

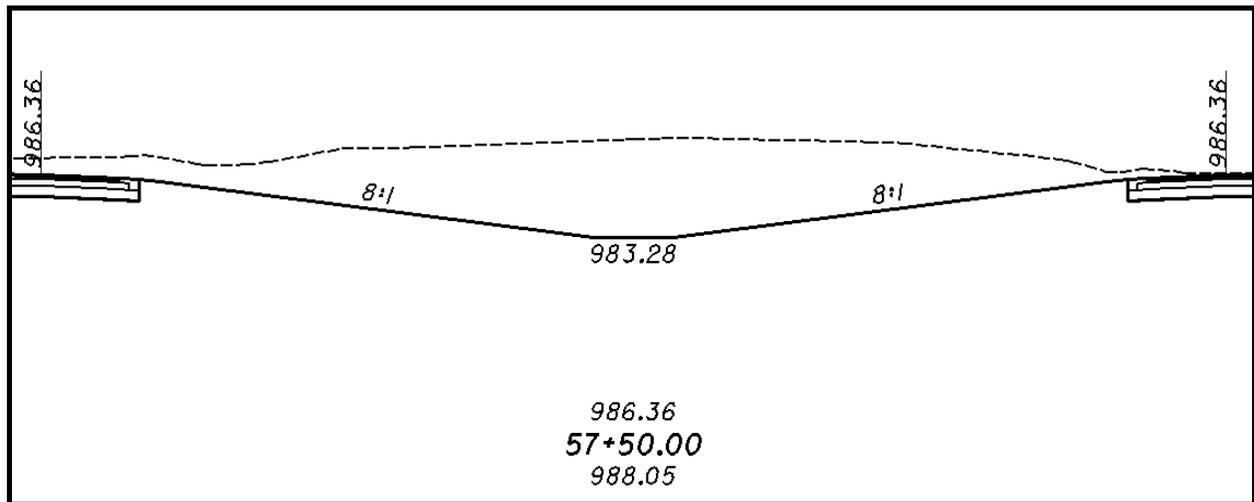
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Description

MED304-1.X is used to draw depressed medians or barrier medians according to Figure 304-1 of the Location and Design Manual, Volume 1, Roadway Design. Type A, B, A1, B1, or C barrier can be drawn according to Standard Drawing MC-9.3.

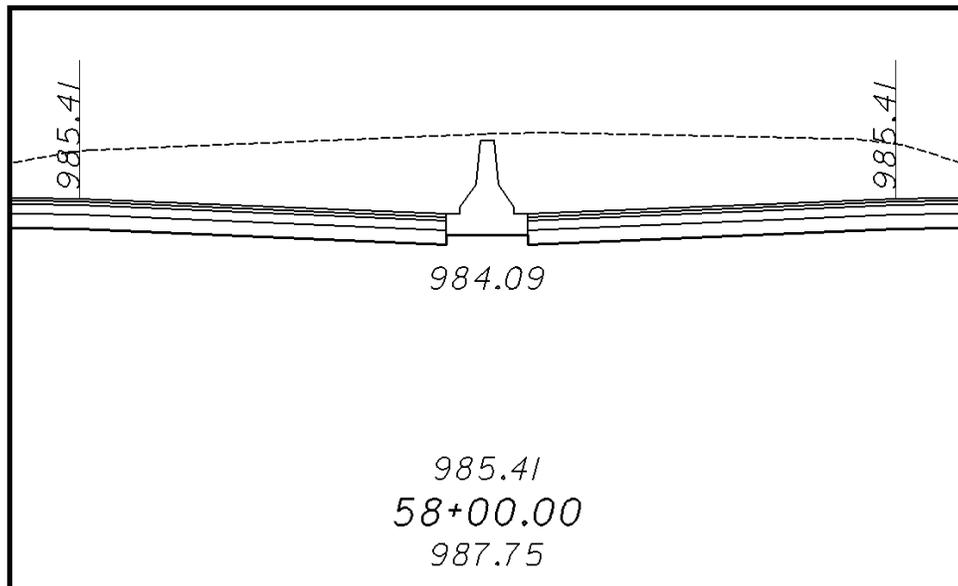
DEPRESSED MEDIAN EXAMPLE:

In this example, the median width is 60'. The median is drawn using a 8:1 slope as specified by figure 304-1 of the Location and Design Manual, Volume 1 - Roadway Design. A 4' flat bottom ditch is drawn as shown below.



