

### 2-2.3 Typical Cross Sections

This sheet shows the structural elements of the roadway. Geometric elements are to be shown on the Layout sheets, not on the typical Cross Sections sheets. Typical cross sections are a graphic representation of existing conditions, the pavement structure (structural section) and some of the proposed items of work within the station limits shown (not every item need be shown, but the major items or the majority of work from the layouts). When the project consists of only a few sheets of plans and only one typical cross section is required, this cross section may be shown on the layout sheets. Determination of the number of typical cross sections necessary to be shown is based on the change in the types of materials used, widths and depths of material used, but not changes in the types of barrier, dike or side slopes of the roadbed.

As applicable to project construction, typical cross sections are to be provided for mainlines, ramps, frontage roads, detours, etc. In all cases typical cross sections shall be presented from the perspective of looking “up-station.”

Pavement structure textural symbols, such as patterns or hatching, are not be used on the typical cross section. Existing sections are to be shown as dashed lines.

In most circumstances, the vertical scale of the sections is to be exaggerated to clearly show the thickness of the various layers of the pavement structure. Thicknesses of the layers, within any one typical section, are to be shown proportionally. The vertical dimensions of the typical cross sections are to be expressed in hundredths of a foot. Where a new pavement structure is to be

constructed, the thickness of each layer is to be rounded to the nearest 0.05-foot.

Horizontal roadway dimensions on a typical cross section are to be expressed in decimal feet, not feet and inches. Horizontal roadway dimensions are not to be shown smaller than a hundredth of a foot for existing widths and to the nearest tenth of a foot for new construction. If the lane or shoulder width is a whole number, show the width without decimals of a foot. (Example: A 12 foot lane is shown as 12' not 12.0' or 12.00').

Horizontal roadway dimensions are to be referenced to the alignment line used for construction. The cross slope of the roadbed surface is to be identified by percent and an arrow showing downward direction of slope, or where applicable, show as "MATCH EXISTING SLOPE" with an arrow showing downward direction of slope. If dimensions vary, give minimum and maximum values. Side slopes are to be identified as a horizontal to vertical ratio, and can be further described with "OR FLATTER." See Section 2-1.3 for additional instructions to describe side slopes. Hinge points for side slopes are to be identified. Do not show every change to side slopes on the typical cross sections, but rather show the side slopes that occur most within the limits of each cross section.

Cut and fill lines are to be shown on the layout sheets. Quantities of roadway excavation and embankment are to be listed with the roadway profiles, see "Profile Content" in Section 2-2.5 of this manual for additional instructions. Design cross sections are used to determine the quantities of earthwork for roadways (roadway excavation, embankment, and imported

borrow), not the Typical Cross Sections sheets.

Except for indeterminate right of way as described in the subsection titled "Right of Way" in Section 2-1.1 of this manual, right of way lines are to be shown:

- As a reference when 15 feet or less from the catch point.
- When the right of way is constant enough to be shown with one distance or a range. If a range is shown, give minimum and maximum values.

Right of way lines shown on the typical cross sections do not replace or supersede showing right of way lines on the layout sheets (or other plan view sheets). The right of way note described in Section 2-1.1 is not required on the Typical Cross Sections sheets unless there are no plan view sheets that show right of way. In this case only show the right of way note on the first sheet of the Typical Cross Sections.

The design designation, as defined in the Highway Design Manual Topic 103, shall be shown on the first sheet of the Typical Cross Sections for all new, reconstruction, or rehabilitation projects. See "Typical Cross Sections Examples" for the method of expressing the design designation.

Where geosynthetic pavement interlayer is included as part of the pavement structure, show the limits of the interlayer.

In addition to the pavement structure materials, items generally shown on a typical cross section include edge drains, barriers, ditches, shoulder backing, curb, and dikes. When these and similar items are

shown, identify the type if only one type is used, otherwise identify generically (example: HMA DIKE). If items are shown on various typical cross sections, include a note on the first Typical Cross Sections sheet such as: "EXACT LOCATIONS AND TYPES OF DIKE AND CURB ARE SHOWN ON THE LAYOUTS AND IN THE SUMMARY OF QUANTITIES SHEETS."

When there are multiple typical cross sections to be shown on a Typical Cross Sections sheet, the section with the lowest stationing limits is shown on the bottom portion of the sheet and the additional sections are to advance up the sheet in the direction of greater stationing. Where a typical cross section covers more than one range of stationing, the station labeling is to be stacked one above the other, with the lowest stationing at the top of the stack. If the typical cross sections for a route or road can be displayed in columns, start typical cross sections in the left column and go up the sheet, then proceed to the right column.

