

**Guidelines for Preparation of Traffic Control
and Pavement Marking Plans for Design-Build Projects**
August 2008

Introduction

Use the following Guidelines in conjunction with the Traffic Control Scope of Work provided in the Request for Proposals and Design-Build Submittal Guidelines to develop the Traffic Control and Pavement Marking Plans. The Traffic Control and Pavement Marking Plans shall be developed to accommodate all types of traffic as defined by the *2003 Manual of Uniform Traffic Control Devices*, including but not limited to over-sized vehicles.

Traffic Control Plan and Final Pavement Marking Plan Development procedure:

Unless prior approval is obtained from the Alternative Delivery Unit, use the procedure below to develop Traffic Control and Final Pavement Marking Plans.

1. General requirements for developing Traffic Control and Pavement Marking Plans:

The Traffic Control Plan shall identify all maintenance of traffic needs, including but not limited to, lane closures, road closures, traffic control devices, temporary lane markings, construction signing, etc. The plan shall identify lane widths, transition taper lengths and any geometry necessary to define placement of devices and temporary roadway alignments, including but not limited to crossovers. The Plan shall show the pavement design for temporary roadway alignments and pavement markings / markers for temporary patterns on all roads and shoulders.

Ensure the development of the Traffic Control Plan is in compliance with the NCDOT 2006 *Roadway Standard Drawings*, NCDOT 2006 *Standard Specifications for Roads and Structures*, and the *2003 Manual on Uniform Traffic Control Devices (M.U.T.C.D.)*.

NCDOT's 2006 *Roadway Standard Drawings* – Sections 1100 and 1200 - contain traffic control and pavement marking standard details. These will need to be incorporated into the plans for most work activities. The Traffic Control and Final Pavement Marking Plans shall provide details where traffic control activities, device placement and / or pavement marking layouts cannot be entirely covered by these standard drawings.

The Work Zone Traffic Control web site shown below contains the latest microstation cell libraries, revised roadway standard drawings, latest work zone warning sign details, and special provisions that shall be adhered to.

<http://www.ncdot.org/doh/preconstruct/wztc/>

2. Plan Layout:

- a. TCP and Final Pavement Marking Plan Scale and Format

Traffic Control and Pavement Marking Plans shall comply with the following:

- Overview sheets shall be developed with a maximum scale of 1" = 500' (Metric 1:5000)*
- Detail sheets shall be developed with a maximum scale of 1"=50' (Metric 1:500) *
- Half-size sheets shall be 11" x 17".
- All Traffic Control Plan sheets shall be numbered TCP-1, TCP-2, etc.
- All Final Pavement Marking Plan sheets shall be numbered PM-1, PM-2, etc.
- The Traffic Control Plans shall build from the first phase submittal. Each subsequent phase submittal shall be easily added to the previous phase submittals, with minimal plan sheet replacement to the current plan.

*Scales are for full-size plans.

b. TCP and Final Pavement Marking Plan Layout

The plan layout shall contain:

- **Title sheet**, with Index of Sheets, list of 2006 *Roadway Standard Drawings* and Legend. See the WorkZone Traffic Control website for microstation cell library that contains the standard cell to be used for the Title Sheet. Title Sheet shall also contain the following NCDOT contact information:

NCDOT CONTACT INFORMATION

Phone Number (919) 250-4234 Fax number (919) 212-5711

Rodger Rochelle, PE, State Alternative Delivery Engineer

Teresa Bruton, PE, Design-Build Project Engineer

- **General Notes sheet(s)** shall contain all appropriate notes.
- **Phasing sheet(s)** shall explain how the project will be constructed while maintaining traffic and following the three rules of phasing below:
 - (1.) What Traffic Control is being used to handle traffic during this Phase? (for example: Is construction away from traffic or are lane closures and / or flaggers used during construction.)
 - (2.) What construction is occurring?
 - (3.) Where is traffic at the end of the workday?
- **Project overview sheet(s)** can be used per phase to show where construction is occurring and how traffic will be maintained. For complicated or long projects, overviews can be used to show detail sheet locations.
- **Details sheet(s) per phase** will provide more information than the project overview, showing device locations, pavement marking layout and other necessary information. Temporary hydraulic and roadway designs should also be shown on these details.
- **Work Zone Warning Sign Detail Sheet(s)** provide the appropriate Work Zone Warning Sign details from the Work Zone Traffic Control website. These details are not needed if the designer chooses to place the signs on a project overview or in phase details. However, the appropriate notes from the Work Zone Warning Sign details shall be included. The details require the designer to modify and customize them to match project conditions and shall be sealed by the designer.

- **Temporary Offsite Detour sheet(s)**, if required, shall identify the detour route and all required signing and devices. Sign designs for special signs shall be included in the Traffic Control Plans.
- **Revised Standard Drawing(s)**, see the Work Zone Traffic Control website for the latest revised standard drawings and include them in the plan if needed.
- **Final Pavement Marking Plans** shall include details for all areas that roadway standard drawings do not apply. For all symbols and line patterns, a legend of the type, width, color and material thickness shall be provided.

Other Plan requirements:

- All details and overviews shall show north arrows, traffic flow arrows, road names and any other features important to traffic control phasing.