BARRIER MEDIAN EXAMPLE:

In this example, the criteria encountered median barrier lines drawn in the plan view design file. A median barrier is drawn as shown below.



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Inclusion Sequence

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. `MED304-1.X` can be included after the following ODOT Standard shoulder criteria files:

```
SH301-8.X
SH301-8B.X
SH301-9.X
```

`MED304-1.EX` should be included after the shoulder criteria for the Side Slope Left condition of the Right shape cluster. A sample inclusion sequence is shown below:

```
Criteria for Shape Cluster
shape cluster baseline = P185
shape cluster profile  = P185
shape cluster tie      = -30.000
side slope LT
    include define.x
    include pavt.x
    include sh301-8b.x
    include ss307-4.x

side slope RT
    include pavt.x
    include sh301-8b.x

Criteria for Shape Cluster
shape cluster baseline = P185
shape cluster profile  = P185
shape cluster tie      = 30.000
side slope LT
    include pavt.x
    include sh301-8b.x
    include med304-1.x

side slope RT
    include pavt.x
    include sh301-8b.x
    include ss307-4.x
```

NOTES:

1. ODOT's criteria is written with the assumption that the left side slope condition is always processed first (this is the GEOPAK default). Be sure to always define the left pavement lanes and the left side slope first.
2. `DEFINE.X` does not need to be included for every side slope condition. It only needs to be included as the very first criteria file in the first side slope condition as shown in the example above.

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Define Variables

The following variables have been given default values where noted below.

“barrier type”

The width of the barrier to be drawn on the cross sections is determined by the width of the graphics in the MicroStation design file (see **Processing Notes For Barrier Medians** on page 8 for more information). The “barrier type” variable is used to determine whether a type 1 barrier should be drawn. There are two possible values for the variable as described below:

“barrier type” = 0

A type A or a type B barrier will be drawn according to Standard Drawing MC-9.3. A type C barrier will be drawn in superelevated or bifurcated sections. The default value is 0.

“barrier type” = 1

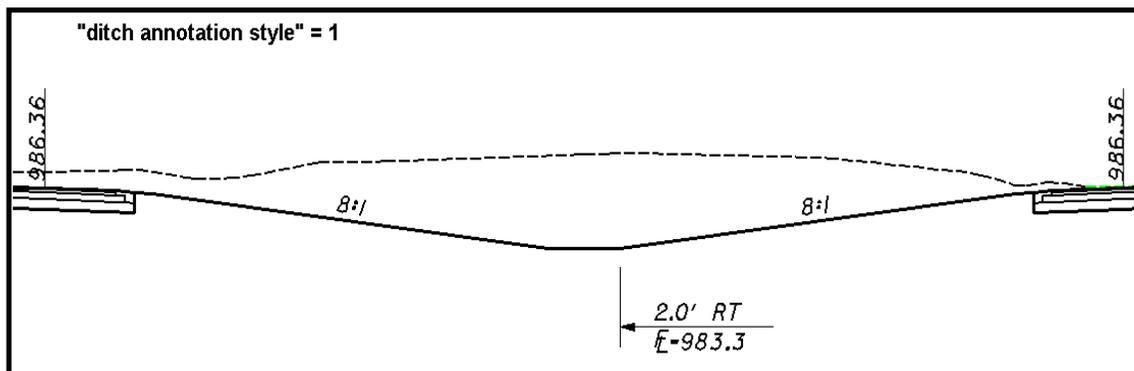
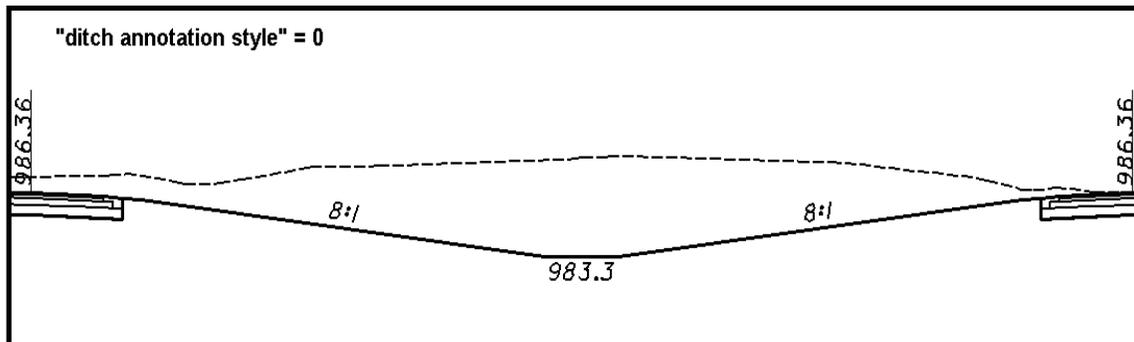
A type A1 or type B1 (50" or 1270 mm) barrier will be drawn according to Standard Drawing MC-9.3. A type C barrier will be drawn in superelevated or bifurcated sections.

