DEPARTMENT OF TRANSPORTATION
COBB COUNTY GEORGIA

SPECIAL PROVISION

2027-4 RESURFACING CONTRACT
COUNTYWIDE MAJOR THOROUGHFARES (LMIG)
PROJECT NO. B2935

SECTION 150 – TRAFFIC CONTROL

ADD the following:

150.3 CONSTRUCTION REQUIREMENTS

150.3.01 GENERAL

C. Traffic Interruption Restrictions

Delete and add the following:

The Department reserves the right to restrict construction operations when, in the opinion of the Engineer, the continuance of the Work would seriously hinder traffic flow, be needlessly disruptive or unnecessarily inconvenience the traveling public. The Contractor shall suspend and/or reschedule any work when the Engineer deems that conditions are unfavorable for continuing the Work.

If the Work is suspended, the Contractor may submit a request for additional Contract time as allowed under Section 108. The Department will review the request and may grant additional Contract time as justified by the impact to the Contractor's schedule. Compensation for loss of productivity, rescheduling of crews, rental of equipment or delays to the Contractor's schedule will not be considered for payment. Additional contract time will be the only consideration granted to the Contractor.

The Contractor shall not install lane closures, pace traffic or move equipment or materials between the hours of 6:00 a.m. and 9:00 a.m. and 4:00 p.m. to 7:00 p.m. Monday through Friday; and 6:00 a.m. to 1:00 p.m. Sunday, during times when school is in session.

When school is not in session, the Contractor shall not install lane closures, pace traffic or move equipment or materials between the hours of 6:00 a.m. and 8:00 a.m. and 5:00 p.m. to 7:00 p.m. Monday through Friday; and 6:00 a.m. to 1:00 p.m. Sunday.

Contractor shall not interfere with the flow of traffic on minor collectors, major collectors or arterial roadways Monday to Friday 6:00 a.m. to 9:00 a.m. and Monday to Friday 4:00 p.m. to 7:00 p.m.

Flagging protection will be required whenever Contractor or their equipment are, or are likely to be, working within fifty (50) feet of live track or over existing tracks. Contractor shall give advance notice to the railroad in order to coordinate any anticipated need for flagging service. No work within 50 feet of RR track (includes moving equipment across RR track) shall be undertaken until the RR flag person(s) is/are at the job site. Contractor to assume all costs should railroad liability insurance be required.

All required temporary markings, with the exception of long lines, (any arrows, stop bars, etc.) will be replaced with paint or temporary tape and will be included in the cost of traffic control.

Vicinity of Truist Park (if applicable)

1. Home Games: No lane or sidewalk/trail closures will be allowed during home games unless prior written approval has been granted by the County. All lane and sidewalk/trail closures shall be removed a minimum of four (4) hours prior to the scheduled start of any home game. No lane or sidewalk/trail closure will be allowed until minimum of three (3) hours after the conclusion of a home game.
2. The County may adjust these hourly restrictions based on traffic volumes, impacts to the flow of traffic and special circumstances. The pre-game restriction may be increased from four (4) hours to as much as six (6) hours prior to the scheduled start of any game. The County may reduce the post-game restriction from three (3) hours to two (2) hours after the conclusion of a game. Any modifications to these closure restrictions are at the sole discretion of the County.
3. The same restrictions stated above shall apply to other stadium events such as musical concerts, festivals, carnivals, etc., at the sole discretion of the County.

Failure to adhere to these restrictions will result in non-refundable deductions as specified in Section 150.5.01 Enforcement and Adjustments.

DEPARTMENT OF TRANSPORTATION
STATE OF GEORGIA

SUPPLEMENTAL SPECIFICATION

Section 201—Clearing and Grubbing Right-of-Way

201.1 General Description

This work includes clearing, grubbing, removing and disposing of vegetation, buildings and debris within the entire Right-of-Way and easement areas adjacent to the Right-of-Way or as designated by the Engineer. Except, do not remove objects designated to remain or removed according to other sections of these specifications. This work also includes preserving (from injury and defacement) vegetation and objects designated to remain in place.

201.1.01 Definitions

Clearing: Removing and disposing trees, brush, stumps, logs, grass, weeds, roots, decayed vegetable matter, poles, stubs, rubbish, refuse dumps, sawdust piles, and loose boulders of 1 yd^3 (1 m^3) or less existing outside of the construction limits, debris resting on or protruding through the ground surface, or appearing on the Right-of-Way before final acceptance of the work.

Clearing also includes removing and disposing of obstructions, such as fences, bridges, buildings, and other incidental structures within the Right-of-Way unless the work or a portion of the work is:

- Removed as excavation
- Shown in the Proposal as a separate Pay Item
- Performed by others

Grubbing: Removal from the Right-of-Way and proper disposal of all objectionable matter defined above under clearing, which is embedded in the underlying soil.

Grubbing also includes removing and properly disposing of parking lots, abandoned pavements, sidewalks, driveways, catch basins, drop inlets, pipes, manholes, curbing, retaining walls, utilities, foundations, paved floors, underground tanks (for removal of underground tanks see Section 217), and other structures within the Right-of-Way unless the work or portions of the work are:

- Obstructions removed as one of the excavation items
- Shown in the Proposal as separate Pay Items
- Removed by others
- To be incorporated in the project.

Objectionable Roots: Any of the following types of roots:

- Matted trees and brush roots (regardless of the size of the roots)
- Individual roots more than 0.75 in. (20 mm) diameter
- Individual roots more than 3 ft. (1 m) long regardless of size
- Large quantities of smaller roots present in the top 1 ft. (300 mm) of the finished subgrade or road surface when detrimental to the work as determined by the Engineer.

Stumps: The butt of a tree with a diameter of 4 in. (100 mm) or more.

Drift material: Organic debris, primarily large tree limbs, that are carried by a stream and accumulate at the upstream side of bridges and culverts, impeding navigation and threatening the integrity of the drainage structure.

201.1.02 Related References

A. Standard Specifications

Section 107—Legal Regulations and Responsibility to the Public

Section 109—Measurement and Payment

Section 160—Reclamation of Material Pits and Waste Areas

Section 161—Control of Soil Erosion and Sedimentation

Section 208—Embankments

Section 215 – Removal of Solid Waste

Section 217—Removal of Underground Storage Tanks

B. Referenced Documents

General Provisions 101 through 150.

201.1.03 Submittals

General Provisions 101 through 150.

201.2 Materials

General Provisions 101 through 150.

201.2.01 Delivery, Storage, and Handling

General Provisions 101 through 150.

201.3 Construction Requirements

201.3.01 Personnel

General Provisions 101 through 150.

201.3.02 Equipment

General Provisions 101 through 150.

201.3.03 Preparation

General Provisions 101 through 150.

201.3.04 Fabrication

General Provisions 101 through 150.

201.3.05 Construction

A. General

Establish Right-of-Way and construction lines. The Engineer will designate which trees, shrubs, and plants will remain in the ground. Preserve things designated to remain.

Apply the requirements of Subsection 107.22, Subsection 107.23, and Section 161 to clearing and grubbing operations.

Ensure Subsection 161.3.05.H is reviewed and implemented before beginning any land disturbing activity.

Strip grass immediately ahead of grading.

To prevent the spread of *Introduced Invasive Pest Species*, do the following:

1. Adhere to the restrictions of Section 155.3.05.A for moving soil, mulch, sod or plants, stump wood or timber with soil attached.
2. Adhere to the requirements of Section 155.3.05.B for cleaning of equipment, except that the USDA inspection will not be required for vegetative matter.
3. Dispose of vegetative parts of plants that may reproduce (roots and aboveground parts that bear fruit) by burning on site (where permitted) or bury with a minimum cover of 3 ft. (1 meter) at an approved site. Obtain the Engineer's approval for any other methods of disposal.

B. Clearing

Clear objects within the Right-of-Way and easement areas as follows:

1. Choose a method of clearing that prevents damage to property, trees, or retained shrubbery in or outside of the Right-of-Way.
2. Remove stumps that are part of the clearing operations as specified under Subsection 201.3.05.C, *Grubbing*
3. Cut the stumps not grubbed as specified in this section.
4. Dispose of cleared materials as specified in Subsection 201.3.05.E.

C. Grubbing

Grubbing consists of removing and disposing objectionable matter embedded in the underlying soil (defined in Subsection 201.3.05.B, *Clearing*) from the Right-of-Way and easement areas.

1. Grubbing Operations

   When grubbing, remove abandoned obstructions referenced in Subsection 201.1.01 *Definitions* to the following depths:

   a. Under Pavements: Remove to a depth of at least 3 ft. (1 m) below the finished subgrade.
   b. Underneath Other Structures: Remove to at least 3 ft. (1 m) below the foundations of any proposed structure, including installations such as guard rail posts and utility poles.
   c. Elsewhere in the Right-of-Way and easement areas: Remove as follows:
      1) Remove to at least 3 ft. (1 m) below the finished surface of slopes and shoulders and 1 ft. (300 mm) below natural ground outside construction lines.
      2) Thoroughly crack or break abandoned structures that may impound water. These structures include concrete floors, basements, and catch basins within 10 ft. (3 m) of finished grade.
      3) Break floors so that no section greater than 10 ft.^{2} (1 m^2) remains intact.

2. Except as modified under Subsection 201.3.05.D, use the following procedure to perform grubbing:

   a. Remove stumps and other matter that cannot be removed by a root rake. Remove stumps to a minimum depth of 2 ft. (600 mm) below the ground line.
   b. Rake areas containing objectionable roots to a depth of at least 6 in. (150 mm) below the surface.
   c. Remove remaining objectionable matter by hand or other suitable means. When necessary, remove small roots (see Subsection 201.1.01 *Objectionable Roots*) detrimental to the work.
   d. Backfill stump holes and compact backfill to the approximate density of the surrounding soil.
   e. Harrow the area with a heavy-duty disc harrow that penetrates and turns the ground to at least 6 in. (150 m) deep.
   f. Remove objectionable matter exposed by the harrowing.
   g. Level the harrowed areas with blading equipment. Leave the grubbed areas smooth enough for a power mower.

D. Modifications of Clearing and Grubbing

Modify clearing and grubbing as follows:

1. In Excavation Areas

   Modify clearing and grubbing in excavation areas as follows:

   a. Harrowing and leveling may be omitted.

   b. Do not fill stump holes except when the bottom of any stump hole extends below the elevation of the finished subgrade. In this case, fill the portion of each hole below subgrade elevation with suitable material compacted to at least the density of the surrounding soil.

2. In Embankment Areas

   Modify clearing and grubbing in embankment areas as follows:

   a. Under 4.5 ft. (1.4 m)

      Clear and grub areas without modification where the original ground and finished grade differ in elevation 4.5 ft. (1.4 m) or less.

   b. Over 4.5 ft. (1.4 m)

      Clear, but do not grub areas covered by embankments exceeding the 4.5 ft. (1.4 m) elevation difference specified in step (a) above. Except the removal of unsound or decayed stumps.

      Remove and backfill stumps according to Subsection 201.3.05.C.2. When leaving sound stumps in place, cut them off to no more than 6 in. (150 mm) above the original ground line.

   c. Embankment Areas Over Old Roads

      Clear and grub without modification ditches and slopes of old roads to a depth that removes all objectionable matter to provide a firm foundation.

3. Areas Outside of Roadway

   Except as specified in this section, clear and grub the entire Right-of-Way and easement areas outside construction limits and leave it smooth and free from loose boulders and debris that would interfere with power mowers. Exceptions to the above requirements are as follows:

   a. Selective Clearing

      When the Engineer directs to preserve certain trees and plants, protect them from injury. Trees to be removed shall be felled to prevent injury to standing trees, plants, and improvements to be preserved.

      Cut off tree branches overhanging the roadway within 20 ft. (6 m) of the finished grade close to the boles. Also, remove other branches to create a balanced appearance. Grub areas adjacent to selected trees and shrubs without damage to living roots of the selected trees or shrubs.

   b. Special Treatment Areas

      Clear special treatment areas according to the plan notes.

   c. Steep Slopes

      Clear or selectively clear slopes that are too steep for power mowers (slopes steeper than 3 horizontal to 1 vertical) and clear or selectively clear slopes that are subject to excessive erosion. Do not grub in these areas.

   d. Grassed Areas

      Do not grub (if the Engineer approves) reasonably large areas outside construction limits covered with grasses and smooth enough for power mowers. Remove stumps, trees, loose rocks, and other objectionable matter.

4. Bridge Sites

   Modify clearing and grubbing at bridge sites as follows:

   a. Stream Bridges

      Clear the Right-of-Way for stream bridges for the full length of the proposed structure and existing structures. Cut stumps and brush flush with the ground line.

      The Engineer will require a second cutting if high water prevents cutting stumps flush with the ground. If the Engineer requires more than two cuttings, see Subsection 201.5 for payment.

Remove drift and stumps where necessary to permit installation of rip rap, piling, piers, abutments, wing walls, bents, removal of existing structures, and other parts of the Work. Properly backfill the holes.

Preserve stump and brush root systems at river and stream banks when they have been cut flush with the ground line.

b. Other Bridges

Clear and grub bridges (other than stream bridges) as specified within this specification for roadway areas and areas outside of the roadway.

E. Removal and Disposal of Materials

1. Merchantable Timber and Buildings

The Department may dispose of merchantable timber and buildings or may allow a property owner to remove them from the land granted for Right-of-Way before the Contractor begins operation. Therefore, the Department does not guarantee that merchantable timber or buildings will be on the Right-of-Way when the work begins.

