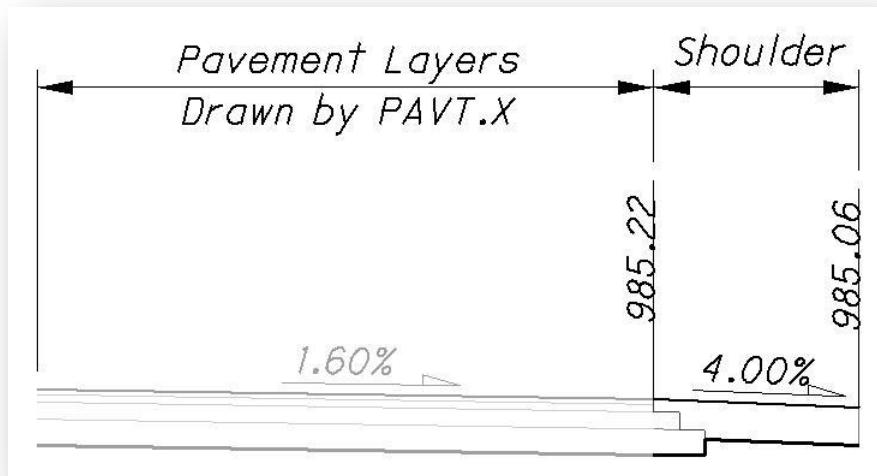

Description

SH301-8.X is used to draw a paved shoulder according to the standards defined in the Location & Design Manual, Volume One, Roadway Design, Figure 301-8. The width of the shoulder is determined from the plan view graphics. The criteria will also draw the pavement steps, beneath the shoulder, as shown below.



Inclusion Sequence

ODOT's criteria files are written so that each individual file is responsible for drawing only a specific component of the proposed cross section design. This allows for greater flexibility when utilizing the criteria files to accommodate a wide variety of design scenarios. When a criteria run is processed, the user will specify the individual criteria files that will be used to draw each component. The order in which these components are specified is significant. Criteria files must be included in the order that they will process from the centerline out. For example, the pavement criteria must be included before the shoulder criteria which must be included before the side slope criteria. Each criteria file will start drawing where the previous criteria file ended.

The ODOT Standard criteria file DEFINE.X contains default definitions for some of the Define Variables used by ODOT's criteria files. DEFINE.X must always be included first in any criteria run.

SH301-8.EX can be included after the following ODOT pavement Criteria files:

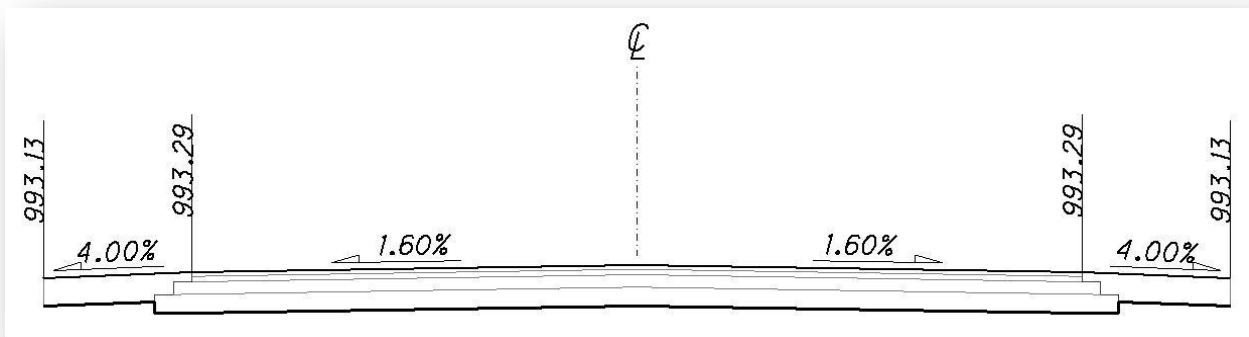
- pavt.x
- pavt_overlay1.x
- pavt_shapeless.x
- pavt_widen.x

Processing Notes

Starting from the proposed edge of pavement, the criteria will search the design file specified by the variable "proposed dgn file name" for elements matching the symbology for a proposed shoulder as defined by the dgn variable "~shoulder in dgn". If a shoulder line is encountered, the criteria will draw the shoulder using the width measured from the graphics.

