Chapter 11: Signing

11.1 Introduction

The Work Zone Traffic Control Section (WZTCS) signing covers a broad range of issues including sign types, placement, specifications, and design. In almost all cases, the designer will be required to use some form of signing in designing a traffic control plan, and in rare cases a pavement marking plan. Signing is the most important form of communication in or out of the work zone and helps to ensure the safety of the motorist and construction worker. Therefore, it is important to choose the most effective message or series of messages when designing traffic control plans in an effort to optimize safety on and off of the work zone. This chapter will discuss how to use the best signing applications and how they are integrated into the traffic control plan.

The purpose of this chapter is to give the designer guidelines set forth by the Work Zone Traffic Control Section concerning sign usage and placement in the work zone and how to best utilize the resources used in designing Traffic Control plans.

11.2 Definitions & Abbreviations

Advance Warning Sign (AWS) – A work zone sign that is located in advance or at the end of a work zone.

Barricade Mounted Sign – A sign mounted on the front face of a barricade.

Dynamic Sign – A type of sign that allows the message portrayed on the sign face to change, i.e. Portable Changeable Message Boards or Dynamic Message Boards.

Grade B Fluorescent Orange: Retroreflective sheeting materials meeting Grade B, commonly referred to as “intermediate grade”, are typically of unmetallized microprismatic construction. Grade B shall be used for all school zone signs, bicycle and pedestrian crossing signs (fluorescent yellow-green); and highway-rail crossing signs (fluorescent yellow).

MUTCD – Manual on Uniform Traffic Control Devices

Portable Sign – A sign erected with a portable sign stand assembly.

RSD – Roadway Standard Drawings. This Standard Manual is used to display the most appropriate signing and the placement of signing. Every designer should have a copy of the English version of the RSD.

Special Sign Design – A sign design that is not standard and requires design from the Signing Section.

Stationary Sign – A sign erected with a stationary ground mounted post.

11.3 Policies

Signing in a work zone is a very important part of designing the traffic control plan. There are three types of static signs: stationary, portable, and barricade mounted (see definitions). These sign types in addition to dynamic signs which include Portable Changeable Message Signs (CMS), Dynamic Message Signs (DMS), and Flashing Arrow Boards (FAB), make up the communication devices used to help the motoring public navigate through a work zone safely. It is the responsibility of the designer to provide the clearest communication possible in a work zone area to keep the public and construction worker safe during the life of the project.

Part of ensuring that a sign is legible is to use a sheeting material on each sign that allows the motorist to read the sign clearly at an appropriate distance. NCDOT standard policy states that all work zone signs are to utilize Grade B fluorescent orange retro-reflective sheeting or better.

11.3.1 Work Zone Traffic Control Design Resources

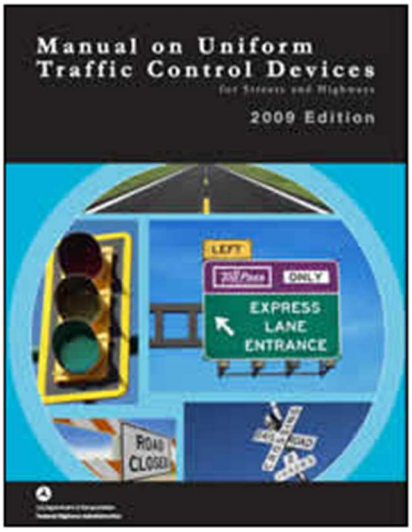
Engineering judgment is required when determining the placement of signs. In most cases, the designer can refer to a standard resource to help determine sign placement. Design resources are discussed below.

The **Roadway Standard Drawings (RSD)** are used in designing a work zone for a phase or a step within a phase. They assist the designer in selection of the best traffic control strategy, including proper signing, to move motorists through a construction work zone safely and efficiently. WZTC designers will use Division 11 for work zone signing issues. Engineering judgment is required to determine the most appropriate RSD. This includes ensuring the signing communicates the proper message to the motorist. In some cases, the most appropriate RSD will not exactly fit the design required for the work zone, so signs may need to be added, removed, or changed to accommodate the needs of the work zone. Coordinate with your supervisor to determine how best to address changes to a RSD for a specific project and ensure MUTCD minimum standards are met.