Material salvaged from removing timber or buildings becomes the property of the Contractor.

Demolish, remove, and dispose of all building structures within the right of way and easement areas including concrete slabs, footings, foundations, etc. except building structures designated to remain in place. Grade to drain all disturbed ground to a reasonably smooth and pleasing appearance, free from loose boulders and other debris that would interfere with the use of power mowers. Grass all disturbed areas.

Prior to demolition or removal:

a. Inspect all building structures for the presence of asbestos. The inspection shall be done by an EPA Asbestos Hazard Emergency Response Act (AHERA) accredited inspector whose certification is current.

b. Provide a copy of all inspection reports including the inspector's credentials to the Engineer.

c. Provide written notice of intent to demolish to the Georgia Environmental Protection Division (EPD) of the Georgia Department of Natural Resources in accordance with EPD regulations with a copy to the engineer. This notice is required even if there is no asbestos present.

If there is asbestos present, its removal shall be done by a contractor licensed with the EPD in accordance with the Rules of Georgia Department of Natural Resource Environmental Protection Division chapter 391-3-14-04. All asbestos removal and disposal shall be done in accordance with EPD regulations. All asbestos removal shall be considered as Extra Work and payment will be made in accordance with Subsection 109.05.

2. Combustible Material

Abide by Federal, State, and local codes when the Right-of-Way (or any portion of the Right-of-Way) lies within an area where burning is restricted. All combustible material except sawdust piles may be burned on the Right-of-Way except where prohibited by Federal, State, or local air pollution control regulations.

a. Prevent fire from spreading to adjacent areas and damaging living trees and shrubs designated to remain on the Right-of-Way and easement areas.

b. Prevent damage to public and private installations either within or adjacent to the Right-of-Way and prevent damage to traveling public.

c. Obtain suitable areas for burning the combustible material when necessary (at the Contractor's expense). Burning area are subject to the approval of the Engineer.

d. Dispose of unburned combustible material according to Subsection 201.3.05.E.3. If the disposal area is located on private property, present written authority to the Engineer (signed by the property owner) granting the Contractor and the Department permission to use the area for the purpose intended. Reclaim the disposal area according to Section 160 except that the reclamation is at the Contractor's expense.

e. Completely remove sawdust within the construction limits. Haul the sawdust to approved disposal areas, or deposit it on the Right-of-Way in a layer less than 3 in (75 mm) deep. Immediately mix the sawdust with the underlying soil by dicing and harrowing. Leave the harrowed surface smooth.

3. Solid Waste Material

a. Nonregulated Material

(1) Common fill is defined as soil, rock, brick, concrete without reinforcement, concrete with reinforcement where the reinforcement has been removed flush with the surface of the concrete and cured asphalt, provided that such material does not contain hazardous waste constituents above background levels and the material results from Department funded construction contracts. Such fill is not subject to the Georgia Comprehensive Solid Waste Management Act of 1990 and the Solid Waste Management Rules when used as fill material on Department funded construction contracts or Department property or when used as fill material on property not owned by the Department when all requirements of this specification are fully met. Common fill meeting this definition may be placed as follows:

(a) At a permitted municipal, construction and demolition materials or inert landfill fully meeting all requirements of the Solid Waste Rules and Act and any other applicable laws or ordinances.

(b) At an off-site engineered fill location in accordance with the following requirements;

- Place the material in uniform layers 3 ft. thick or less and distributed to avoid the formation of large voids or pockets.
- Fill voids with finer material.
- Cover the last layer of fill with at least 2 ft. of soil.
- Construct the fill according to Section 208, except compact it to at least 90 percent of the maximum laboratory dry density.
- A Georgia registered professional engineer shall document, certify and submit the following information on behalf of the Contractor to the Department; compaction rates, waste description including average particle size, and the depth of clean earthen fill lying above the engineered fill.

(c) On site as compacted fill if prior written approval has been granted by the Engineer and in accordance with the following requirements:

- As compacted fill incorporated into embankment only. No area shall be excavated for the sole purpose of disposing of common fill.
- Place the material in uniform layers 3 ft. thick or less and distributed to avoid the formation of large voids or pockets.
- Fill voids with finer material.
- Cover the last layer of fill with at least 2 ft. of soil.
- Construct the fill according to Section 208, except compact it to at least 90 percent of the maximum laboratory dry density.
- Records of the exact location by station and offsets, amount disposed per location in cubic yards, waste description including average particle size, compaction rates and depth of clean earthen fill lying above the composite materials shall be kept by the Engineer.

(d) Materials that may be recycled or reused such as asphaltic concrete, Portland cement concrete, plastic, metal and materials that qualify under EPD regulations for sale or use may be reclaimed by the Contractor.

b. Regulated Material

(1) Inert waste is defined as organic debris such as stumps, limbs and leaves, and any of the aforementioned common fill items that do not meet the compaction requirements when placed in an excess materials pit. An inert waste landfill permit shall be obtained in accordance with GDNR/EPD Rules to properly record the disposal of inert waste when compaction requirements are not met at an excess materials pit. If disposed of at a landfill, inert waste may only be disposed

at a permitted municipal, construction and demolition materials or inert landfill fully meeting all requirements of the Solid Waste Rules and Act and any other applicable laws or ordinances.

(2) Construction and demolition waste is defined as construction forms, barrels, scrap metal, and other such by-products of construction not specifically listed above as either common fill or inert waste. Construction and or demolition waste must be disposed of at a permitted municipal, construction and demolition materials, or inert landfill fully meeting all requirements of the Solid Waste Rules and Act and any other applicable laws or ordinances.

(3) Dispose of oils, solvents, fuels, untreated lead paint residue, and other solid hazardous waste through a properly licensed hazardous waste disposal facility.

(4) Remove municipal solid waste discovered during construction or shown on the plans according to Section 215.

c. Solid Waste Handling and Disposal Documentation Requirements:

(1) Waste disposed at a permitted municipal or construction and demolition landfill – all tipping receipts generated by the receiving landfill shall be provided to the Engineer.

(2) Waste disposed at inert landfill – a copy of the landfill's Permit by Rule notification, and for landfills exceeding one acre, a copy of the landfill's NPDES General Storm water Permit Notice of Intent (NOI) and any local jurisdiction Land Disturbing Activity Permit, if applicable, shall be provided to the Engineer.

(3) Any necessary documentation regarding a disposal site's permit status must be obtained by the Contractor and verified by the Department before any common fill, inert waste, or other solid waste is allowed to leave the site.

(4) The documentation listed herein shall be maintained on-site in the project files and at any other location the Department deems necessary until a valid NPDES Notice of Termination is filed.

d. Recyclable materials must be separated from all waste materials and shall be properly stored in containers.

e. Excluding the above allowances, all types of waste shall be handled in full compliance with the following:

- The Georgia Solid Waste Management Rules, as amended (391-3-4)
- Georgia Comprehensive Solid Waste Management Act of 1990, as amended (O.C.G.A. 12-8-20)
- The Georgia Erosion & Sedimentation Act as amended (O.C.G.A. 12-7-1) and any applicable Local and State requirements as well as the General Permits of the Georgia Water Quality Control Act
- Any other applicable Federal, State, or Local rules or laws

F. Removal of Drift Material from Drainage Structures

When removal of drift material is required on the project, the following conditions are intended as a minimum to protect aquatic resources during drift removal activities executed by GDOT personnel or contractors.

1. All Project personnel shall be advised of the potential presence of federally and state protected species. These species are protected under the Endangered Species Act of 1973, the Georgia Endangered Wildlife Act of 1973 and the Georgia Wildflower Preservation Act of 1973. There are civil and criminal penalties for harming, harassing, or killing these species.
2. Drift removal shall be accomplished by attaching lift cables or ropes to the drift and hoisting the materials out of the stream from the top of the bridge deck or road surface. Any modifications to this method or any other methods for removal shall be submitted to, and will require prior written approval from, the State Environmental

Administrator within the GDOT Office of Environmental Services (Ecology_submittals@dot.ga.gov). Accumulated drift material shall not be dragged across the streambed.

3. Mechanized equipment shall not be allowed to rest upon or contact the streambed. Boats shall be allowed into the stream for the purpose of accessing accumulated drift, provided that water depth is adequate to ensure the watercraft would not contact the streambed.
4. If vegetation clearing is required to accomplish drift removal (e.g. to provide access for boats), mechanized clearing shall not be used within 200 feet of stream banks. Vegetation clearing by hand is permissible.
5. Drift material shall be disposed of outside the project right of way and placed in either a permitted solid waste facility or a permitted inert waste landfill. Refer to Subsection 201.3.05.E.3.b of the Standard Specification and Supplements thereto for additional information.
6. In the event any incident occurs that may cause, or has caused, harm to an aquatic species, the State Environmental Administrator shall immediately be notified by providing a description of the incident and photos of the harmed aquatic species to Ecology_submittals@dot.ga.gov. All activities on or near the structure shall cease, except traffic control and erosion control activities, pending consultation by the Department with the U. S. Fish and Wildlife Service, National Marine Fisheries Service, Georgia Department of Natural Resources, and, if applicable, the lead federal agency.

201.3.06 Quality Acceptance

General Provisions 101 through 150.

201.3.07 Contractor Warranty and Maintenance

General Provisions 101 through 150.

201.4 Measurement

The Department does not measure clearing and grubbing separately for payment. The area is considered the full Right-of-Way width for the length of the Project including slope and construction easement areas shown on the plans.

201.4.01 Limits

General Provisions 101 through 150.

201.5 Payment

Payment for this Item, completed and accepted, will be made at the lump sum price bid. The payment will be full compensation for all work specified in this Section including final cleanup as required.

If the Engineer requires more than two cuttings to clear the Right-of-Way for stream bridges (according to Subsection 201.3.05.D.4.a), the additional cuttings will be paid for as a Force Account according to Subsection 109.05.

No separate payment will be made for the disposal of solid waste materials.

Removal of Drift Material will only be paid for separately when shown in the plans for maintenance projects. Otherwise, Removal of Drift Material will be included in lumps sum Clearing and Grubbing. When Clearing and Grubbing is not shown as a payment item, the cost is included in the overall Contract Price.

Payment will be made under:

Item No. 201	Clearing and grubbing	Per lump sum
Item No. 201	Removal of Drift Material	Per lump sum

201.5.01 Adjustments

General Provisions 101 through 150.

Date: October 12, 2026

DEPARTMENT OF TRANSPORTATION
COBB COUNTY, GEORGIA

SPECIAL PROVISION

2027-4 RESURFACING CONTRACT
COUNTYWIDE MAJOR THOROUGHFARES (LMIG)
PROJECT NO. B2935

Section 419—HIGH FRICTION SURFACE TREATMENT

419.1 General Description

This work includes furnishing and installing a textured, high friction surface treatment (HFST) system in accordance with this Section and in conformity with the area shown on the pages provided.

Ensure the high friction surface treatment color is consistent throughout the project.

419.1.1 Definitions

General Provision 101 through 150.

Continuous Section – section of HFST that is placed in one continuous pass, whether by hand or with a machine. Any stoppages of the installation process resulting in a cold joint, or as described in Section 419.3.06 C-2 below, will constitute the beginning of another continuous placement.

Dynamic Friction Tester (DFT) – ASTM E 1911 friction testing device which reports pavement coefficient of friction versus speed at 20 kph, 40 kph, and 60 kph.

419.1.2 Related References

A. Standard Specifications

General Provision 101 through

150. 800 – Coarse Aggregate

801 – Fine Aggregate

886 – Epoxy Resin Adhesives

B. Referenced Documents

AASHTO PP79-14	AASHTO T104	ASTM D695	ASTM C 881
AASHTO T255	ASTM C25	ASTM D 570	ASTM E 1911
AASHTO T27	ASTM	ASTM D 638	
AASHTO T96	D1640	ASTM D 2240	

419.1.1 Submittals

Submit independent laboratory reports from an AASHTO accredited laboratory documenting that the resin binder and aggregate meet the requirements of this specification. Submit documentation of pre-installation friction characteristics of the existing pavement. Submit documentation of the in-place friction characteristics of the high friction surface treatment in accordance with ASTM E 1911 within five days after the placement (once the surface is deemed cured) of each continuous section and again 90 days after the initial test of each continuous section. Using a DFT, ensure a minimum of 0.90 is achieved within 5 days after placement of the high friction surface treatment; and ensure a minimum of 0.80 is achieved 90 days after completion of the high friction surface treatment for each reading.

419.2 Materials

Use a two part modified resin binder treatment containing a binder capable of retaining a skid-resistant calcined bauxite aggregate topping under vehicular traffic conditions.

A. Resin Binder: Ensure the binder is a two-part modified exothermic resin treatment. Use a binder consisting of a thermosetting compound which holds aggregate firmly in position. Ensure the binder has the following physical properties:

TEST	REQUIREMENTS	TEST METHOD
Ultimate Tensile Strength	2,650 psi min.	ASTM D-638 (Type 1 Specimen)
Tensile Elongation	30 – 70%	ASTM D-638 (Type 1 Specimen)
Compressive Strength	1,600 psi min.	ASTM D-695
Gel Time	10 minutes min	ASTM C-881
Cure Rate	3 hours max (thin film @ 75° F)	ASTM D-1640
Water Absorption	1 % max	ASTM D-570
Hardness, Shore D	60 – 75	ASTM D-2240

Two part resin binder materials which are not exothermic in curing will not be allowed.