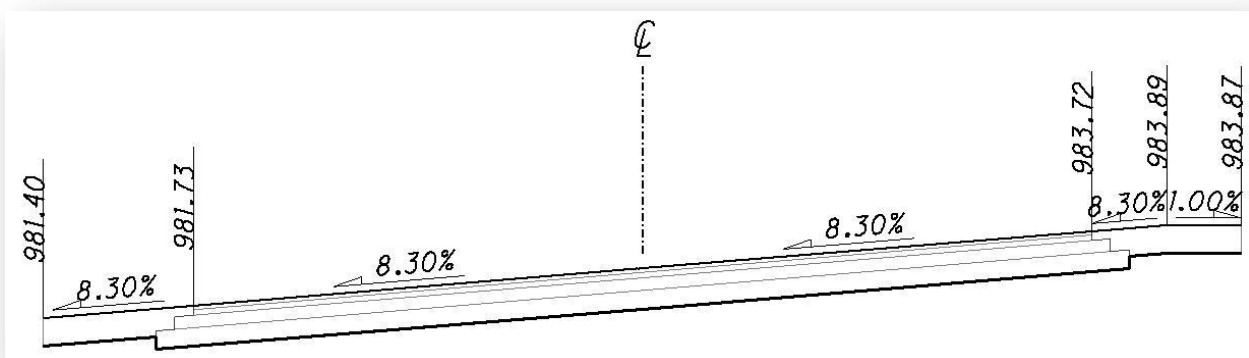
Normal Sections

The criteria will next test the cross slope of the proposed pavement. If the proposed pavement is in normal crown, the shoulder is drawn at a 4% slope as shown in below.



Superelevated Sections

On the low side of superelevated sections, the criteria will maintain the shoulder slope of 4% until the pavement slope exceeds the shoulder slope. From that point forward, the criteria will draw the shoulder at the same slope as the pavement as shown on the left side of the cross section below.



On the high side of superelevation, the criteria will break the shoulder slope as shown on the right side of the cross section above.

Define Variables

A summary of the variables defined in SH301-8.X is included below. Each variable has been assigned a default value within the criteria. The user should review the variables below to ensure that the default values are acceptable for the project. The value of each variable can be changed by the user before processing the criteria, as needed. See the ODOT GEOPAK Road Training Guide, Part 2, Chapter 5 for more information on modifying the default value of the variables.

“PROPOSED DGN FILE NAME”

This variable is used by the DEFINE_DGN variables to identify the base map MicroStation design file that contains the proposed plan view graphics. The default value for the variable has been defined using a relative path as follows:

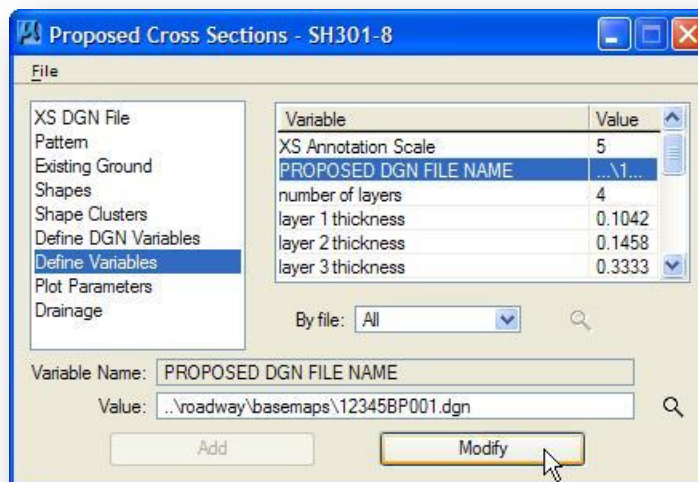
```
define "PROPOSED DGN FILE NAME" ..\roadway\basemaps\nnnnnBP###.dgn
```

By default GEOPAK will look for design files in the Working Directory assigned for the project. Using the directory structure defined in the [ODOT CADD Engineering Standards Manual](#), Section 302, Project Directory Structure, the GEOPAK Working Directory should be defined as the geopak folder.

The “..” syntax will instruct GEOPAK to look for the proposed design file by starting in the Working Directory, and then go up the project folder path one directory. From there, go into the \roadway\basemaps folder to find the file.

The name of the design file, nnnnnBP###.dgn, must be edited to reflect the name of the plan view design file for your project. See the [ODOT CADD Engineering Standards Manual](#), Section 304 File Naming Conventions for design file names.