When changes to a RSD are required and apply to the majority of projects, revised sheets are drawn and inserted in the traffic control plan in place of the outdated RSD. Updated or revised RSD's will be posted on WZTC webpages until incorporated within the next publication.

The NCDOT strives to meet the standards found within the **MUTCD** and the RSD meets or exceeds to its minimum requirements. Therefore, the MUTCD is another reliable source to refer to when the RSD does not apply. There are various chapters in the MUTCD that pertain to

signing issues, but the primary chapter that a WZTC designer will refer to for such issues is Chapter 6F. When consulting the MUTCD the WZTC designer should remember that the MUTCD is the minimum standard.



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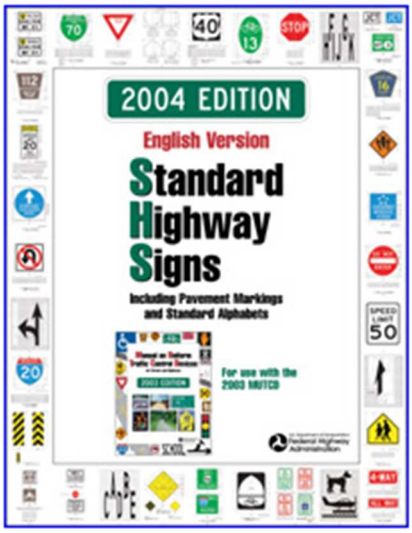

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The prevailing **Standard Specifications for Roads and Structures** is the official manual for sign specifications, placement and installation, mounting heights, etc. WZTC designers will refer to Division 11 for work zone signing issues.

The information found in the **NCDOT – Maintenance/Utility Traffic Control Guidelines** is similar to the Standard Specifications for Roads and Structures and lists information about sign credibility. It is primarily useful to contractors, D.O.T. inspectors, and field units, but can also be a good source when performing a work zone review.

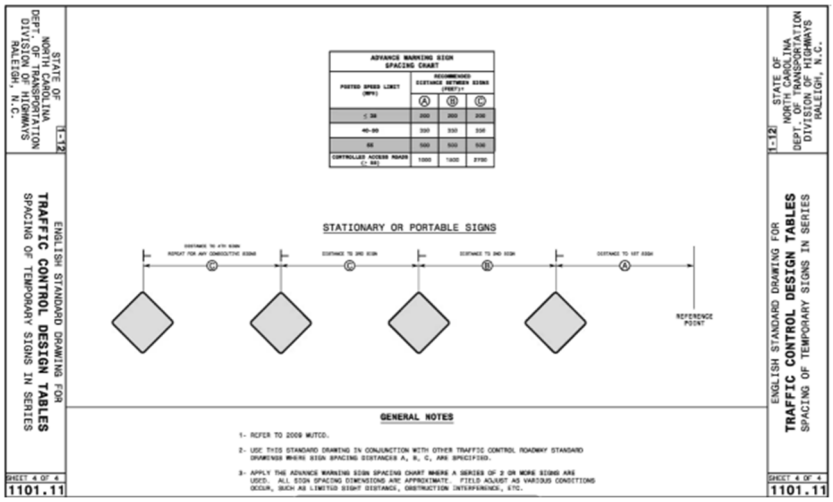
Should the designer not find any information about a particular signing question in any design resource or another experienced WZTCS employee, the designer can ask a member of the Signing Section.