B. Aggregate: Use high friction calcined bauxite. Ensure the aggregate is virgin, clean, dry, and free from foreign matter. No recycled aggregate may be used on the project. Use aggregate that has the following properties:

TEST	REQUIREMENTS	TEST METHOD
Percent Wear	20% max	AASHTO T-96
Soundness	15% max	AASHTO T-104
Moisture content	0.2% max	AASHTO T-255
Aluminum Oxide (Al_2O_3) Content	87% min	ASTM C-25

AGGREGATE GRADATION		
SIEVE SIZE	% PASSING BY WEIGHT	Test Method
No. 4	100	AASHTO T-27
No. 6	95-100	AASHTO T-27
No. 16	0-5	AASHTO T-27

419.2.01 Delivery, Storage and Handling

Deliver aggregate to construction site in clearly labeled bags or sacks that are uniquely identifiable and shall include the following: manufactures name, batch #, lot #, date and location of processing.

419.3 Construction Requirements

419.1.3 Personnel

General Provision 101 through 150.

419.1.4 Equipment

General Provisions 101 through 150.

419.1.5 Preparation

Remove crack sealant and any other material that might interfere with the bond between the resin binder material and existing surfaces. Ensure surfaces are clean, dry and free of all dust, oil, and debris. Clean existing surfaces by use of mechanical sweepers, high pressure air, or other methods approved by the Engineer prior to the installation. Pavement surfaces contaminated with oils, greases, or other deleterious materials not removed by the surface preparation shall be washed with a mild detergent solution, rinsed with clean potable water and dried using compressed air. Adequate cleaning of all surfaces will be determined and approved by the Engineer based on the recommendation of the manufacturer's representative.

Protect utilities, drainage structures, curbs and other structures within or adjacent to the application location of the high friction surface treatment materials. Cover and protect all existing pavement markings that are adjacent to the application surfaces as directed by the Engineer. Remove pavement markings that conflict with the surface application by grinding, hydro blasting or sand blasting as approved by the Engineer. Clean the surface prior to binder application by a method specified herein as approved by the Engineer.

Clean and fill all inadequately sealed joints and cracks greater than ¼ inch in width and/or depth. The joints and cracks shall be filled with a slurry created with the binder and aggregate specified herein. Once the slurry in the pretreated areas has gelled and cured, proceed with the installation of the high friction surface treatment.

For applications on new pavements, install the high friction surface treatment a minimum of 30 days after the placement of the underlying and adjacent asphalt pavement to reduce the likelihood of tracking or raveling.

Portable Shot Blast Equipment: Use approved portable shot blast equipment meeting the requirements to remove curing compound and prepare Portland cement concrete surfaces prior to application of the polymeric resin binder a minimum of 30 days after the placement of the underlying and adjacent Portland cement concrete.

419.1.6 Fabrication

General Provisions 101 through 150.

419.1.7 Construction

A. Qualification of the Installer

Submit to the Department a minimum of two projects including the installer's contact information. The two projects must have a cumulative minimum of 5,000 square yards of HFST and must have been placed within the past three years. All submitted projects must have an average friction reading of at least .90, using a dynamic friction tester, within 5 days of the installation when tested in accordance with ASTM E 1911.

B. Quality Control (QC) Plan

Submit a project specific QC Plan for approval to the Engineer before any material placement. Discuss the QC Plan at the pre-construction meeting. The QC Plan must include key personnel, equipment, materials, proposed methods of installation and operation, and the following requirements:

1. A designated QC Plan Administrator, who has full authority to institute any action necessary for the successful operation of the QC Plan and is responsible for the following:

    a. Identify and provide to the Engineer, contractor procedures for:
        - Documenting quantities used for binder and aggregate at each HFST site so that application rates (binder and aggregate) may be confirmed to be in accordance with the specification.
        - Moisture control methods of aggregate.
        - Cleaning and maintenance schedule for machinery and equipment.
        - Corrective actions for unsatisfactory conduction practices. Any deviation from the approved QC Plan will be cause for immediate suspension of operations.
        - Creating slurry for filling joints and cracks
        - The chance and/or event of rain

    b. Contractor performance of required field QC sampling, testing and record keeping in conformance with the approved QC Plan and contract documents.

c. Maintain and make available upon request, complete records of sampling, testing corrective actions, and QC inspection results.
d. Provide a copy of stored material as mentioned in section 419.3.04 C.
e. Installation and testing schedule.

2. A resin binder manufacturer's technical person, who is responsible for the following:

a. Must be present for the pre-construction meeting.
b. Must be present at any job site that requires corrective work
c. Or must be present as otherwise approved by the Engineer in the QC Plan.

C. Delivery and Storage of Materials

Store materials in a clean, dry environment and in accordance with the manufacturer's recommendations. Do not expose the aggregate to rain or moisture. Obtain and post at the storage areas the Safety Data Sheet (SDS), Product Data Sheet, and other information from the manufacturer pertaining to the safe practices for the storage, handling, and disposal of the materials, and to their health hazards. Provide a copy of such information to the Engineer. Storage containers must have the manufacturer's name, date of manufacture, batch/lot number, trade name, quantity, and mixing ratio printed on the label.

D. Application Conditions

Do not place the resin binder on a wet surface or when the surface temperature of the pavement is below 50ºF or greater than 105ºF or per written recommendations received from the epoxy manufacturer. When there is a 40% or greater chance of rain forecasted within 24 hours of application the Contractor will discuss a plan of action as require by Section
419.3.05 B, QC Plan. Do not place the high friction surface treatment if the material can't be applied, cured and open to traffic prior to the ambient temperature decreasing to 40ºF and/or it begins to rain; or the contractor will remove and replace said section of treatment.

E. Application Method

Table 1 shows the permissible main application methods, depending on the size and Average Daily Traffic (ADT) of each individual HFST installation sites. Manual application is permissible at sites as a secondary method where for reasons of access or geometry the mechanized equipment cannot be used, as approved by the Engineer. Do not allow the mixed Binder material to be separate, cure, dry, or otherwise harden in such a way as to impair retention and bonding of aggregate. Remove and replace any Binder that becomes contaminated at no additional expense to the Department.
Immediately remove loose aggregate that falls onto any part of an active adjacent travel lane after the traffic is temporarily held. Contractor equipment and traffic are not allowed on the HFST during the curing period.

Table 1
Permissible Methods of Application

Average Daily Traffic	Site Size (Square Yards)	Main Application Method
Less than 25,000	Less than 300	Hand Mixing and manual Application or Automated Continuous Application
	300 and above	Automated Continuous Application
25,000 and above	Less than 300	Automated Continuous Application
	300 and above	Automated Continuous Application

1. Hand mixing and Manual Application

Provide calibrated containers for proper proportioning of the Binder components. Provide a clean, dry, container large
enough to blend and mix the proper proportions of the Binder. Uniformly mix the Binder components to

within ± 2% of the manufacturer's specifications (by volume) using a low-speed, high-torque drill fitted with a helical stirrer, moving the stirrer around to all the edges of the mixing container, or as approved by the manufacturer's technical person. Do not use wheel mixers or paddle mixers. Hand squeegee the mixed components onto the prepared pavement surface using a serrated edge squeegee at a uniform application thickness of 60 ± 5 mils (2.7-3.6 square yards per gallon). The Contractor shall wear elevated or spiked shoes while squeegeeing the mixed components. The Engineer and the Contractor will measure and monitor placement of the Binder using a contractor supplied wet film thickness gauge a minimum rate of one (1) per one hundred (100) square yards placed to ensure proper application thickness.
Immediately after the Binder application, mechanically or manually spread the aggregate onto the wet, uncured Binder at a uniform rate of 12-15 pounds per square yard. Completely cover the wet, uncured Binder with aggregate to achieve a uniform surface with no exposed Binder remaining visible on the surface. The high friction aggregate shall be applied within five (5) minutes of the base resin binder application onto the pavement section. Spread the aggregate without displacing the wet Binder film during placement. Minimize walking or standing on the Binder. Do not allow loose aggregate onto any part of the adjacent, active travel lanes.

2. Automated Continuous Application

Automated Application Machine: Machine mixing and application of Binder, machine application of aggregate, no hand squeegee work allowed. Perform automated application using equipment that continuously and thoroughly mixes, meters, monitors, and applies the Binder followed by application of the aggregate by use of equipment capable of placing Binder and aggregate in one continuous pass at a minimum of 12 foot in width. If recommended by the Binder manufacturer, use a heated metering pump. Blend and mix the Binder in accordance with the manufacturer's specification (± 2% by volume) and place a uniform Binder thickness of 60 ± 5 mils (2.7-3.6 square yards per gallon) . Flow meter readings shall be recorded and supplied to the Engineer. Apply the aggregate mechanically at a rate of 12- 15 pounds per square yard (achieving saturation) by vertical drop onto the wet, uncured Binder with a maximum height of 24 inches to ensure there is no displacement of the Binder. Do not allow loose aggregate onto any part of the adjacent, active travel lanes. Use equipment capable of continuously monitoring Binder and aggregate application rates. Record the initial and ending readings of the tanks (binder and aggregate) at the start and end of each continuous section. Walking or standing on the Binder should be minimized.

3. Smaller Scale Projects

Projects with a total of 30,000 square yards or less may deviate from Table 1 and use either application method stated above - a "semi-automated" method will be allowed. Regardless of method chosen, the Contractor Qualification submission in Specification Section 419.1.7 A is still required. The Engineer shall approve any variance from the methods stated above and said variance shall be documented in the QC Plan.

F. Curing

Allow the aggregate topped binder to cure in accordance with manufacturer recommendations until it is ready to accept traffic. Ensure that there are no visible wet spots after the aggregate has been applied. Protect treated surfaces from traffic and environmental effects until the area has cured. Remove the excess aggregates by one of the methods shown below before opening to traffic:

1. Remove the excess aggregate with a sweeper truck that has a built in internal hopper.

2. **Self-Propelled Air Sweeper (SPAS):** Use a SPAS with power brooms capable of cleaning the existing pavement and removing loose aggregate without dislodging the bonded HFST aggregate. The vacuum head shall have a minimum width of 6 feet (2 meters) and blast re-circulated, filtered air at a minimum rate of 20,000 cu ft/min (565 cu m/min). The SPAS must be capable of being used without water for dust suppression to ensure a dry surface will be maintained.

Three (3) calendar days after the initial installation, remove the excess aggregate with a sweeper truck that has a built in internal hopper. Excess aggregate cannot be reused.

419.3.06 Quality Acceptance

A. Testing Schedule

Submit a testing schedule to the Quality Assurance Branch Chief with the Office of Materials & Testing a minimum of three weeks prior to any testing being conducted on the project. The schedule shall be updated and resubmitted a maximum of every 14 calendar days or sooner if needed.

B. Pre-installation Testing

At no additional cost to the Department, the contractor will use a DFT to measure the friction characteristics of the existing pavement to be treated in accordance with ASTM E 1911. Pre-installation testing can be conducted prior to or on the same day as HFST installation. If conducted prior to the installation, the pre-installation testing shall be done within each installation section limits and noted on the shoulder so that the post-installation testing can take place in the same location. If pre- installation testing is to be conducted on the same day as HFST installation, it should be conducted on a section of adjacent pavement (e.g., just beyond the limits of the HFST), as long as the pavement appears to be similar in nature (e.g., constructed at the same time) to the pavement being treated. If there is a change in the pavement surface within the limits of the treated section, pre-installation testing should be conducted on each apparently different pavement. Whenever possible, pre-installation testing should be conducted not more than 20 LF beyond the limits of the HFST. Pre-installation testing should be conducted in one of the wheel paths where friction values are generally lower, but can also be conducted in the center of the lane as approved by the Engineer.

C. Post-installation Testing

At no additional cost to the Department, the Contractor will use DFT to measure the friction characteristics of the high friction surface treatment in accordance with ASTM E 1911 within five days after the placement (once the surface is deemed cured) of each continuous section and again 90 days after the initial test of each continuous section. The contractor may conduct the initial test of the surface as early as the same day and as late as the 5th day. The earliest the contractor may conduct the second round of testing on each continuous section shall be a minimum of 90 days after the installation. Using a DFT ensure a minimum of 0.90 is achieved within 5 days after placement of the high friction surface treatment and ensure a minimum of 0.80 is achieved 90 days after completion of the high friction surface treatment for each reading.

C-1 Contractor Testing

1. The Contractor shall conduct DFT testing on each continuous section as stated below.
2. The first test location should be within the first 25 LF of the continuous section, and the second test should be at least 200 LF beyond the first test, unless the continuous section is less than 225 LF, in which case it should be located at the approximate midpoint of the continuous section. Each subsequent test should be conducted 200 LF beyond the last test for each continuous section. If the first four DFT testing results are satisfactory, the frequency of testing may be decreased to one DFT test for every 1000 LF as approved by the Engineer.
3. Each test location shall contain 3 separate test in each lanes. Each test shall report the DFT values for 20, 40, and 60 kph.
4. Testing shall be conducted in right or left wheel path of a lane, approximately 3 LF from the centerline or shoulder stripe or in the apparent wheel path.
5. Conduct an additional DFT tests at the location of any surface anomalies or deficiencies, as directed by the Engineer. Anomalies which may require an additional test from the agency include but are not limited to:
    a. Locations where the resin shows through the aggregate.
    b. Locations of surface defects/impressions from construction operations (e.g., wheel and foot tracks).
    c. Locations of manual patching after completion of installation.
    d. Test locations where the friction values as described in Item 419.03.06 C-1(8) below.
6. Note the location of any continuous sections where any friction values fall below the specification limit of 0.90at 60 kph.
7. Note any continuous sections where the friction values from the two DFT tests differ by more than 10 percent, regardless of whether the friction value was above the specification limit. Note any continuous sections with a single DFT test where the friction value differs by more than 10 percent from the previous continuous section.
8. The contractor shall submit proof of annual DFT calibration from an approved facility in accordance with ASTM E 1911 precision requirements.