The name and path of the "PROPOSED DGN FILE NAME" variable can be edited in the GEOPAK Proposed Cross Sections dialog as shown below.



"shoulder thickness"

The pavement thickness for the paved shoulder in Master Units.

"maximum shoulder break"

The maximum shoulder break over for the high side of super elevation. The default value is 7%.

"number of layers"

The total number of pavement layers. Up to six pavement layers can be defined. This variable is initially defined in the pavement criteria. The default value is 4.

"layer 2 step"

The step width for pavement layer 2 in Master Units, measured from the edge of pavement. The default value is 0.

"layer 3 step"

The step width for pavement layer 3 in Master Units, measured from the edge of pavement. The default value is 0.

"layer 4 step"

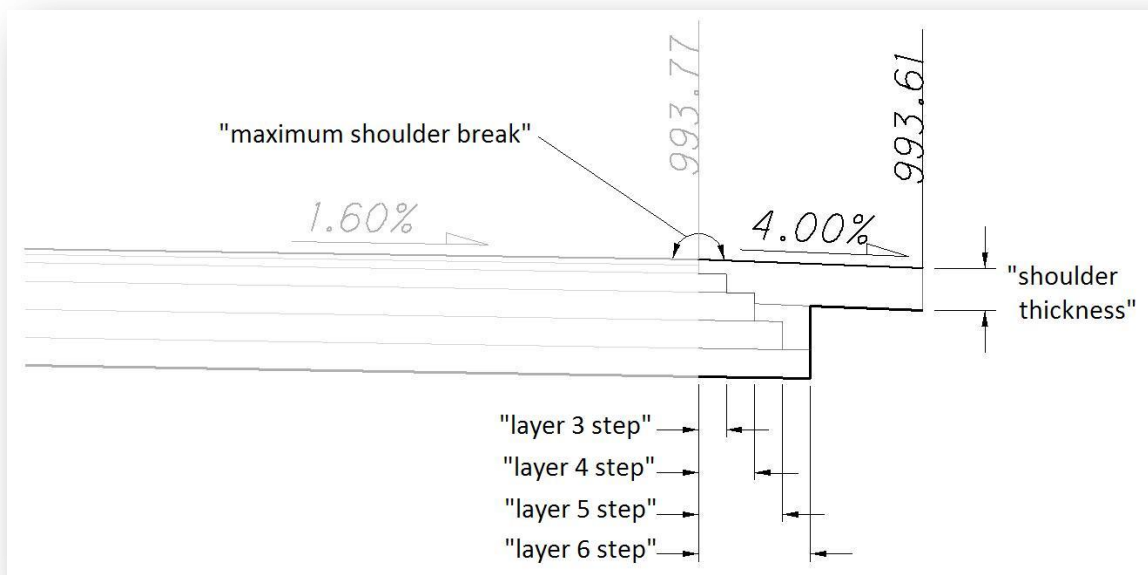
The step width for pavement layer 4 in Master Units, measured from the edge of pavement. The default value is 0.

"layer 5 step"

The step width for pavement layer 6 in Master Units, measured from the edge of pavement. The default value is 0.

"layer 6 step"

The step width for pavement layer 6 in Master Units, measured from the edge of pavement. The default value is 0.



DGN Variables

The following DEFINE_DGN variables are used by the criteria to graphically locate the MicroStation elements that SH301-8.X will search for in order to draw the proposed shoulder.

These variables have been defined with the values listed below in accordance with ODOT standards and should never be redefined by the user.

Additionally, these variables have been defined as “hidden” variables and will not show up in the DEFINE_DGN Variables portion of the Proposed Cross Sections dialog box when preparing a criteria run.

"~shoulder in dgn pr"

This variable is used to define the symbology of the proposed shoulder. The shoulder has been defined as follows:

```
define_dgn "~shoulder in dgn pr" \  
dgn = "dgn file name" \  
lvsname = PV_P_Shoulder \  
wt = 1, ByLevel \  
co = 6, ByLevel \  
lc = 0, ByLevel
```

"~curb in dgn pr"

This variable is used to define the symbology of the proposed curb. The curb has been defined as follows:

```
define_dgn "~curb in dgn pr" \  
dgn = "dgn file name" \  
lvsname = PV_P_Curb \  
wt = 1, ByLevel \  
co = 10, ByLevel \  
lc = 0, ByLevel
```

"~guardrail in dgn pr"