11.3.2 Sign Placement

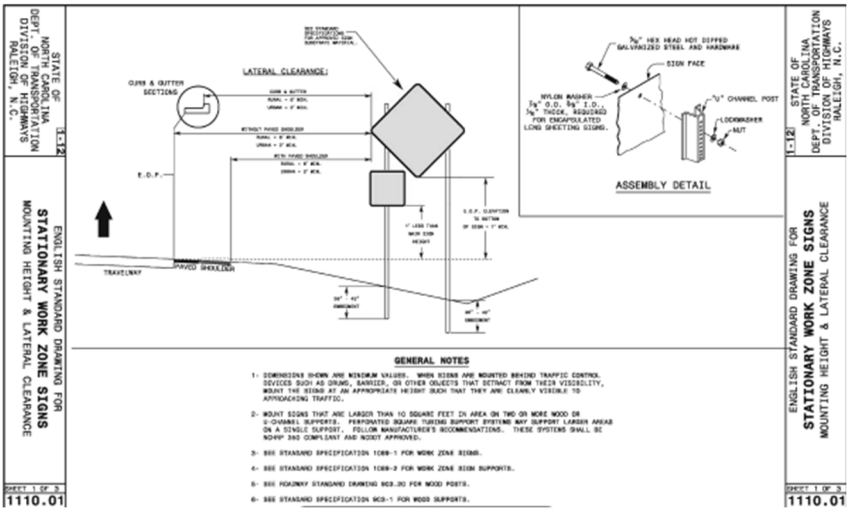
Work Zone sign placement is another important part of communicating sign messaging to the public. It is important to give the motorist an appropriate amount of time to read, comprehend, and execute the action required by the sign messaging. The RSD sheets detail the distances that signs are to be placed in advance of and within the work zone area. The drawings listed below give more specific information on how to accomplish this.

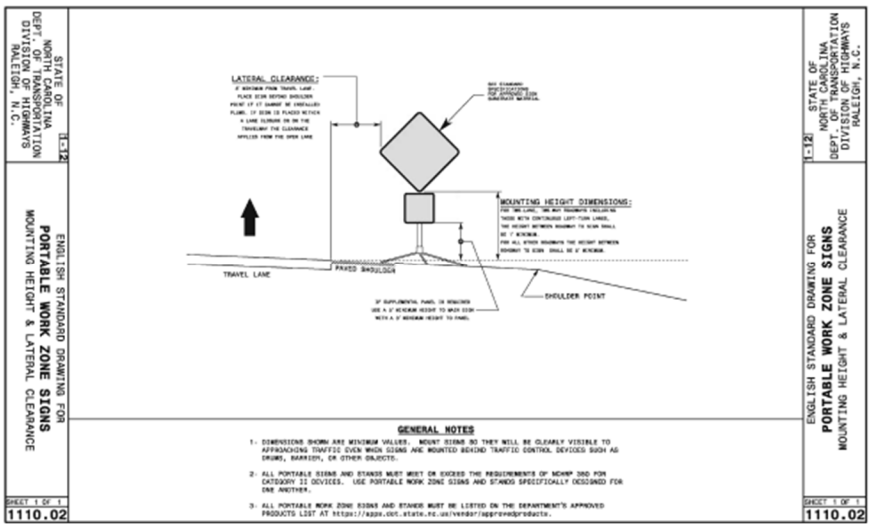
- **RSD 1101.11** These sheets include design tables and diagrams to help the designer determine the placement of signs in advance of a work zone and should be used in accordance with RSD 1101.02, 1101.03, 1101.04, 1101.05, and any other designs the designer may be required to create.

https://connect.ncdot.gov/resources/Specifications/Pages/2018-Roadway-Standard-Drawings.aspx



- **RSD 1110** series is used to determine mounting heights and lateral clearances for stationary and portable signs.





Sign placement is also important in regards to off-site detours. After determining the most appropriate off-site detour route the designer can determine the best locations of the signs for the detour route.

11.4 Off-Site Detour Design

Off-site detour routes for bridge closures, in most cases, are already resolved prior to the development of the traffic control plan. These detours are usually shown in the planning or environmental document or on the title sheet of the roadway plan. The designer should not assume that the proposed detour is the best route. In all cases, the designer should investigate all detour routes to ensure that the route corresponds to what has already been proposed within the Roadway Plans and the Planning or Environmental document. The designer should ensure that all traffic will be able to maneuver across all roadways, bridge structures, culverts, and intersections. To accomplish this task, the designer should check the following: detour vertical and horizontal curves, sight distances, pavement conditions, pavement marking/marker conditions, structure weight limit postings, deck width clearances on structures, intersection skew angles, the off-detour length, and the detour user costs.