C-2 A new continuous section of HFST placement shall be delineated whenever the following occur:

1. Installation process stops for a period of time exceeding the curing time of the resin binder, resulting in a cold joint in the HFST.
2. Any time there is a change in the installation process, such as a switch from machine applied to hand applied or hand applied to machine applied.

C-3 Agency Verification Testing for 5-Day Test:

1. The intent is to test at the same time as the Contractor. If this cannot be accomplished, the Agency will make every effort to test within five business days.
2. Conduct a single DFT test within each continuous section of HFST placement, as designated during the installation. Testing will be conducted in the same wheel path as the contractor's test.
3. Compare friction testing results at 20, 40, and 60 kph to the contractor's acceptance test results.
4. If friction values vary more than 10 percent (at 60 kph) from the contractor's test results, a second test at the same location will be conducted to verify results.
5. If friction values still vary more than 10 percent (at 60 kph) from the contractor's test results, additional testing by the contractor at the same location will be required at no additional cost to the Department.
6. If the contractor's new results do not agree with the Agency's results, then both testers will be examined to ensure they are calibrated to the manufacturer's recommendations. Calibration will be confirmed once the contractor's and state's values are within 10 percent (at 60 kph) of each other.
7. If contractor's new test results agree with agency results, and the friction value at 60 kph, using a DFT, is below the specification threshold, conduct additional testing upstream and downstream from this test location to identify the limits for removal and replacement of the HFST.
8. GDOT reserves the right to obtain random samples of materials listed under 419.2 for testing.

D. Removal and Replacement

At no additional cost to the Department, the Contractor will remove and replace high friction surface treatment placed that the Engineer determines has any raveling, delamination, streaking or failure to meet the DFT friction values after 90 days. Ensure the minimum replacement is the full lane width and no less than ten feet long and as approved by the Engineer. Replace with acceptable high friction surface treatment at the Contractor's expense. Random samples tested by GDOT, or its representative laboratory shall pass all specified requirements. Ensure that any materials failing to meet specified requirements are to be removed and replaced with acceptable high friction surface treatment at the contractor's expense.

419.4 Measurement

The area to be measured is the number of square yards (meters) of high friction surface treatment completed and accepted.

419.4.01 Limits

The length and width is measured along the surface. The area to be paid for is determined on site.

419.5 Payment

The accepted area of high friction surface treatment will be paid for at the Contract Unit Price per square yard complete after acceptable 5 day test is provided.

Payment will be made under:

Item No. 419	High friction surface treatment	Per square yard

DEPARTMENT OF TRANSPORTATION
STATE OF GEORGIA

SUPPLEMENTAL SPECIFICATION

Section 653—Thermoplastic Traffic Stripe

653.1 General Description

This work includes furnishing and applying standard, wet weather, and audible profiled thermoplastic reflectorized pavement marking compound. Ensure markings conform to plan details and locations, these specifications, and the Manual on Uniform Traffic Control Devices.

Thermoplastic traffic stripe consists of solid or broken (skip) lines, words, and symbols according to plan color, type, and location.

Audible profiled thermoplastic markings consist of a thermoplastic stripe with raised bumps placed atop a thermoplastic stripe simultaneously as a system according to Plans and Specifications.

653.1.01 Definitions

Thermoplastic Marking Compound: A heated compound extruded or mechanically sprayed on the pavement that cools to pavement temperature. When combined with glass spheres and/or reflective composite optics it produces a reflectorized pavement marking.

Short Lines: Crosswalks, stop bars, arrows, symbols, and crosshatching. Extrude short lines rather than spraying them on.

653.1.02 Related References

A. Specifications

Section 656—Removal of Pavement Markings

B. Referenced Documents

QPL 46

QPL 71

SOP 37

SOP 38

SOP 39

Federal Test Standard Number 595B

Federal Test Standard Number 695B

AASHTO M 247

AASHTO M 249

ASTM D 92

ASTM D 476

ASTM D 2240

ASTM D 4960

ASTM E 1710

ASTM E 2177

40 CFR 261.24

EPA Method 3050

EPA Method 3052

EPA Method 6010

EPA Method 7000A

653.1.03 Submittals

Ensure the producers of the thermoplastic compound and the producers of both the intermix and drop-on glass spheres furnish to the Department copies of certified test reports showing results of all tests specified in this Section. Also ensure that producers certify that the materials meet the other requirements of this Section by submitting copies of certification at the time of sampling.

653.2 Materials

A. General Characteristics of Thermoplastic

Use thermoplastic material produced from an approved source listed on QPL 46. Use thermoplastic material that meets the requirements of AASHTO M 249 with the following exceptions:

1. Material Composition

   Ensure the resin of the thermoplastic material is an alkyd binder. Ensure the alkyd binder consists of a mixture of synthetic resins and a high boiling point plasticizer. Ensure at least one synthetic resin is a solid at room temperature. Ensure at least 50 percent of the binder composition is 100 percent maleic-modified glycerol ester resin. Ensure at least 18 percent by weight of the entire material formulation consists of binder. Do not use alkyd binder that contains petroleum-based hydrocarbon resins. Ensure the finished thermoplastic material is not adversely affected by contact with pavement materials or by petroleum droppings from traffic. Use thermoplastic material that has been evaluated (2-year field evaluation) by the National Transportation Product Evaluation Program (NTPEP) test facility or other approved test facility.

2. Suitability for Markings

   Use thermoplastic material that is especially compounded for traffic markings and has the following characteristics:

   - Prevents markings from smearing or spreading under normal traffic conditions at temperatures below 120 °F (49 °C)
   - Gives a uniform cross section, with pigment evenly dispersed throughout the material
   - Has a uniform material density and character throughout its thickness
   - Allows the stripe to maintain its original dimensions and placement
   - Ensures that the exposed surface is free from tack and is not slippery when wet
   - Does not lift from the pavement in freezing weather
   - Has cold ductility properties that permit normal movement with the road surface without chipping or cracking

3. Color

   Confirm the color of thermoplastic by providing data from the manufacturer to the Area Manager as follows:

   White – Use titanium dioxide that meets the requirements of ASTM D 476, Type II, Rutile, as the pigment for white thermoplastic material. Do not use anatase titanium dioxide pigment. Ensure thermoplastic material is free from dirt or tint. Ensure white thermoplastic material heated for 240 ± 5 minutes at 425 ± 3 °F (218 ± 3 °C) and cooled to 77 ± 3 °F (25 ± 2 °C) matches Federal Test Standard Number 695B-Color 17925. Ensure that the Y tristimulus value is measured to be a minimum value of 45. Ensure the material, when

compared to the magnesium oxide standard using a standard color spectrophotometer according to ASTM D 4960, meets the following:

Scale	Definition	Magnesium Oxide Standard	Sample
Rd	Reflectance	100	75 min.
a	Redness-Greenness	0	-5 to + 5
b	Yellowness-Blueness	0	-10 to + 10

a. Yellow – Use only non-hazardous pigments as defined by the Resource Conservation and Recovery Act (RCRA) Subarticle C rules, table 1 of 40 CFR 261.24 “Toxicity Characteristic”. Do not use yellow thermoplastic containing more than 3.0 ppm lead by weight when tested in accordance with the most recent

EPA Methods 3050 and 6010 or 7000. Ensure yellow thermoplastic material heated for 240 ± 5 minutes at 425 ± 3 °F (218 ± 2 °C) and cooled to 77 ± 3 °F (25 ± 2 °C) matches AMS-STD-595. Ensure that the Y tristimulus value is measured to be a minimum value of 45. Ensure the material, when compared to PR#1 Chart using a standard color spectrophotometer according to ASTM D 4960, plots within the following chromaticity coordinates:

	1	2	3	4
X	0.455	0.510	0.472	0.530
Y	0.444	0.485	0.400	0.456

b. Black – The black pigment must produce a completely opaque, black stripe when applied on the road and after 70 hr of weatherometer exposure in accordance with ASTM G 155 using Exposure Cycle 1 with a quartz inner filter glass and Type “S” Borosilicate outer filter glass. Ensure that Y tristimulus value is measured to be a maximum value of 5.

c. Ensure the in-service daytime chromaticity for yellow, white, and black material plots within the following coordinates after a period of 30 days:

	1		2		3		4	
	x	y	x	y	x	y	x	y
White	0.290	0.315	0.310	0.295	0.350	0.340	0.330	0.360
Yellow	0.435	0.429	0.510	0.485	0.449	0.377	0.530	0.456
Black	0.355	0.355	0.305	0.305	0.285	0.325	0.335	0.375

4. Indentation Resistance

Measure the hardness by a Shore Durometer, Type A2, as described in ASTM D 2240. Maintain the temperature of the Durometer, 4.4 lb. (2 kg) load and the specimen for 2 hours at 115 °F (45 °C). Apply the Durometer and 4.4 lb. (2 kg) load to the specimen. The reading must fall between 50 to 75 units, after 15 seconds.

5. Reheating

Ensure that the compound does not break down, deteriorate, scorch, or discolor if held at application temperature of 425 °F (218 °C) for 6 hours and if reheated up to 4 times to the application temperature. Ensure that the color of white and yellow thermoplastic comply with Subsection 653.2.A.3.a and Subsection 653.2.A.3.b after prolonged heating or reheating.

6. Intermixed Glass Spheres and Reflective Composite Optics

   Ensure glass spheres meet the requirements of AASHTO M 247.

   Do not use glass spheres and /or reflective composite optics containing greater than 200 ppm total arsenic, 200 ppm total antimony, or 200 ppm total lead when tested according to US EPA Methods 3052 and 6010C, or other approved methods.

7. Flashpoint

   Ensure the thermoplastic flashpoint is not less than 500 °F (260 °C) as determined by ASTM D 92.

B. Drop-On Glass Spheres and Reflective Composite Optics

Ensure glass spheres meet the requirements of AASHTO M 247. Use spheres produced from an approved source listed on QPL 71. Glass spheres conforming to an alternative gradation may be used provided all other requirements of AASHTO M 247 and this specification are met. Do not use glass spheres and /or reflective composite optics containing greater than 200 ppm total arsenic, 200 ppm total antimony, or 200 ppm total lead when tested according to US EPA Methods 3052 and 6010C, or other approved methods.

C. Sealing Primer

Place the particular type of binder-sealer at the application rate as recommended in writing by the thermoplastic material manufacturer.

653.2.01 Delivery, Storage, and Handling

Use material delivered in 50 lb (22.7 kg) unit cardboard containers or bags strong enough for normal handling during shipment and on-the-job transportation without loss of material.

Ensure that each unit container is clearly marked to indicate the following:

- Color of the material
- Process batch number or similar manufacturer's identification
- Manufacturer's name
- Address of the plant
- Date of manufacture

653.3 Construction Requirements

653.3.01 Personnel

General Provisions 101 through 150.

653.3.02 Equipment

Depending on the marking required, use hand equipment or truck-mounted application units on roadway installations.

A. Application Machine

Ensure that each application machine is equipped with the following features:

- Parts continuously mix and agitate the material.
- Truck-mounted units for lane, edge, and center lines operate at a uniform, predetermined rate of speed, both uphill and downhill, in order to produce a uniform application of striping material and capable of following straight lines and making normal curves in a true arc.
- Conveying parts between the main material reservoir and the shaping die or gun prevent accumulation and clogging.
- Parts that contact the material are easily accessible and exposable for cleaning and maintenance.
- Mixing and conveying parts, including the shaping die or gun, maintain the material at the plastic temperature with heat transfer oil or electrical element-controlled heat. Do not use an external source of direct heat.
- Parts provide continuously uniform stripe dimensions.

- Applicator cleanly and squarely cuts off stripe ends and applies skip lines. Do not use pans, aprons, or similar appliances that the die overruns.
- Parts produce varying widths of traffic markings.
- Applicator is mobile and maneuverable enough to follow straight lines and make normal curves in a true arc.

B. Automatic Bead Dispenser

Apply glass spheres and/or reflective composite optics to the surface of the completed stripe using a dispenser attached to the striping machine to automatically dispense the beads/optics instantaneously upon the installed line. Synchronize the glass sphere/optics dispenser cutoff with the automatic cutoff of the thermoplastic material.

C. Special Kettles

Use special kettles for melting and heating the thermoplastic material. Use kettles equipped with automatic thermostatic control devices that provides positive temperature control and prevents overheating. Ensure that the applicator and kettles are equipped and arranged according to the requirements of the National Fire Underwriters.

D. Hand Equipment

Use hand equipment for projects with small quantities of lane lines, edge lines, and center lines, or for conditions requiring the equipment. Use hand equipment approved by the Engineer.

Ensure hand equipment can hold 150 lbs. (68 kg) of molten material and is maneuverable to install crosswalks, arrows, legends, lane, edge, and center lines.

