

## Chapter 23

### Signing and Pavement Marking Plans

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## Chapter 23

### Signing and Pavement Marking Plans

#### 23.1 General

Signing and pavement marking plans are usually a component set of plans. Projects with minor signing and pavement markings may include these features on sheets in the roadway plan set or detailed on roadway sheets. When prepared as component plans they shall be assembled as a separate plans set complete with a key sheet, tabulation of quantities and all other signing and pavement marking sheets. When prepared as component plans, the sheets shall be numbered consecutively with the sheet numbers prefixed by the letter “S”.

A complete set of signing and pavement marking plans shall include the following sheets:

1. Key Sheet
2. Tabulation of Quantities
3. Plan Sheets
4. Guide Sign worksheet (if required)
5. Overhead Sign Cross Section Sheet (if required)
6. Overhead Sign Support Design (if required)
7. Foundation Details (if required)
8. Boring Data Sheets (if required)

In addition, the signing and pavement marking plans may contain sheets which were prepared separately (perhaps by a sub-consultant) and incorporated into the signing and pavement marking plans early in the design process (prior to the establishment of sheet numbering). As an option, these may be identified with the following prefixes and placed at the end of the numbered sequence of the signing and pavement marking plans:

GS-# Soil Survey and Report of Core Borings normally associated with the signing and pavement marking plans set (including miscellaneous structures but excluding bridges and walls)

Pavement marking material on projects that include new asphalt surfaces will generally be paint, rather than thermoplastic. This is based on the requirement of a 90-day curing

period for new asphalt. Thermoplastic markings on these projects must be placed using a separate contract. Exceptions must be coordinated with the District Construction Office.

**Section 23.9** provides guidance for preparation of separate plans for Thermoplastic Markings.

Thermoplastic may be called for in the plans on those projects that are exclusively of concrete pavement surfaces.

## 23.2 Key Sheet

The key sheet is the first sheet in the set and shall be prepared on a standard key sheet format as described in **Chapter 3** of this volume. Contract plans set information, location map and length of project box are not required on this sheet when shown on the lead key sheet. A complete index of signing and pavement marking plans shall be shown on the left side of the sheet.

Other data, including name, consultant contract number, vendor number, and certificate of authorization number of the firm (when plans are prepared by a consultant) shall be shown as described in **Chapter 3** of this volume.

If shop drawings are anticipated, the name(s) and address(es) of the Delegated Engineer(s) for shop drawing review(s) shall be shown on the right side of the sheet.

## 23.3 Tabulation of Quantities and Pay Item Notes

The tabulation of quantities sheet shall be prepared on the standard plan format and shall show quantities, standard sign numbers, pay item numbers (except for pavement markings pay items) and size of sign for all pay items. The sign size and standard sign number is not required if shown in the plans sheets. Pay items shall be listed in numerical order and quantities shall be tabulated per sheet or by station. Provisions shall be made to show the original and final quantities. Pay item notes shall also be shown on this sheet.

On contracts with multiple Financial Project ID's or federal aid and nonfederal aid quantities, provisions shall be made to tabulate and summarize their respective quantities.

The Painted Pavement Markings (Final Surface) Lump Sum pay item will include the cost of two (2) applications of all painted pavement markings and one (1) application of Retro-reflective Pavement Markers. Refer to **Section 710** of the **Standard Specifications** for detailed information. For these items, the Signing and Pavement Making tabulation of quantities sheet should show the detailed description of the pay item and the quantities for each pay item EXCEPT in lieu of the pay item number substitute an "\*" in the Bid Item Number Column (see **Exhibit 23-1**).

A pay item note is included in the Roadway Plans as shown in **Exhibit 7-1** in **Chapter 7** of this Volume.

## **23.4 General Notes**

General notes pertaining to signing and pavement markings may be shown on a separate plan format sheet. This sheet shall be placed behind the tabulation of quantities in the plans assembly. On minor projects, general notes may be combined with the tabulation of quantities sheet.

## 23.5 Plan Sheets

### 23.5.1 Format and Scale

The plan sheets shall be prepared on a standard plan format. The scale shall be such that all details are clear and legible. See the requirements of **Section 10.1** as a guide. For simple projects, or sections of a project, “stacking” multiple plans on one sheet is generally permitted if clarity and legibility are maintained. Stationing shall progress from left to right and multiple plan views shall be stacked from top to bottom.

A north arrow and scale shall be shown at a point of maximum visibility on the sheet. If two plans are “stacked” on one sheet, then each plan portion shall contain a north arrow and scale.