When the Force Account document requires the contractor to install off-site detour signing for a project, the designer must also design the off-site detour in the traffic control plan. This requires the designer to:

1. Determine the appropriate off-site detour route signing locations (discussed in 3.11.3.2 Sign Placement),

2. Design the sign assemblies for the detour route, and

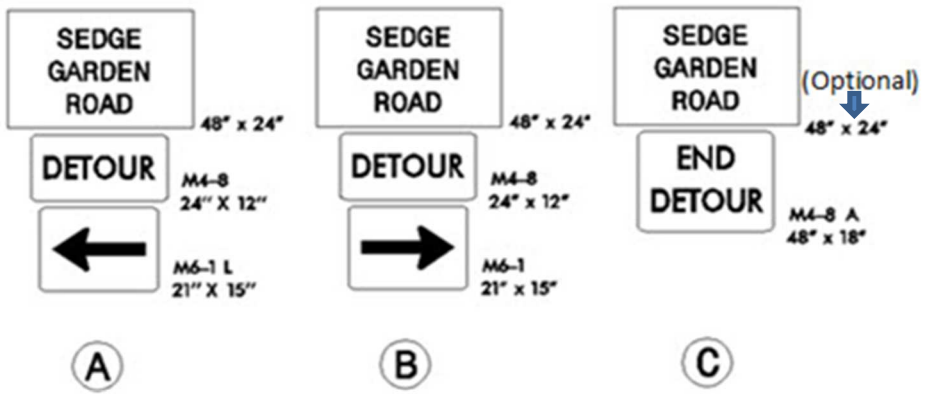
3. Request special sign designs for non-standard signs or local roads from the Signing Section. This manual will focus on the latter two steps.

11.4.1 Off-site Detour Sign Assembly Procedure

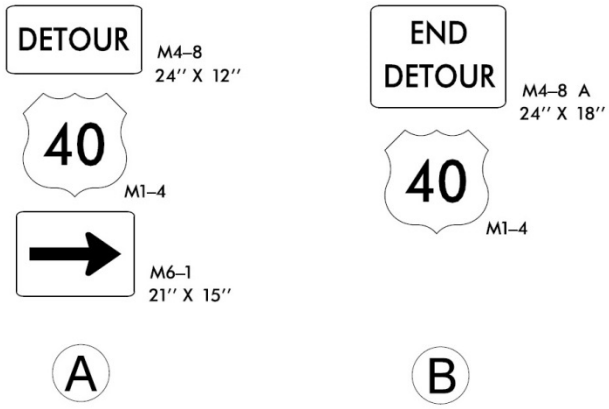
A traffic control related memorandum on Approved Traffic Control Plan Implementation Committee Recommendations (dated 08/06/97) has determined the procedure for mounting off-site detour signing assemblies. The letter has been paraphrased for the benefit of the designer to fully understand the procedure.

For all off-site detours the actual detour [message] should consist of a three-sign assembly mounted on a single post and paid for under the pay item [estimate] for "Work Zone Signs (Stationary)".