E. Auxiliary Vehicles

Supply the necessary auxiliary vehicles for the operation.

653.3.03 Preparation

For asphaltic concrete pavement, do not begin placement of thermoplastic striping until 15 calendar days after completion of the final surface course.

653.3.04 Fabrication

General Provisions 101 through 150.

653.3.05 Construction

A. General Application

Notify the Engineer prior to the placement of the thermoplastic materials. Furnish the Engineer with the manufacturer's name and batch numbers of the thermoplastic materials and glass spheres to be used. Ensure that the approved batch numbers appear on the thermoplastic materials and glass spheres packages.

Thoroughly clean pavement areas to be striped. Use hand brooms, rotary brooms, air blasts, scrapers, or other approved methods that leave the pavement surface clean and undamaged. Take care to remove all vegetation and road film from the striping area. Ensure all new Portland cement concrete pavement surfaces are mechanically wire brushed or abrasive cleaned to remove all laitance and curing compound before being striped.

Lay stripe with continuous uniform dimensions.

Apply the type of stripe at each location according to the Plans, using one of the following methods:

- Spray techniques
- Extrusion methods wherein one side of the shaping die is the pavement and the other three sides are contained by or are part of the suitable equipment to heat and control the flow of material.
- Extrusion methods using a pressurized ribbon gun to control the application of material.

1. Temperature

   Apply thermoplastic traffic stripe only when the pavement temperature in the shade is above 40 °F (4 °C).

   To ensure optimum adhesion, install the thermoplastic material in a melted state at the manufacturer's recommended temperature but not at less than 375 °F (190 °C).

2. Moisture

   Do not apply when the surface is moist. When directed by the Engineer, perform a moisture test on the Portland cement concrete pavement surface. Perform the test as follows:

   a. Place approximately 1 yd^2 ($1m^2$) of roofing felt on the pavement surface.
   b. Pour approximately 1/2 gallon (2 L) of molten thermoplastic onto the roofing felt.
   c. After 2 minutes, lift the roofing felt and inspect to see if moisture is present on the pavement surface or underside of the roofing felt.
   d. If moisture is present, do not proceed with the striping operation until the surface has dried sufficiently to be moisture free.

3. Sealing Primer

   To ensure optimum adhesion, apply a binder-sealer material before installing the thermoplastic in each of the following cases:

   - Where directed by the Engineer for sprayed thermoplastic
   - Old asphaltic concrete pavements with exposed aggregates
   - Portland cement concrete pavements
   - Bridge Deck Polmer Overlay

   Ensure that the binder-sealer material forms a continuous film that mechanically adheres to the pavement and dries rapidly. Use a binder-sealer currently in use and recommended by the thermoplastic material manufacturer according to QPL 46.

   Apply the binder-sealer immediately in advance of, but concurrent with, the application of the thermoplastic material. Apply in a continuous film over the pavement surface.

4. Bonding to Old Stripe

   If the old stripe is to be renewed by overlaying with new material, ensure the new material bonds to the old line without splitting or cracking.

5. Offset from Construction Joints

   Off-set longitudinal lines at least 2 in (50 mm) from construction joints of Portland cement concrete pavements.

6. Crosswalks, Stop Bars, and Symbols

   Make crosswalks, stop bars, and symbols at least 3/32 in (2.4 mm) thick at the edges and no more than 3/16 in (4.8 mm) thick at the center.

7. Thickness

   a. Maintain the following minimum average dry thicknesses above the surface on all types of pavements
      - 0.090 in. (2.3 mm) * for lane lines
      - 0.060 in. (1.5 mm) * for edge lines
      - 0.120 in. (3.0 mm) * for gore area lines
      - 0.120 in. (3.0 mm) * for polymer overlay edge lines and lane lines

   (See below for '*' reference.)

Compute the minimums by the amount of material used each day, as follows:

(For 6 in wide stripe)	
* Average Thickness (in) =	[(lbs. used) ÷ (total linear feet)] x 0.236
(For 150 mm wide stripe)	
*Average Thickness (mm) =	[(kg used) ÷ (total linear meters)] x 4.0
(For 12 in wide stripe)	
* Average Thickness (in) =	[(lbs. used) ÷ (total linear feet)] x 0.118
(For 250 mm wide stripe)	
* Average Thickness (mm) =	[(kg used) ÷ (total linear meters)] x 2.0

b. Audible Profiled Thermoplastic – Apply a flat edge line or center line having a thickness of 0.100 inches – 0.150 inches (100 mils – 150 mils) above the surface on all types of pavements, exclusive of bumps.

8. Glass Spheres and Reflective Composite Optics

a. Apply glass spheres and/or reflective composite optics to installed stripe surface above the minimum rate recommended by the thermoplastic material manufacturer to produce the required retro-reflectivity value in accordance with Subsection 653.3.06.

b. Apply the glass sphere and/or reflective composite optics top-coating with a pressure-type gun specifically designed for applying glass spheres and/or reflective composite optics that will embed at least one-half of the sphere's and optic's diameter into the thermoplastic immediately after the material has been applied to the pavement.

c. Audible Profiled Thermoplastic– Apply glass sphere and/or reflective composite optics to all markings at the rates determined by the manufacturer's recommendations as identified in the APL system.

9. Dimensions of Raised Bumps:

a. Apply the raised bumps with a profile such that the leading and trailing edges are sloped at a sufficient angle to create an audible and vibratory warning.

b. Bumps on the edge line and/or center line markings shall be at least 0.45 in. (11 mm) at the highest point of the bump, above the pavement surface including the base line. The height measures after the application of the drop-on retroreflective elements or glass spheres.

c. Bumps shall have a minimum baseline coverage dimension of 2.5 in. (65 mm) to 3 in (75 mm) in the longitudinal direction and 6 in. (150 mm) in the transverse direction.

d. The bumps may have a drainage channel. The width of each drainage channel will not exceed 0.25 in. (6 mm) at the bottom of the channel. The longitudinal distance between bumps shall be approximately 18 in. (475 mm) center to center.

B. Removing Existing Stripe

Remove existing stripe according to Section 656.

Remove 100 percent of existing traffic stripe from:

- Portland cement concrete pavement where the new stripe will be placed at the same location as the existing marking
- Pavement where the new stripe will be placed at a different location from the existing markings

C. Tolerance and Appearance

1. No traffic stripe shall be less than the specified width and shall not exceed the specified width by more than 1/2 in. (13 mm). The length of the10 ft. (3 m) segment for skip stripe and the 30 ft. (9 m) gap between segments may vary plus or minus 1 ft. (300 mm). The alignment of the stripe shall not deviate from the intended alignment by more than 1 in. (25 mm) on straight lines. On curves up to and including 1 degree (radius of 1745 m or greater), the alignment of the stripe shall not deviate from the intended alignment by more than 1 in. (25 mm). On curves exceeding 1 degree (radius less than 1745 m), the alignment of the stripe shall not deviate from the intended alignment by more than 2 in. (50 mm).
2. The longitudinal spacing of raised bumps may vary plus or minus 1 in (25 mm)
3. Stop work when deviation exceeds the above dimensions and remove the nonconforming stripe.
4. No more than 1 percent of the bumps or more than three consecutive bumps are missing or broken (less than half a bump remaining) within the first 45 days under traffic, replace all failed bumps at no cost to the Department.
5. If the bumps are replaced and more than 2 percent of the replaced bumps fail within the first 45 days under traffic, the replacement period will be extended an additional 45 days from the date all replacement bumps were installed.
6. If at the end of the additional 45 days more than 2 percent of all bumps (initial and replacement) fail, replace all failed bumps at no expense to the Department.

D. Traffic Marking Protection (Audible Profile Thermoplastic)

Do not allow traffic onto or permit vehicles to cross newly applied pavement markings until they are sufficiently dry. Remove and replace any portion of the pavement markings damaged by passing traffic or from any other cause, at no additional cost to the Department.

653.3.06 Quality Acceptance

A. General

For a minimum of 30 days from the time of placement, ensure the thermoplastic pavement marking material and/or audible profiled thermoplastic shows no signs of failure due to blistering, excessive cracking, chipping, bleeding, staining, discoloration, oil content of the pavement materials, smearing or spreading under heat, deterioration due to contact with grease deposits, oil, diesel fuel, or gasoline drippings, spilling, poor adhesion to the pavement material, vehicular damage, and normal wear. In the event that failures mentioned above occur, ensure corrective work is completed at no additional cost to the Department.

Obtain pavement marking retroreflectivity values with a 30-meter geometry retro-reflectometer.

B. Initial Retroreflectivity

1. Longitudinal Lines

   Within 30 days of installation, ensure the in-place markings meet the following minimum reflectance values:

   a. Standard

	White	Yellow
Dry (ASTM E 1710)	400 mcd/lux/m^2	300mcd/lux/m^2

   b. Wet Weather

	White	Yellow
Dry (ASTM E 1710)	400 mcd/lux/m^2	300 mcd/lux/m^2
Wet recovery (ASTM E 2177)	150 mcd/lux/m^2	125 mcd/lux/m^2

   c. Audible Profile Thermoplastic

	White	Yellow
Dry (ASTM E 1710)	300 mcd/lux/m^2	250 mcd/lux/m^2

For each center line, edge line, and skip line, measure retroreflectivity 9 times for each mile; 3 times within the first 500 ft. (152 m), 3 times in the middle, and 3 times within the last 500 ft. (152 m). For projects less than one mile (1600 m) in length, measure retroreflectivity 9 times as above.

Record all retroreflectivity measurements on the form OMR CVP 66 in SOP 39.

2. Messages, Symbols, and Transverse Lines

   At the time of installation, ensure the in-place markings when tested according to ASTM E 1710 meet the following minimum reflectance value of 275 mcd/lux/m^2.

   Perform at a minimum, one retroreflectivity measurement at one message, one symbol and one transverse line per intersection. Take one measurement per mile (1600 m) for locations other than intersections (i.e. school messages, railroad messages, bike symbols etc.)

C. Six Month Retroreflectivity (Longitudinal Lines)

Maintain the following minimum reflectance values for 180 days after installation:

1. Standard

	White	Yellow
Dry (ASTM E 1710)	400 mcd/lux/m^2	300 mcd/lux/m^2

2. Wet Weather

	White	Yellow
Dry (ASTM E 1710)	400 mcd/lux/m^2	300 mcd/lux/m^2
Wet recovery (ASTM E 2177)	150 mcd/lux/m^2	125 mcd/lux/m^2

3. Audible Profile Thermoplastic

	White	Yellow
Dry (ASTM E 1710)	300 mcd/lux/m^2	250 mcd/lux/m^2

Retest the in-place markings according to Subsection 653.3.06.B.1, 180 days after installation to ensure these minimum retro-reflectance values are maintained.

NOTE: The Contractor is responsible for retro-reflectivity testing. Furnish initial test results to the Engineer within 30 days of application. Furnish additional testing for a period that totals 180 days from initial application or the stoppage of contract time, whichever comes first.

D. Thickness

1. New Striping

   Check the thicknesses on all skip lines, edge lines and center lines with an approved traffic marking thickness gage consisting of 3 dials as follows:

   For each center line, edge line, and skip line, measure thickness above the pavement 3 times for each mile (1600 m); once within the first 500 ft. (150 m), once in the middle, and once within the last 500 ft. (150 m). For projects less than one mile (1600 m) in length, measure the thickness above the pavement 3 times.

   Record all thickness measurements on the form OMR CVP 66 in SOP 39.

2. Recapping Refurbishment Thermoplastic

   Place durable tape, film, or metal plate of known and uniform thickness on an area to be striped. After the striper has passed over, remove the sample and measure the thickness with calipers or a micrometer.

   For each center line, edge line, and skip line, measure thickness above the pavement 3 times for each mile (1600 m); once within the first 500 ft. (150 m), once in the middle, and once within the last 500 ft. (150 m). For projects less than one mile (1600 m) in length, measure the thickness above the pavement 3 times.

   Submit results to the Engineer.

3. Audible Profiled Thermoplastic

   Ensure the thickness of white and yellow pavement marking conform to Subsection 653.3.05.A.7.b

   Record all thickness measurements on the form OMR CVP 66 in SOP 39 and submit to the Engineer.

The Engineer will verify the thickness of the pavement marking in accordance with Subsection 653.3.05.A.7.b within 30 days of receipt of the Contractor's certification.

Thickness measurement may be performed using a strong adhesive tape to install a metal plate (approximately 6 inches (150 mm) wide by 8 inches (200 mm) long, the thickness of the plate can by 1/8 inch (3 mm) as long as the plate does not deform) to the roadway where the pavement marking will be placed. After the material has dried remove the plate and check the thickness of the pavement marking material on the plate with a micrometer.

E. Corrective Work

For each mile (1600 m) section, if the thermoplastic traffic stripe fails to meet Plan details or specifications or deviates from stated dimensions, correct it at no additional cost to the Department. If removal of pavement markings is necessary, perform it according to Section 656 and place it according to this specification. No additional payment will be made for removal and replacement of unsatisfactory striping. Ensure corrective work is completed at no additional cost to the Department. Perform testing according to this specification. Any retest due to failures will be performed at no additional cost to the Department. Furnish all test reports to the Department.

Retro-reflectivity and Thickness Longitudinal Line Deficiency: A deficiency will ensue when two or more Location Average results as recorded on form OMR CVP 66 within a One-Mile (1600 m) Section do not meet the performance criteria herein. The entire line within this one-mile (1600 m) section will be determined to be deficient. If the evaluated section is less than 1.0 mile (1600 m), a single Location Average result not meeting the performance criteria herein will result in the entire line to be determined to be deficient.