This variable is used to define the symbology of the proposed new guardrail. The guardrail has been defined as follows:

```
define_dgn "~guardrail1 in dgn pr" \  
dgn = "proposed dgn file name" \  
lvsname = RD_P_GR \  
wt = 1 \  
co = 11
```

"~barrier in dgn pr"

This variable is used to define the symbology of the proposed concrete barrier or median barrier. The barrier has been defined as follows:

```
define_dgn "~BARRIER IN DGN PR" \  
dgn = "PROPOSED DGN FILE NAME" \  
lvname = RD_P_Concrete_Barrier, RD_P_Median_Barrier
```

If curb or barrier is encountered, the cross slopes for the shoulder are drawn according to The Location and Design Manual, Volume Three - Highway Plans, Figure 301-8 Curbed-High Side of Superelevated Sections.

Levels and Symbology

Proposed Grading

The final cross section cut and fill lines representing the proposed grading are drawn on level XS_P_Finished_Grade. This level should always be shown on the final cross sections.

Pavement Layers

The pavement layers are drawn on level XS_P_Pavt_Layers for reference only. This level is not normally shown on the final cross sections.

Text Labels

The criteria will place labels and direction arrows annotating the shoulder slope. The criteria will also place labels for the elevation at the edge of the shoulder. These labels are all placed on level XS_P_Text_Info for the designer's reference and are not normally shown on the final cross sections.

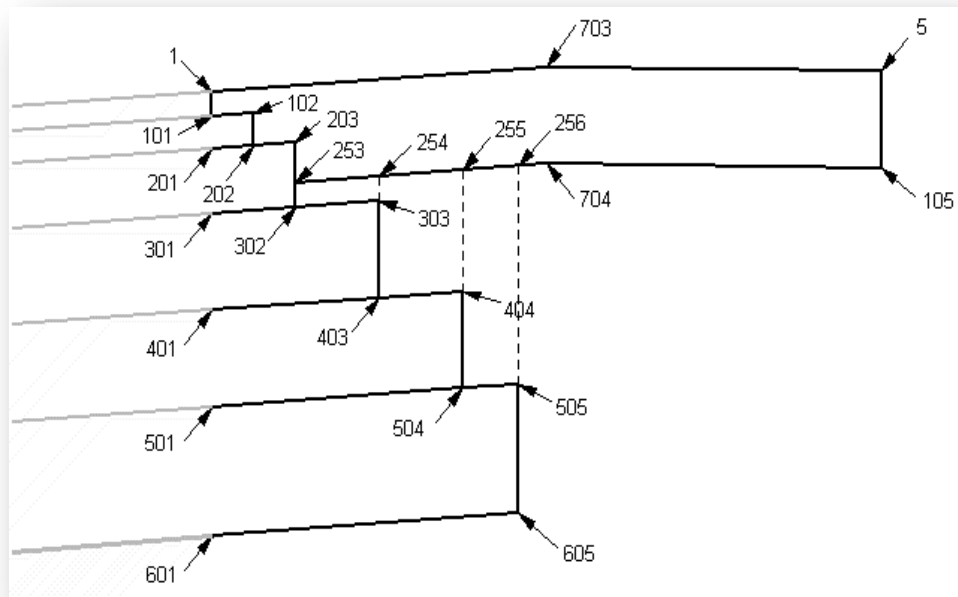
Marked Points

GEOPAK has a simple, yet very important way of "remembering" the location of various points during the drawing process. This is accomplished with marked points.

Some marked points are stored during the criteria processing that are only used temporarily and do not need to be "remembered" as processing continues. These points can be subsequently redefined by another criteria file. There are, however, certain key locations that must be referred to by multiple criteria files. The following marked points must be previously defined by the pavement criteria files in order for SH301-8.X to process correctly:

Edge of pavement	x1 y1
Bottom of pavement layer 1	x101 y101
Bottom of pavement layer 2	x201 y201
Bottom of pavement layer 3	x301 y301
Bottom of pavement layer 4	x401 y401
Bottom of pavement layer 5	x501 y501
Bottom of pavement layer 6	x601 y601

The following Marked Points are stored by the criteria, as shown in Figure 5 below:



Marked points 251 (not shown), 252 (not shown), 253, 254, 255 and 256 are located at the intersection of the bottom of the paved shoulder with the pavement layers.

Marked points 703 and 704 are stored only on the high side of superelevation in the shoulder break case.