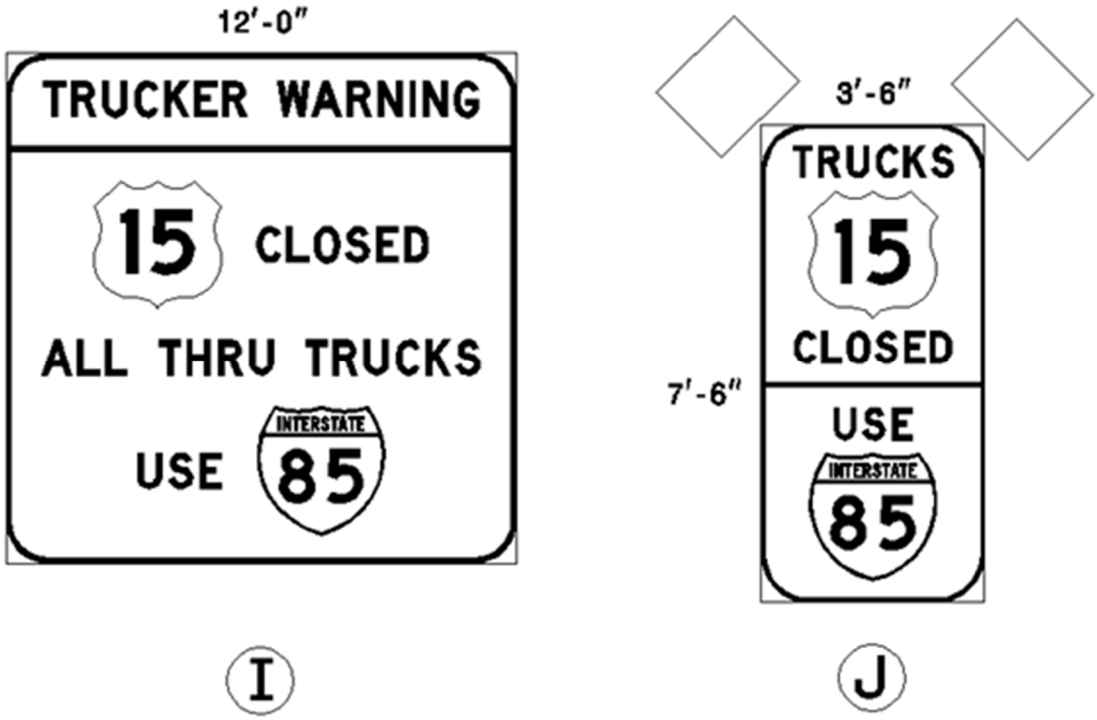
For off-site detours for local roads the sign assembly will consist of three signs. The top sign should be the local road name and would require a special design from the Signing Section. The middle sign should be sign M4-8 "Detour." The bottom sign should be a directional arrow informing the motorist of an upcoming change in the direction of the detour. "End Detour" sign assemblies may consist of two signs. When utilizing two signs, the top sign (optional) should be the local road name and the bottom sign should be the M4-8a "End Detour" sign.



For off-site detours for US, NC, or Interstate routes, the sign assemblies shall consist of three signs. The top sign should be sign M4-8 "Detour". The middle sign should be the standard route sign. The bottom sign should be a directional arrow informing the motorist of an upcoming change in the direction of the detour. "End Detour" sign assemblies shall consist of two signs. The top sign should be sign M4-8a "End Detour" and the bottom should be the standard route marker.



In rare cases, some projects require placement of detour signs on overhead or ground mounted guide signs. In these cases, the designer should determine the most appropriate message for the sign, consult with your supervisor, then coordinate with the Signing Section to ensure the sign is designed properly. This is especially important when designing large temporary signs for interstates and highways. These signs are a Signing pay item.