Retro-reflectivity Transverse Markings and Symbol Deficiency: A single Location Average result on the marking or symbol not meeting the performance criteria herein will result in the marking or symbol to be determined to be deficient.

653.3.07 Verification

See SOP 39

653.4 Measurement

When stripe will be paid for by the square yard (meter), the actual number of square yards (meters) painted will be measured. The space between the stripes will be included in the overall measurement.

Linear measurements may be made by electronic measuring devices attached to a vehicle.

Thermoplastic traffic stripe, complete in place and accepted, is measured as follows:

A. Solid Traffic Stripe (Including Audible Stripe)

Stripe is measured by the linear foot (meter), linear mile (kilometer), or square yard (meter). Breaks or omissions in solid lines or stripes at street or road intersections are not measured for payment.

B. Skip Traffic Stripe (Including Audible Stripe)

Skip stripe is measured by the gross linear foot (meter), or gross linear mile (kilometer) as specified. The unpainted space between the painted stripes is included in the overall measurement if the plan ratio of one to three (10 ft. [3 m] skip stripe and 30 ft. [9 m] gap or other patterns as designated on the plans) remains uninterrupted. Measurement begins and ends on a stripe.

C. Words and Symbols

Each word or symbol complete according to plan dimensions is measured by the Unit.

653.4.01 Limits

General Provisions 101 through 150.

653.5 Payment

Payment is full compensation for the Work under this section, including:

- Cleaning and preparing surfaces
- Furnishing all materials
- Applying, curing, and protecting stripe
- Protecting traffic, including providing necessary warning signs
- Furnishing tools, machines, and other equipment necessary to complete the Item

Measurement and payment for removing pavement markings will be according to Section 656 when shown in the Proposal as a payment Item. Otherwise, removal will not be paid for separately, but will be included in the payment for other Work under this section.

Payment will be made under:

Item No. 653	Thermoplastic solid traffic stripe, __ in. (mm), (color)	Per linear foot (meter)
Item No. 653	Thermoplastic solid traffic stripe, __ in. (mm), (color)	Per linear mile (kilometer)
Item No. 653	Thermoplastic skip traffic stripe, __ in. (mm), (color)	Per gross linear foot (meter)
Item No. 653	Thermoplastic skip traffic stripe, __ in. (mm), (color)	Per gross linear mile (kilometer)
Item No. 653	Audible profiled thermoplastic solid traffic stripe, __ in. (mm), (color)	Per linear foot (meter)
Item No. 653	Audible profiled thermoplastic solid traffic stripe, __ in. (mm), (color)	Per linear mile (kilometer)
Item No. 653	Audible profiled thermoplastic skip traffic stripe, __ in. (mm), (color)	Per gross linear foot (meter)
Item No. 653	Audible profiled thermoplastic skip traffic stripe, __ in. (mm), (color)	Per gross linear mile (kilometer)
Item No. 653	Thermoplastic pavement markings, words, and symbols (color), type _____	Per each
Item No. 653	Thermoplastic traffic stripe	Per square yard (meter)
Item No. 653	Wet Weather Thermoplastic solid traffic stripe, __ in. (mm), (color)	Per linear foot (meter)
Item No. 653	Wet Weather Thermoplastic solid traffic stripe, __ in. (mm), (color)	Per linear mile (kilometer)
Item No. 653	Wet Weather Thermoplastic skip traffic stripe, __ in. (mm), (color)	Per gross linear foot (meter)
Item No. 653	Wet Weather Thermoplastic skip traffic stripe, __ in. (mm), (color)	Per gross linear mile (kilometer)
Item No. 653	Wet Weather Thermoplastic pavement markings, words, and symbols (color), type _____	Per each
Item No. 653	Wet Weather Thermoplastic traffic stripe	Per square yard (meter)

653.5.01 Adjustments

General Provisions 101 through 150.

DEPARTMENT OF TRANSPORTATION
STATE OF GEORGIA

SUPPLEMENTAL SPECIFICATION

Section 800—Coarse Aggregate

800.1 General Description

This section includes requirements for coarse aggregate. All aggregate shall be the specified type, class, and grade, and shall meet the requirements for the intended use.

800.1.01 Related References

A. Standard Specifications

Section 424—Bituminous Surface Treatment

B. Referenced Documents

AASHTO	ASTM
T 11	C 295
T 27	E 30
T 96	G 23
T 104	
T 303	

GDT 104

GDT 129

GDT 133

QPL 2

SOP 1

800.2 Materials

800.2.01 Coarse Aggregate

A. Requirements

The Contractor shall use the type, group, class, and grade of coarse aggregate specified. For coarse aggregate sources, see QPL 2.

1. Coarse Aggregate Types

Type	Characteristics
Crushed stone	Sound, durable rock particles.
Gravel	Sound, durable rock without damaging coatings.
Air-cooled blast furnace slag	Sound, durable particles with uniform density and quality, or other slags that have a good service record. Dry slag shall weigh at least 70 lb./ft.^{3} (1120 kg/m^3) compacted and shall contain less than 30% glassy particles by weight. Do not use slag as aggregate for Portland cement concrete.
Synthetic aggregate	Sound, durable, expanded clay, shale, or other manufactured product.

2. Coarse Aggregate Groups
   a. **Group I:** Limestone, dolomite, marble, or any combination thereof. Ensure Group I aggregates meet the abrasion requirement for Class A stone when used in Portland cement concrete of any type or class.
   b. **Group II**: Slag, gravel, granitic and gneissic rocks, quartzite, synthetic aggregate, or any combination thereof.
3. Classes

   Aggregates are classified by physical properties that determine how they are used.
   a. Do not blend aggregates that meet abrasion requirements with aggregates that do not meet requirements from different sources as listed on the Qualified Products List.
   b. "**Class A**" and "**Class B**" aggregate used in Portland cement concrete, asphaltic concrete, and bituminous surface treatment shall meet these limits:

Percent Wear AASHTO T 96 ("B" Grading)		
	Class A	**Class B**
Group I Aggregates	0-40	41-55
Group II Aggregates	0-50	51-60

   c. "**Class B**" aggregates used in all applications other than Portland cement concrete, asphaltic concrete, or bituminous surface treatment shall meet these limits:

Percent Wear AASHTO T 96 ("B" Grading)	
	Class B
Group I Aggregates	41-55
Group II Aggregates	51-65

4. Soundness

   Test coarse aggregate used in Portland cement concrete, bituminous surfaces, bituminous bases, aggregate bases, or surface treatment with five alternations of the magnesium sulfate soundness test.
   a. Use aggregate with a weight loss of less than 15 percent.
   b. The 15 percent soundness loss for a Class "CS" concrete is waived if it has a 5-year service record.

c. If the material meets all the requirements except for the 15 percent soundness requirement, the material may be used in Zones 3 and 4 (see Subsection 424.3.05, *Construction Requirements*) under the following conditions:

1) The aggregate in bituminous courses and in all types and classes of Portland cement concrete construction, except as stated in Group I, has a satisfactory five-year service record under similar service and exposure.

2) The Engineer's investigation shows that it equals or exceeds the quality of approved aggregate (in cases where the material's uniformity changes at the source or does not have a five-year service record).

5. Grades

Use coarse aggregate that is well graded within the limits and sizes specified in Table 800.1.

6. Detrimental Substances

a. Detrimental substances include shale, weathered or decomposed rock, friable particles, or any substance that may be detrimental for the use intended.

b. Do not use any aggregate that can cause a deleterious reaction.

c. Do not use aggregates that contain Chrysotile (defined as fibrous serpentinite) as a temporary or permanent unbound surfacing for roads, nor as stabilizer for soil used as subgrade, base, or surface course.

d. Detrimental substances shall not exceed the following limits:

1) For Portland Cement Concrete:

Substance	Max % Allowed
Mica schist—Materials defined in ASTM C 294 as phyllite or schist. Use GDT 104 to analyze these materials.	5
Materials that pass the No. 200 (75 µm) sieve.	1.5
Flat and elongated pieces (with lengths more than five times the average thickness).	10
Sulphur content computed as sulfide sulphur (for bridge-type structures)—If the sulphur content exceeds 0.01%, do not use the aggregate unless it passes a petrographic analysis and a weathering test equivalent to 6 months or more of exposure.	0.01
Other local detrimental substances. (Any Combination)	2.0
NOTE: Do not use aggregate in Portland Cement concrete that is capable of producing a deleterious reaction when combined with Portland Cement.	

2) For Asphaltic Concrete:

Substance	Max. % Allowed
Mica schist—Materials defined in ASTM C 294 as phyllite or schist. Use GDT 104 to analyze these materials.	10
Flat or elongated particles (with lengths more than five times the average thickness).	10
Glassy particles (slag).	30
Other local detrimental substances. (Any combination)	2.0

3) For Bituminous Surface Treatment:

Substance	Max. % Allowed
Mica schist—Materials defined in ASTM C 294 as phyllite or schist. Use GDT 104 to analyze these materials.	10
Material finer than No. 200 (75 µm) sieve. #5 Stone #6 Stone #7 Stone #89 Stone	 0.5 0.7 0.7 1.0
Flat and elongated particles (with lengths more than five times the average thickness).	10
Glassy particles (slag).	30
Other local detrimental substances. (Any combination)	2

7. Ensure that gravel used in Asphaltic Concrete and Bituminous Surface Treatment meets the following additional requirements:

- Consists of siliceous particles.
- A minimum of 85 percent, by count, of the material retained on the No. 4 (4.75 mm) sieve has one or more fractured faces.
- The fracture is for the approximate average diameter or thickness of the particle.

8. Ensure that No. 7 stone used in Bituminous Surface Treatment meets the following gradation:

¾ in. (19 mm)	½ in. (12.5 mm)	3/8 in. (9.5 mm)	No. 4 (4.75 mm)	No. 8 (2.36 mm)
100	85-100	40-70	0-15	0-5

B. Fabrication

General Provisions 101 through 150.

C. Acceptance

Test as follows:

Test	Method
Material that passes the No. 200 (75 µm) sieve	AASHTO T 11
Sulphur content	ASTM E 30, Leco method
Weathering	ASTM G 23
Petrographic analysis	ASTM C 295
Soundness (magnesium sulfate)	AASHTO T 104
Percent wear	AASHTO T 96
Aggregate gradation	AASHTO T 27
Reactivity	AASHTO T 303
Schist or phyllite	GDT 104
Flat and elongated particles	GDT 129
Friable Particles	GDT 133

D. Materials Warranty

General Provisions 101 through 150.

TABLE 800.1 - SIZES OF COARSE AGGREGATES

SIZE NO	NOMINAL SIZE SQUARE OPENINGS		AMOUNTS FINER THAN EACH LABORATORY SIEVE (SQUARE OPENINGS). %, BY WEIGHT											
	(1)	mm	2 ½ in.	2 in.	1 ½ in.	1 in.	¾ in.	½ in.	3/8 in.	No. 4	No. 8	No. 16	No. 50	2 ½ in.
			63 mm	50 mm	37.5 mm	25 mm	19 mm	12.5 mm	9.5 mm	4.75 mm	2.36 mm	1.18 mm	300 µm	63 mm
3	2-1	50 - 25	100	90-100	35-70	00-15	-----	00-5	----	-----	-----	-----	-----	
357	2-No. 4	50 - 4.75	100	95-100	-----	35-70	-----	10-30	----	00-5	-----	-----	-----	
4	1 ½ -3/4	37.5 - 19	-----	100	90-100	20-55	00 - 15	-----	00-5	-----	-----	-----	-----	
467	1 ½-	37.5 - 4.75	-----	100	95-100	-----	35 - 70	-----	10-30	00-5	-----	-----	-----	

SIZE NO	NOMINAL SIZE SQUARE OPENINGS		AMOUNTS FINER THAN EACH LABORATORY SIEVE (SQUARE OPENINGS). %, BY WEIGHT											
	(1)	mm	2 ½ in.	2 in.	1 ½ in.	1 in.	¾ in.	½ in.	3/8 in.	No. 4	No. 8	No. 16	No. 50	2 ½ in.
			63 mm	50 mm	37.5 mm	25 mm	19 mm	12.5 mm	9.5 mm	4.75 mm	2.36 mm	1.18 mm	300 µm	63 mm
	No. 4													
5	1-1/2	25 – 12.5	-----	-----	100	90-100	20-55	00-10	00-5	-----	-----	-----	-----	
56	1-3/8	25 – 9.5	-----	-----	100	90-100	40-75	15-35	00-15	00-5	-----	-----	-----	
57	1-No. 4	25 – 4.75	-----	-----	100	95-100	-----	25-60	-----	00-10	00-5	-----	-----	
6	¾-3/8	19 – 9.5	-----	-----	-----	100	90-100	20-55	00-15	00-5	-----	-----	-----	
67	¾-No. 4	19 – 4.75	-----	-----	-----	100	90-100	-----	20-55	00-10	00-5	-----	-----	
68	¾-No. 8	19 – 2.36	-----	-----	-----	100	90-100	-----	30-65	05-25	00-10	0-5	-----	
7	½-No. 4	12.5 – 4.75	-----	-----	-----	-----	100	90-100	40-70	00-15	00-5	-----	-----	
78	½-No. 8	12.5 – 2.36	-----	-----	-----	-----	100	90-100	40-75	05-25	00-10	0-5	-----	
8	3/8-No. 8	9.5 – 2.36	-----	-----	-----	-----	-----	100	85-100	10-40	0-10	0-5	-----	
89	3/8-No. 16	9.5 – 1.18	-----	-----	-----	-----	-----	100	90-100	20-55	0-15	0-10	0-5	

SIZE NO	NOMINAL SIZE SQUARE OPENINGS		AMOUNTS FINER THAN EACH LABORATORY SIEVE (SQUARE OPENINGS). %, BY WEIGHT											
	(1)	mm	2 ½ in.	2 in.	1 ½ in.	1 in.	¾ in.	½ in.	3/8 in.	No. 4	No. 8	No. 16	No. 50	2 ½ in.
			63 mm	50 mm	37.5 mm	25 mm	19 mm	12.5 mm	9.5 mm	4.75 mm	2.36 mm	1.18 mm	300 µm	63 mm
9	No. 4- No. 16	4.75 – 1.18	-----	-----	-----	-----	-----	-----	100	85-100	10-40	0-10	0-5	

(1) In inches, except where otherwise indicated. Numbered sieves are those of the United States Standard Sieve Series

August 5, 2024

DEPARTMENT OF TRANSPORTATION
STATE OF GEORGIA

SUPPLEMENTAL SPECIFICATION

Section 802—Aggregates for Asphaltic Concrete

802.1 General Description

This section includes the requirements for fine and coarse aggregates used in asphaltic concrete.