Typical drawings may be used on rural projects with long sections of roadway that show only edge and lane delineation lines. Detail sheets should be used to depict markings at intersections along with typicals to depict the remaining areas. Signs may be tabulated to indicate location and disposition.

### 23.5.2 Required Information

The basic information pertaining to roadway geometrics and project limits required on the signing and pavement marking plan sheets is the same as that required on the plan portion of the plan-profile sheets (**Chapter 10** of this volume). Topography and construction details need not be shown. Utilities, drainage, lighting, sidewalks, driveways, landscape features, etc. shall be checked for conflicts. Those that may cause conflicts with sign placement shall be shown.

All pavement markings shall be clearly shown and labeled with their widths, color and spacing specified. Either the begin and end pavement marking stations, with offset or the begin pavement marking station with offset and the total length of roadway for pavement marking shall be shown. The location of raised pavement markers and delineators shall be indicated by specifying the type, color, spacing, and limits of application by stations.

All regulatory, warning and directional signs shall be shown at the proper locations. Each sign face shall be shown in close proximity to its respective sign with a leader line connecting the sign location and sign face. Each sign face shall be oriented on the plan sheet to be read as viewed from the direction of travel along the roadway. The location of all signs shall be indicated by station or milepost.

The pay item number and standard sign designation, or assigned number if nonstandard, shall be shown for each sign.

Any signs to be mounted on signal span wires should be shown and listed on the signalization plan for illustration and placement purposes. Sign details should be included on the signing plans.

Begin and end stations shall be shown.



## 23.6 Guide Sign Worksheet

The sign face, with the complete message layout with legend spacing (vertical and horizontal), margins, border widths and corner radii shall be shown on the guide sign worksheet.

For multi-support roadside signs, cross sections are not required in the plans set, but the support data (size and average length) for each sign shall be tabulated on the guide sign worksheet.

This sheet should be prepared on the standard plan sheet format to any convenient scale that will preserve clarity and legibility. The number of signs that may be shown on a single sheet depends on the sign size and complexity. The format of the sheet is flexible as long as the information listed above is shown. The output from the Transoft **GuidSign** Program or a similar format may be used for the sheet.

## 23.7 Sign Supports

### 23.7.1 Multi-Post Signs

Standard foundations for multi-post signs are provided in the **Design Standards**. These foundations are based on the sign support size. However, the post size and length are not included in the **Design Standards** and must be included as a part of the design and shown in the plans.

### 23.7.2 Overhead Sign Cross Section and Support Structure

The sign cross section sheet shows the location of overhead sign(s) in cross section. A standard profile format should be utilized. The cross section of the roadway at the sign location shall be shown and fully dimensioned. The recommended scale for the cross section is 1" = 10' horizontally and vertically.

For overhead signs, the design of the support truss, columns and foundations, along with the boring data information, shall be included in the signing and marking plans. The "Cantilever Sign Structures Data Table" and the "Span Sign Structures Data Table" work in conjunction with **Index Nos. 11310 and 11320** of the **Design Standards**. These tables include the information noted above and should be completed by the Structures Design Engineer of Record and inserted as a sheet in the plans.

A computer program for the design of overhead cantilever sign structures and a program for the design of overhead span sign structures are available. The programs were developed by the Structures Design Office and may be downloaded from the Structures Design web site.

The design of the attachment system for signs mounted on bridge structures shall be the responsibility of the Structures Design Engineer of Record. The design shall be included in the structures plans if bridge work is included in the project. If bridge work is not in the project, design details shall be included in the signing and pavement marking plans.

## **23.8 Typical Pavement Marking Sheet**

For simple projects, or sections of a project, it may be possible to show signing and pavement marking plan details schematically using straight-line format and typical markings. All signs shall be properly identified and shown at their graphic location on the straight-line diagram. Pavement markings shall be shown and labeled on a typical marking plan.

## 23.9 Plans for Thermoplastic Markings

As discussed under **Section 23.1**, placement of thermoplastic markings on most projects will require a separate contract to be let after original construction (and striping with paint) is complete. For convenience and economy several projects may be let under one contract.

As a minimum, contract plans will consist of a Key Sheet, Summary of Pay Items, Tabulation of Quantities and details about the areas to be marked. This will include any changes in pavement markings that may have occurred since completion of the original project. The scope and final content of the plans shall be as directed by the district.

### **Exhibit 23-1 Standard Notes for Signing and Pavement Marking Plans**

Add the following note at the bottom of the Tabulation of Quantities sheet:

- \* These quantities are paid for under Painted Pavement Markings (Final Surface), Lump Sum - Item No. 710-90. The quantities shown are for one application; see **Specification 710** for the number of applications required.

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