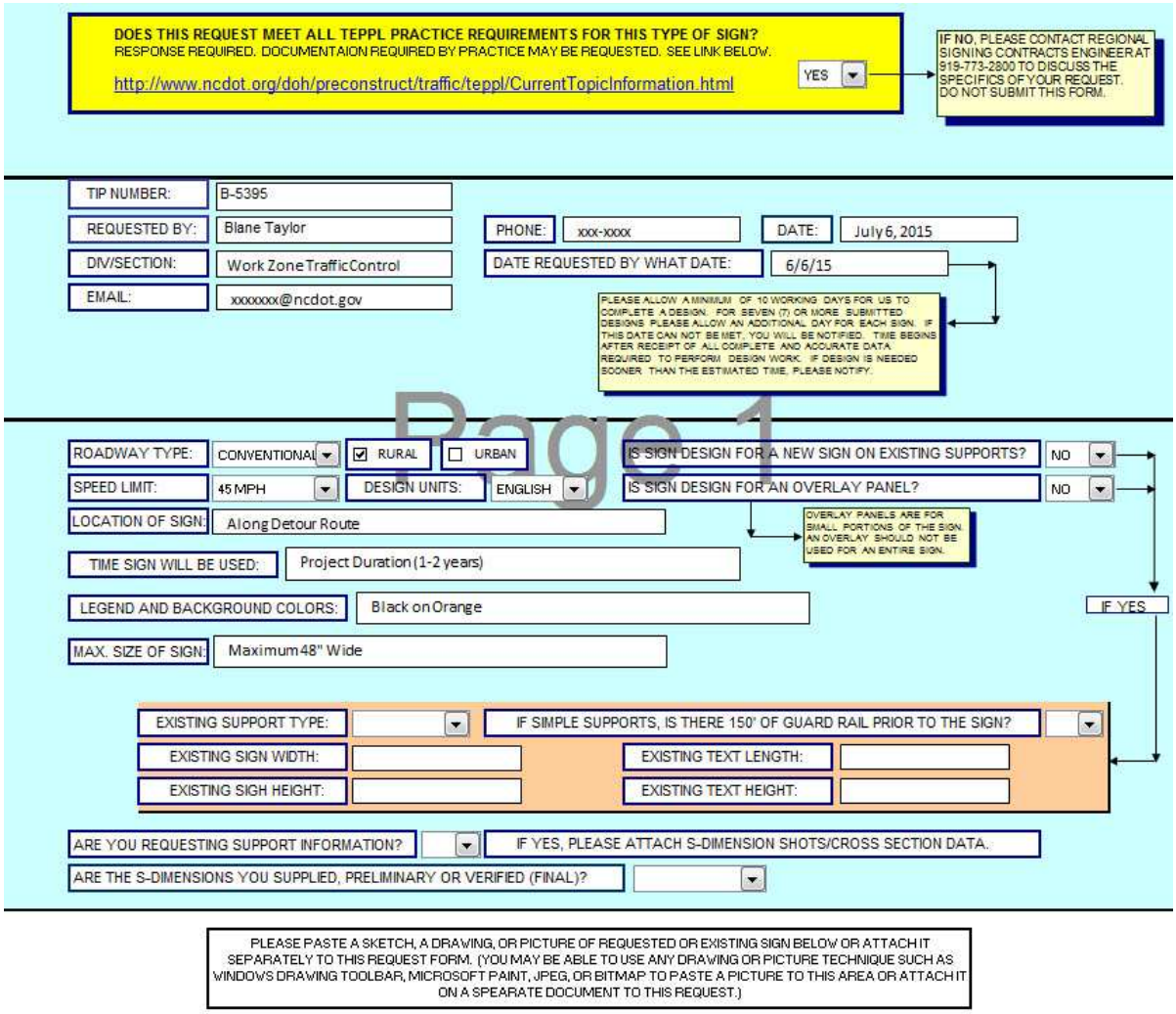


11.4.2 Special Sign Design Procedure

There are often projects which the designer is required to have a sign that is not a standard sign listed within the MUTCD or the RSD. In such cases it is necessary for the designer to request a special sign. WZTCS coordinates with the Signing Section as a part of the special sign design process.

1. To begin the design, the designer needs to determine the message needed to communicate to the public what instruction is to be carried out.

2. Once this is determined, complete the sign design form: located at https://connect.ncdot.gov/projects/wztc/pages/design-resources.aspx .Attach the form to an e-mail, and send the e-mail to the appropriate project personnel in the WZTC section. Before sending the e-mail, be sure to:
   - Include a picture of the requested sign in the form (any program with photo editing capabilities can be used. See the note on the Sign Design Request Form for examples of these programs).
   - Under the comment section request the following:
     - Have electronic copies of the sign design files sent to the designer.
     - The appropriate widths of the sign. This is to ensure that the sign itself does not become a safety hazard to the motorist.
       - For local road signs and all other signs mounted on U-channel posts, the maximum width of the sign should be between 42” to 48”.
       - For overhead and ground mounted signs, coordinate with your supervisor and the Signing section.
       - State that the sign is for temporary use and give the approximate duration the sign will be needed.



3.To utilize completed sign designs, follow the steps below.

- Create a blank design file.
- Attach the saved sign design created by the Signing Section as a reference file
- Scale reference file as desired and place blank sheet border. (DO NOT COPY THE SIGN DESIGN INTO YOUR ACTIVE DESIGN FILE AS IT WILL NOT PLOT CORRECTLY)
- Number sheet(s) sequentially within the 2 series of sheets. Example: TMP-2A, TMP-2B, etc.
- Title each sheet “SPECIAL SIGN DESIGNS”
- Plot full size plan sheet (Ensure all data can be reproduced and legible)

11.5 Design Resources

Design resources other than this book include:

Roadway Standard Drawings
Manual on Uniform Traffic Control Devices
Federal Standard Highway Signs
WZTCS Webpage
Work Zone Traffic Control Rodeo Notebook
Approved TCP Implementation Committee Recommendations: Off-Site Detour Routing and Signing