802.1.01 Definitions

Fine Aggregate: All aggregate passing a No. 8 (2.36 mm) sieve

Coarse Aggregate: All aggregate retained on a No. 8 (2.36 mm) sieve

802.1.02 Related References

A. Standard Specifications

Section 800—Coarse Aggregate

Section 828—Hot Mix Asphaltic Concrete Mixtures

B. Referenced Documents

AASHTO T 27

AASHTO T 96

ASTM C 295

GDT 63

SOP 1

802.2 Materials

802.2.01 Fine Aggregate for Asphaltic Concrete

A. Requirements

Use the appropriate type, group, class, and grade of fine aggregate.

1. Types

   Use fine aggregate made of sharp, strong, angular material meeting the required performance characteristics when combined into a mixture.

   a. Ensure that the aggregate meets the following requirements:

   - Does not contain any deleterious substances.
   - Natural sand is free of organic matter, roots, or twigs.
   - Manufactured Sand used in asphaltic concrete shall be made from Group I or Group II aggregates as specificed in Section 800.2.01 A.2.

- A combination of natural and manufactured sands meeting the requirements in Subsection 802.2.01.A.3 and Subsection 802.2.01.A.4 after being combined.

b. Do not use crushed alluvial gravel as virgin aggregate in any mixture.

2. Groups

Fine aggregate groups include:

a. Group I—Limestone, dolomite, marble, or combination thereof

b. Group II—Gravel, granitic and gneissic rocks, quartzite, natural sand, or a combination thereof

3. Sand Equivalent

Use these sand equivalent values:

Material	Sand Equivalent Value
Group I	At least 28
Group II	At least 40
Natural sand	At least 25
Blended sand*	Natural sand at least 20; combined blend at least 25
*Blended natural sands or natural sand blended with stone screenings that meet the Group I or Group II sand equivalent limits.	

4. Mica

a. Use fine aggregate with no more than 35 percent free mica in asphaltic concrete surface mixes.

b. When approved by the Engineer, use fine aggregate with more than 35 percent mica if blended with natural sand or sand manufactured from Group II aggregates.

5. Aggregate for Stone Matrix Asphalt

Manufactured screenings will be considered as fine aggregate and shall contain no more than 20 percent by weight coarser than a No. 4 (4.75 mm) sieve.

B. Fabrication

General Provisions 101 through 150.

C. Acceptance

Test the fine aggregate as follows:

Test	Method
Aggregate gradation	AASHTO T 27
Sand equivalent	GDT 63
Mica content	ASTM C 295

D. Materials Warranty

General Provisions 101 through 150.

802.2.02 Coarse Aggregate for Asphaltic Concrete

A. Requirements

1. Types

   Ensure coarse aggregate meets the following requirements:

   - Class A or B crushed stone, gravel, or synthetic aggregate as in Subsection 800.2.
   - Have uniform quality throughout without any deleterious substances.
   - Meet the required performance characteristics when combined into a mixture.

NOTE: Do not use alluvial gravel as virgin aggregate.

2. Groups

   Coarse aggregate shall be one of either group below as specified in the composition Table in Subsection 828.2.A.2:

   - Group I—Limestone, dolomite, marble, or combination thereof
   - Group II—Gravel, granite and gneissic rocks, quartzite, or combination thereof

3. Aggregate for Stone Matrix Asphalt

   Use coarse aggregate that meets requirements of this Section and Section 800 except as follows:

   - Use Class A aggregate only with percent wear of each individual size not to exceed 45 percent based on the B grading of AASHTO T 96
   - Use aggregate that meets Section 828.2.02 (Stone Matrix Asphalt Mixtures)
   - Do not blend aggregates that meet abrasion requirements with aggregates that do not meet requirements from different sources as listed on the Qualified Products List.

B. Fabrication

General Provisions 101 through 150.

C. Acceptance

Test as follows:

Test	Method
Coarse Aggregate	Subsection 800.2.01.C

D. Materials Warranty

General Provisions 101 through 150.

DEPARTMENT OF TRANSPORTATION
STATE OF GEORGIA

SPECIAL PROVISION

Section 820—Asphalt Cement

Delete Section 820 and substitute the following:

820.1 General Description

This section includes the requirements for asphalt cements prepared from crude petroleum.

820.1.01 Related References

A. Standard Specifications

General Provisions 101 through 150.

B. Referenced Documents

AASHTO R 28
AASHTO R 92
AASHTO T 44
AASHTO T 48
AASHTO T 49
AASHTO T 51
AASHTO T 53
AASHTO T 179
AASHTO T 240
AASHTO T 313
AASHTO T 314
AASHTO T 315
AASHTO T 316
AASHTO T 350
AASHTO M 332
ASTM D 7173
SOP 4
SOP 15
QPL 7
QPL 65
QPL 98
QPL 106

C. Definitions

Performance Grade (PG): Method of classifying an asphalt cement binder relative to its rated performance at different testing temperatures.

Polymer Modified Asphalt (PG 76-22 PMA): Engineered asphalt cement which incorporates Styrene-Butadiene-Styrene (SBS) or Styrene-Butadiene (SB) polymers.

Highly Modified Polymer Asphalt (PG 76E-22): Engineered asphalt cement which incorporates significantly higher levels of Styrene-Butadiene-Styrene (SBS) or Styrene-Butadiene (SB) polymers than PG 76-22 PMA.

Terminal Blended Polymer-Rubber Hybrid (PG 76-22 TBPRH): An engineered blended polymer-ground tire rubber modified hybrid asphalt cement which is fully compliant with PG binder (PG 76-22 PMA) specifications. TBPRH is blended at a refinery or terminal that is approved on GDOT's QPL 7 "Georgia's List of Approved Bituminous Materials Facilities" and transported to the asphaltic concrete producer's asphalt plant in a tanker.

Asphalt Rubber Binders (PG 76-22 ARB): Engineered asphalt cement which incorporates Styrene-Butadiene-Rubber (SBR) or Ground Tire Rubber (GTR). The GTR may be incorporated into the asphalt concrete mixtures via a dry method when approved by the Office of Materials and Testing.

Hot Applied Non-Tracking Bituminous Tack: A non-tracking engineered asphalt cement based bituminous tack coat material that is applied using a conventional heated distributor.

820.2 Materials

820.2.01 Asphalt Cement

A. Requirements

1. Type

Use a material homogenous and water-free and will not foam when heated to 347 °F (175 °C).

Ensure blend used to produce a specified performance grade meets the following requirements:

- Is uniform and homogeneous without separation.
- Uses PG 64-22 or PG 67-22 described below for the base asphalt with the exception of PG 76E-22, where a different base PG binder may be used with the approval of the Office of Materials and Testing.
- Consists of production materials not being "air-blown".
- Contains < 0.5% acid (including Polyphosphoric Acid (PPA) modification, when approved by the Office of Materials and Testing.
- Only additives or modifiers approved by the Office of Materials and Testing are to be used.

2. Grade

Use the various grades of asphalt cement meeting the requirements shown in the test requirements for Petroleum Asphalt Cements.

Add Styrene-Butadiene-Styrene (SBS) or Styrene-Butadiene (SB) to neat asphalt to produce a binder meeting requirements for PG 76-22 PMA or PG 76E-22, when specified, when roadway ADT is equal to or greater than 100,000 for Stone Matrix Asphalt (SMA) and Porous European Mix (PEM) or Open Graded Friction Course (OGFC) Mixtures. When approved by the Office of Materials and Testing, PG 76-22 TBPRH meeting all the requirements for PG 76-22 PMA and subsection 820.2.01.2, Note g, may be used when roadway ADT is equal to or greater than 100,000 ADT for SMA, PEM and OGFC mixtures.

Styrene Butadiene Rubber (SBR) or crumb rubber modified PG 76-22 are acceptable alternatives to SBS or SB modified asphalt cement at contractor's discretion, when roadway ADT is less than 100,000, provided the SBR or crumb rubber modified asphalt cement meets the tests' requirements specified in Table 8.

For SBR modified PG 64-22 or PG 67-22 to meet PG 76-22 ARB, use only SBR currently approved on QPL 65 "Georgia's List of Approved Latex Suppliers". For crumb rubber modified PG 64-22 or PG 67-22 to meet PG 76-22 ARB, use only GTR approved on QPL 106 "Georgia's List of Approved Ground Tire Rubber Suppliers" at a minimum 10% of weight of neat asphalt cement content of the asphaltic concrete mixture. Ensure Trans-

Polyoctenamer is added at 4.5% of the weight of the crumb rubber to achieve better particle distribution. Other workability additives approved on QPL 98 “Georgia’s List of Approved Workability Additives” may be used, provided the end product meets the specified requirements of PG 76-22 ARB. PG 76-22 ARB produced using ≥8%<10% GTR incorporating an approved GTR and workability additive combination is approved in accordance with Table 8 and Note c. Ensure the end product is homogenous and shows no separation or coagulation. Percentage of ambient or cryogenic ground tire rubber is neat asphalt source dependent to meet specification requirements for PG 76-22 ARB.

Performance Graded Binders approved on QPL 7 “(Georgia’s List of Approved Bituminous Materials)” shall conform to the following PG requirements.

SUPERPAVE BINDER TABLE 1 – HOT APPLIED NON-TRACKING BITUMINOUS TACK

Test and Method	Test Temperature	Specification	Notes
Rotational Viscosity AASHTO T 316	275 °F (135 °C)	Maximum 3.0 Pa-s	a
Dynamic Shear, G*/sin δ, AASHTO T 315, 10 Rad/Sec	180 °F (82 °C)	Minimum 1.00 kPa	
Penetration, 100g, 5 sec, AASHTO T 49	77 °F (25 °C)	Maximum 25	
Softening Point (°F) AASHTO T 53		Maximum 158 °F (70 °C)	

SUPERPAVE BINDER TABLE 2 – PG 58-22

Test and Method	Test Temperature	Specification	Notes
Flash Point AASHTO T 48		Minimum 446 °F (230 °C)	
Rotational Viscosity AASHTO T 316	275 °F (135 °C)	Maximum 3.0 Pa-s	a
Dynamic Shear, G*/sin δ, AASHTO T 315, 10 Rad/Sec	136 °F (58 °C)	Minimum 1.00 kPa	
Solubility of Bituminous Materials AASHTO T 44	Standard Test 77 ±0.5 °F (25 ±0.25 °C) Re-test 100 ±0.5 °F (37.8 ±0.25 °C)	Minimum 99.0%	d
ROLLING THIN FILM OVEN TEST RESIDUE (RTFO) AASHTO T 240			
Mass Loss % AASHTO T 240	325 ±1.8 °F (163 ±1 °C)	Maximum 1.0	
Dynamic Shear, G*/sin δ, AASHTO T 315, 10 Rad/Sec	136 °F (58 °C)	Minimum 2.20 kPa	
PRESSURE AGING VESSEL (PAV) AASHTO R 28			
Dynamic Shear, G* x sin δ, AASHTO T 315, 10 Rad/Sec	72 °F (22 °C)	Maximum 6000 kPa	
Creep Stiffness AASHTO T 313 @ 60 sec	10 °F (-12 °C)	S (Stiffness) Maximum 300 MPA	
		m-value Minimum 0.300	

SUPERPAVE BINDER TABLE 3 – PG 64-22

Test and Method	Test Temperature	Specification	Notes
Flash Point AASHTO T 48		Minimum 446 °F (230 °C)	
Rotational Viscosity AASHTO T 316	275 °F (135 °C)	Maximum 3.0 Pa-s	a
Dynamic Shear, G*/sin δ, AASHTO T 315, 10 Rad/Sec	147 °F (64 °C)	Minimum 1.00 kPa	
Solubility of Bituminous Materials AASHTO T 44	Standard Test 77 ±0.5 °F (25 ±0.25 °C) Re-test 100 ±0.5 °F (37.8 ±0.25 °C)	Minimum 99.0%	d
ROLLING THIN FILM OVEN TEST RESIDUE (RTFO) AASHTO T 240			
Mass Loss % AASHTO T 240	325 ±1.8 °F (163 ±1 °C)	Maximum 1.0	
Dynamic Shear, G*/sin δ, AASHTO T 315, 10 Rad/Sec	147 °F (64 °C)	Minimum 2.20 kPa	
PRESSURE AGING VESSEL (PAV) AASHTO R 28			
Dynamic Shear, G* x sin δ, AASHTO T 315, 10 Rad/Sec	77 °F (25 °C)	Maximum 6000 kPa	
Creep Stiffness AASHTO T 313 @ 60 sec	10 °F (-12 °C)	S (Stiffness) Maximum 300 MPA	
		m-value Minimum 0.300	