All of the typical cross sections for a route (or alignment line) should be grouped together before showing the typical cross sections for another route, ramp, frontage road or detour.

The beginning and end stations of each typical cross section would typically break at full 100-foot stations or at whole-foot stations, unless the break in the typical sections requires more detailed accuracy.

Stationing of sections to the hundredths of a station would occur where the stationing break in the pavement structure (structural section) is at an equation in the alignment or at a physical feature that requires the accuracy to hundredths of a station.

Stationing on multiple typical cross sections shall not overlap.

Pavement width transitions (traveled way or shoulders) must be shown and identified with the appropriate dimensioning.

Pavement structure designation numbers, if used, are to be consistent with those shown on the layout sheets of the plans.

Where new surfacing is to be placed on existing pavement, the bottom of the new surfacing which is to be in contact with the existing pavement is to be shown as a solid line.

The existing pavement structure, the type of material, thickness and width must be identified, even for a simple overlay project. Where the existing pavement structure was previously shown in metric units, the thickness of each layer shown shall be a conversion of the metric unit values (millimeters) to the U.S. customary unit value (hundredths of a foot).

**CHECKLIST FOR TYPICAL CROSS SECTIONS**

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- District, county and route TX=7.0, FT=3, WT=1, LV=10 (upper right corner of sheet).
- Post Miles TX=7.0, FT=3, WT=1, LV=10 (upper right corner of sheet).
- Unit and Project Number and Phase (lower right corner of sheet) TX=7.0, FT=3, WT=1, LV=10.
- Signature and date of signature release are included on Level 63. Current registration seal information is to be included on Level 10, (upper right corner of sheet). The signature is added as the last step before the project goes to PS&E. The text size for the date and information inside the seal is to be TH=7, TW=5, FT=3, WT=1 but the width can be squeezed to fit the area. If both names are long, the first name can be above the last name.
- Information inserted in plan sheet development name block spaces in left margin of border sheet. See Figures 2-10 and 2-11 in Section 2-1.6 of this manual for additional instructions.
- Label sheet(s) "NO SCALE" (TX=8.75, FT=3, WT=2, LV=10). Draw sections proportionally.
- Label the profile grade line "PG" and identify the line designation (example: "A1" LINE).
- The following note is required on the first sheet of the Typical Cross Sections, if a pavement structure is to be constructed:
  1. DIMENSIONS OF THE PAVEMENT STRUCTURES (STRUCTURAL SECTIONS) ARE SUBJECT TO TOLERANCES SPECIFIED IN THE STANDARD SPECIFICATIONS.The following note is required on the first sheet of the Typical Cross Sections when superelevation diagrams are included as part of the contract plans.
  2. SUPERELEVATIONS ARE SHOWN ON THE SUPERELEVATION DIAGRAMS.
- Design designation– Show on first sheet of Typical Cross Sections only. For additional instructions refer to the Typical Cross Sections example sheet, "Generic Project Typical Cross Section, Basic Required Information."
- Legend and list of abbreviations, on first sheet of Typical Cross Sections (do not include standard plans abbreviations as part of the listed abbreviations).
- Alignment line or station line and layout line for walls and barriers.
- Stationing limits below each section, sections with lowest stationing limits of each route at bottom of sheet with greater stationing sections stacked above.

**CHECKLIST FOR TYPICAL CROSS SECTIONS**

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- Typical Cross Sections for route, ramp, and local roads grouped separately.
- Pavement width transitions shown where necessary to clearly show how the roadbed transitions.
- Profile grade point, widths of lanes, shoulders, medians, sidewalk, gutter, ditches, etc. Show variable dimensions with limits.
- Percent of cross slopes, traveled way, shoulders, paved median, gutter, etc. with an arrow showing downward direction of slope.
- Slope rounding (where applicable). May be shown as a detail.
- Benching and strutting (where applicable).
- Right of way lines: Show as applicable to the specific project. Refer to the text of this section for instructions.
- Type, class and thickness of pavement, base and subbase.
- Pertinent existing features, including existing pavement structures, barrier, railing, ditches, shoulder backing etc.
- Seal coats, except fog seals.
- Dike with type identification if only one type, otherwise use generic (example: HMA DIKE).
- Curb types with type identification if only one type, otherwise use generic (example: CONCRETE CURB). Do not show dimensions, even for modified curbs or curb details from a local agency. Dimensions are to be shown on Construction Detail sheets.
- Subsurface drains (where applicable).

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