3. First Submittal, Staging Concept and Preliminary Final Pavement Marking Plans

The first submittal shall consist of an unsealed Staging Concept and unsealed Preliminary Pavement Marking Plans.

a. Staging Concept

This submittal typically consists of a title sheet, general notes sheet(s), overview sheet(s), brief staging, work zone warning sign details, proposed detour(s) if applicable, typical section(s) and detail(s) for more complex construction issues.

Staging can be placed on overview sheet(s) or on separate sheet(s). Follow the three rules of phasing listed above but staging information can be less descriptive than that required for the phase submittals. For example, the following could be written for a staging concept submittal:

Away from traffic, construct the following: -L-, -Y1-, -Y2- and -Y3-. Traffic remains on existing alignment during this construction. (See TCP-X)

OR

Using flaggers and lane closures, construct the tie-in of proposed -Y2- while maintaining -Y2- traffic on the existing alignment. Shift -Y2- to the proposed traffic pattern by the end of the work day. (See TCP-X)

Below is a list of items the Staging Concept shall identify, if applicable. Provide information on why and where each item is needed:

- Identify the proposed temporary traffic barrier system.
- Temporary pavement
- Temporary shoring
- Temporary structures
- Structure staging
- Temporary drainage
- Temporary signals

- Temporary signing
- Temporary on-site or off-site detours
- All roadway construction

b. Preliminary Pavement Marking Plans

Submit Preliminary Pavement Marking Plans that show the pavement markings for the final alignment. Show how proposed markings will connect to existing markings and include any markings required outside of the construction limits due to temporary and final traffic patterns. Include a general statement pertaining to the type of material used for pavement markings on the final wearing surface throughout the project.

4. Phase Submittal(s) and Final Pavement Marking Plans

Phase submittals shall include more detailed information than what is required for the staging concept, including detailed phasing and detail sheets that show what construction will take place and how traffic will be maintained at all times.

a. Information required in details

Typicals and / or Cut-Section views can be useful to illustrate where construction is occurring in relation to where traffic and traffic control devices are located. Match the shading of construction areas with plan view. Typical and / or Cut-sections shall be required when an approved temporary barrier system is used.

- (1) During each particular phase of construction, shade **only** proposed work that has started or is under construction. Completed work shall be shown with solid lines and not be shaded. Do not show traffic being maintained in shaded areas
- (2) Phasing shall detail how traffic will be maintained during wedging and resurfacing operations.
- (3) Show separate Detail Sheets for separate phases of work. Label all roads and other features. Dimension lane and shoulder widths. Show traffic flow arrows and north arrows.
- (4) Details for any given phase of work shall show only the work included in that phase.
- (5) Show all necessary traffic control devices, required signing and any temporary pavement markings on Detail Sheets and in Cut-Section Views (use required scale).
- (6) Show proposed center line ticks and stations.
- (7) Show all temporary pavement markings for all signalized intersections on Detail Sheets (use required scale) and reference the appropriate temporary / final signal plan sheet.

b. Phasing

- (1) The phasing shall be more detailed than staging and follow the three rules of phasing. Below are some examples:

Step 1: Using Roadway Standard Drawing 1101.02, sheet 1 of 7, complete the following:

- *Construct the tie-in of proposed -Y2- and existing -Y3- from -Y2- Sta. X+XX to -Y2- Sta X+XX up to but not including the final surface layer. (See TCP-X).*
- *Place the final surface layer, pavement markings and pavement markers (See PM-X) on -Y2-, Sta X+XX to Sta X+XX, and -Y3-, Sta X+XX to Sta X+XX.*
- *Activate the final traffic signal (Signal # XXXXX - See Signal Plans) at the -Y2- / -Y3- intersection.*
- *Open traffic to the final pattern.*

- (2) Include a written description of how traffic will be maintained during each phase or step of construction. Refer to the proper Roadway Standard Drawing, to describe how traffic will be maintained during construction.
- (3) Refer to the Traffic Control Detail(s) by Sheet Number.
- (4) Define each traffic shift step.
- (5) Describe installation of temporary and final signal(s) and signing.
- (6) Refer to the applicable Pavement Marking Detail(s) by Sheet Number.
- (7) If the RFP allows, identify any Intermediate Contract Times (ICT's) that will be used.
- (8) Label all information on the Details that has been referred to in the Phasing (i.e. Station numbers, road names, equalities, etc.).
- (9) Provide cross sections that show temporary slopes for traffic control and retaining wall locations. The cross sections shall contain grid lines at 1- foot intervals with the station and elevation of the existing ground shown below the section at the centerline and the finished grade elevation shown above the template.

c. Final Pavement Marking Plans requirements:

Prepare Final Pavement Marking Plans at a scale of 1"=50' (metric 1:500) unless prior approval is obtained from the Alternative Delivery Unit. The plans shall show lane widths, transition tapers, lane lines, edge lines, gore markings, symbols, word messages and other appropriate markings and markers. See RFP for required type of markings and markers.

5. Revisions to RFC Plans

If changes to the RFC Traffic Control and / or Pavement Marking Plans are required, a revised plan and / or sheets shall be submitted for review and follow the requirements of the Design-Build Submittal Guidelines before the revised RFC Plans are issued.

A note that details the revision and its need shall be provided on each sheet that is revised. The original seal date and the name and license number of the professional engineer of record shall also be included on all revised sheets.

If revisions are extensive, a reprint of the entire Traffic Control and / or Pavement Marking Plans shall be provided at the Department's request. Plan sheets that are not revised shall not be resealed and dated; but shall include the original seal and date.