SUPERPAVE BINDER TABLE 4 – PG 67-22

Test and Method	Test Temperature	Specification	Notes
Flash Point AASHTO T 48		Minimum 446 °F (230 °C)	
Rotational Viscosity AASHTO T 316	275 °F (135 °C)	Maximum 3.0 Pa-s	a
Dynamic Shear, G*/sin δ, AASHTO T 315, 10 Rad/Sec	153 °F (67 °C)	Minimum 1.00 kPa	
Solubility of Bituminous Materials AASHTO T 44	Standard Test 77 ±0.5 °F (25 ±0.25 °C) Re-test 100 ±0.5 °F (37.8 ±0.25 °C)	Minimum 99.0%	d
ROLLING THIN FILM OVEN TEST RESIDUE (RTFO) AASHTO T 240			
Mass Loss % AASHTO T 240	325 ±1.8 °F (163 ±1 °C)	Maximum 1.0	
Dynamic Shear, G*/sin δ, AASHTO T 315, 10 Rad/Sec	153 °F (67 °C)	Minimum 2.20 kPa	
PRESSURE AGING VESSEL (PAV) AASHTO R 28			
Dynamic Shear, G* x sin δ, AASHTO T 315, 10 Rad/Sec	80 °F (26.5 °C)	Maximum 6000 kPa	
Creep Stiffness AASHTO T 313 @ 60 sec	10 °F (-12 °C)	S (Stiffness) Maximum 300 MPA	
		m-value Minimum 0.300	

SUPERPAVE BINDER TABLE 5 – PG 76-22 PMA

Test and Method	Test Temperature	Specification	Notes
Flash Point AASHTO T 48		Minimum 446 °F (230 °C)	
Rotational Viscosity AASHTO T 316	275 °F (135 °C)	Maximum 3.0 Pa-s	a
Dynamic Shear, G*/sin δ, AASHTO T 315, 10 Rad/Sec	169 °F (76 °C)	Minimum 1.00 kPa	
Dynamic Shear, Phase Angle δ AASHTO T 315,	169 °F (76 °C)	Maximum 75°	e
Solubility of Bituminous Materials AASHTO T 44	Standard Test 77 ±0.5 °F (25 ±0.25 °C) Re-test 100 ±0.5 °F (37.8 ±0.25 °C)	Minimum 99.0%	d
ROLLING THIN FILM OVEN TEST RESIDUE (RTFO) AASHTO T 240			
Mass Loss % AASHTO T 240	325 ±1.8 °F (163 ±1 °C)	Maximum 1.0	
Dynamic Shear, G*/sin δ, AASHTO T 315, 10 Rad/Sec	169 °F (76 °C)	Minimum 2.20 kPa	
Multiple Stress Creep Recovery, J_{nr}, 3.2 AASHTO T 350	147 °F (64 °C)	Maximum 0.50 kPa^{-1} Maximum $J_{nr\ diff}$ = 75%	h
Multiple Stress Creep Recovery, % Recovery AASHTO M 332	147 °F (64 °C)	$\%Recovery_{3.2} > 29.37\ (J_{nr\ 3.2})^{-0.2633}$	
PRESSURE AGING VESSEL (PAV) AASHTO R 28			
Dynamic Shear, G* x sin δ, AASHTO T 315, 10 Rad/Sec	88 °F (31 °C)	Maximum 6000 kPa	
Creep Stiffness AASHTO T 313 @ 60 sec	10 °F (-12 °C)	S (Stiffness) Maximum 300 MPA	
		m-value Minimum 0.300	

SUPERPAVE BINDER TABLE 6 – PG 76E-22

Test and Method	Test Temperature	Specification	Notes
Flash Point AASHTO T 48		Minimum 446 °F (230 °C)	
Rotational Viscosity AASHTO T 316	275 °F (135 °C)	Maximum 5.0 Pa-s	a
Dynamic Shear, G*/sin δ, AASHTO T 315, 10 Rad/Sec	169 °F (76 °C)	Minimum 1.00 kPa	
Solubility of Bituminous Materials AASHTO T 44	Standard Test 77 ±0.5 °F (25 ±0.25 °C) Re-test 100 ±0.5 °F (37.8 ±0.25 °C)	Minimum 99.0%	d
ROLLING THIN FILM OVEN TEST RESIDUE (RTFO) AASHTO T 240			
Mass Loss % AASHTO T 240	325 ±1.8 °F (163 ±1 °C)	Maximum 1.0	
Multiple Stress Creep Recovery, J_{nr}, 3.2 AASHTO T 350	169 °F (76 °C)	Maximum 0.10 kPa^{-1} Maximum $J_{nr\ diff}$ = 75%	f, h
Multiple Stress Creep Recovery, % Recovery AASHTO M 332	169 °F (76 °C)	$\%Recovery_{3.2} \geq 90$	f
PRESSURE AGING VESSEL (PAV) AASHTO R 28			
Dynamic Shear, G* x sin δ, AASHTO T 315, 10 Rad/Sec	88 °F (31 °C)	Maximum 6000 kPa	
Creep Stiffness AASHTO T 313 @ 60 sec	10 °F (-12 °C)	S (Stiffness) Maximum 300 MPA	
		m-value Minimum 0.300	

SUPERPAVE BINDER TABLE 7 – PG 76-22 TBPRH

Test and Method	Test Temperature	Specification	Notes
Flash Point AASHTO T 48		Minimum 446 °F (230 °C)	
Rotational Viscosity AASHTO T 316	275 °F (135 °C)	Maximum 3.0 Pa-s	a
Dynamic Shear, G*/sin δ, AASHTO T 315, 10 Rad/Sec	169 °F (76 °C)	Minimum 1.00 kPa	
Dynamic Shear, Phase Angle δ AASHTO T 315,	169 °F (76 °C)	> 42 ≤ 75°	e
Solubility of Bituminous Materials AASHTO T 44	Standard Test 77 ±0.5 °F (25 ±0.25 °C) Re-test 100 ±0.5 °F (37.8 ±0.25 °C)	Minimum 99.0%	d
ROLLING THIN FILM OVEN TEST RESIDUE (RTFO) AASHTO T 240			
Mass Loss % AASHTO T 240	325 ±1.8 °F (163 ±1 °C)	Maximum 1.0	
Dynamic Shear, G*/sin δ, AASHTO T 315, 10 Rad/Sec	169 °F (76 °C)	Minimum 2.20 kPa	
Multiple Stress Creep Recovery, J_{nr}, 3.2 AASHTO T 350	147 °F (64 °C)	Maximum 0.50 kPa^{-1} Maximum $J_{nr\ diff}$ = 75%	h
Multiple Stress Creep Recovery, % Recovery AASHTO M 332	147 °F (64 °C)	$\%Recovery_{3.2} > 29.37\ (J_{nr\ 3.2})^{-0.2633}$	f
PRESSURE AGING VESSEL (PAV) AASHTO R 28			
Dynamic Shear, G* x sin δ, AASHTO T 315, 10 Rad/Sec	88 °F (31 °C)	Maximum 6000 kPa	
Creep Stiffness AASHTO T 313 @ 60 sec	10 °F (-12 °C)	S (Stiffness) Maximum 300 MPA	
		m-value Minimum 0.300	

Test and Method	Test Temperature	Specification	Notes
OTHER TESTS			
Polymer Separation Test ASTM D 7173	325.4 ± 9 °F (163 ±5 °C)	Maximum 18 °F (10 °C) difference between top and bottom specimens	
All PG 76-22 TBPRH Materials must meet initial evaluation requirements detailed in Note g			

SUPERPAVE BINDER TABLE 8 – PG 76-22 ARB

Test and Method	Test Temperature	Specification	Notes
Flash Point AASHTO T 48		Minimum 446 °F (230 °C)	
Rotational Viscosity AASHTO T 316	275 °F (135 °C)	Maximum 3.0 Pa-s	a, b
Dynamic Shear, G*/sin δ, AASHTO T 315, 10 Rad/Sec	169 °F (76 °C)	Minimum 1.00 kPa	b
ROLLING THIN FILM OVEN TEST RESIDUE (RTFO) AASHTO T 240			
Mass Loss % AASHTO T 240	325 ±1.8 °F (163 ±1 °C)	Maximum 1.0	b
Dynamic Shear, G*/sin δ, AASHTO T 315, 10 Rad/Sec	169 °F (76 °C)	Minimum 2.20 kPa	b
ROLLING THIN FILM OVEN TEST RESIDUE (RTFO) AASHTO T 240 PG76-22 ARB USING ≥ 8% < 10% GTR			
Multiple Stress Creep Recovery, J_{nr}, 3.2 AASHTO T 350	147 °F (64 °C)	Maximum 0.50 kPa^{-1} Maximum $J_{nr\ diff}$ = 75%	b, c, h
Multiple Stress Creep Recovery, % Recovery AASHTO M 332	147 °F (64 °C)	$\%Recovery_{3.2} > 29.37\ (J_{nr\ 3.2})^{-0.2633}$	b, c
PRESSURE AGING VESSEL (PAV) AASHTO R 28			
Dynamic Shear, G* x sin δ, AASHTO T 315, 10 Rad/Sec	88 °F (31 °C)	Maximum 6000 kPa	b
Creep Stiffness AASHTO T 313 @ 60 sec	10 °F (-12 °C)	S (Stiffness) Maximum 300 MPA	b
		m-value	

Test and Method	Test Temperature	Specification	Notes
		Minimum 0.300	
OTHER TESTS			
Polymer Separation Test ASTM D 7173	325.4 ±9 °F (163 ±5 °C)	Maximum 18 °F (10 °C) difference between top and bottom specimens	b
AASHTO T 51, 5 cm per min, cm	77 °F (25 °C)	Ductility Minimum 15 cm	b
All PG 76-22 ARB Materials must meet initial evaluation requirements detailed in Note g			

Notes:

a. The Department may waive this requirement if the supplier warrants the asphalt binder can be adequately pumped and mixed at temperatures meeting all applicable safety standards.

b. PG 64-22 or PG 67-22 modified to meet PG 76-22 ARB using crumb rubber, via dry method, will be evaluated using complete analysis for compliance with PG 76-22 ARB requirements prior to mixture production using laboratory blended materials. PG 64-22 or PG 67-22 modified to meet PG 76-22 ARB using crumb rubber, via dry method, will be evaluated for compliance with original DSR testing requirements for PG 76-22 during mixture production using abson recovery in accordance with GDT 119 in compliance with AC sampling frequencies established in GSP 21 Sub-Section, A.9.

c. AASHTO T 350 and R 92 shall be used in lieu of AASHTO 51 for PG 76-22 ARB incorporating ≥ 8% < 10% GTR in accordance with Table 8.

d. Ensure Solubility testing results performed in accordance with AASHTO T 44 are included on all Performance Graded and TBPRH binders' Certificates of Analysis (COA) submitted with annual QPL 7 documents. The Department may sample and perform Solubility testing at greater than minimum required frequencies.

e. Phase Angle testing shall be conducted in lieu of AASHTO T 350 and R 92 for all "Start-up" samples which are required when an asphalt plant has not produced mixture for more than seven (7) calendar days,

f. MSCR testing in accordance with AASHTO T 350 and R 92, shall also be conducted for all "Start-up" samples which are required when an asphalt plant has not produced mixture for more than seven (7) calendar days in addition to the standard testing requirement use.

g. All asphalt binders incorporating GTR require three (3) successful minimum one (1) year trial test sections, for that GTR Modifier and Workability Additive combination, prior to approval on QPLs 98 and 106. Additionally, all GTR Modifier and Workability Additive combinations will be approved mix type specific, requiring a minimum of one (1) acceptable test section for each mix type, prior to its use in that mix type project wide.

h. The $J_{nr\ diff}$ requirement shall not apply to asphalt binders having a $J_{nr\ 3.2}$ value of 0.5 kPa^{-1} or lower at the selected temperature.

Thoroughly blend the composite materials at the supply facility prior to being loaded into the transport vehicle if modification is required in accordance with 820.2.01. Ensure all blending procedures, formulation, and operations are approved by the Office of Materials and Testing.

3. Certification:

Provide certified test results from an approved, certified laboratory of blends for proposed PG asphalt for each specification characteristic of the asphalt cement proposed for shipment. Provide the certified results to the State Materials Engineer as required in Standard Operating Procedure (SOP 4).

The State Bituminous Construction Manager may temporarily approve daily testing to be performed at a different approved facility when a terminal or refinery is actively shipping a product for extenuating circumstances. The State Bituminous Construction Manager may interrupt production until test results are known in the event there is reason to suspect a sample will be outside specification limits. Mixture placed incorporating modified binders determined to not meet specification requirements may be subject to removal at the recommendation of the State Materials Engineer.

B. Materials Warranty

General Provisions 101 through 150.