“cl chain name”

This variable is used to specify the name of the COGO chain that will be used for any criteria function that measures offsets from a chain. This variable is used in labeling ditch offsets (see “ditch annotation style”). The default value is none.

“ditch annotation style”

This variable selects the ditch annotation labeling style for the median ditch. Two different annotation styles are available as shown below. The default value is 0.



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“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. By default GEOPAK will look for design files in the Working Directory assigned for the project. If the design file is not located in the working directory, be sure to include the full path for the file. The variable does not have a default value and must be defined by the user prior to processing the criteria run.

“median graded shoulder width LT”

This variable is used to define the width of the graded shoulder in the median (to the drivers left) in cases where the median slope is 6:1 or flatter. See figure 303-1 of the Location and Design Manual, Volume 1 - Roadway Design for the acceptable values for this variable. The default value is 6.0

“median graded shoulder width GT”

This variable is used to define the width of the graded shoulder in the median (to the drivers left) in cases where the median slope is steeper than 6:1. See figure 303-1 of the Location and Design Manual, Volume 1 - Roadway Design for the acceptable values for this variable. The default value is 9.0

“median special ditch profile”

This variable identifies the name of the COGO profile to be used for the median ditch. If the specified profile is found at the station being processed, the median slopes will be drawn to intersect the profile elevation. The default value is “none”. NOTE: The criteria will only meet the COGO profile if a graphic ditch line has also been drawn in the design file specified by the variable “**proposed dgn file name**”.

“fixed median slope”

This variable will allow the user to override the default median slopes. When the variable is set to 0, the median slope will be set according to the median width as defined in Figure 304-1 of the Location and Design Manual, Volume 1 - Roadway Design. If the value is set to anything other than 0, the new value will be used for the median slope, regardless of the median width. **Note:** This variable must always specified as an integer. For example, setting the variable to a value of 3 will result in a 3:-1 side slope being placed for the median. The default value is 0.

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Define DGN Variables

The following DEFINE_DGN variables are used by the criteria to locate the MicroStation elements that MED304-1.X will search for in order to draw the proposed median.

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.

GEOPAK has a simple, yet very important way of “remembering” where the location of various points are 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. **FILENAME.X** will store the following marked points during processing that should never be redefined by another criteria file:

```
define_dgn “~median barrier in dgn” \  
  dgn = “proposed dgn file name” \  
  lvname = RD_P_Median_Barrier \  
  wt = 1, ByLevel \  
  co = 11, ByLevel
```

If no lines matching the symbology for the variable “~median barrier in dgn” are found in the design file specified by the define variable “**proposed dgn file name**”, a depressed median will be drawn.

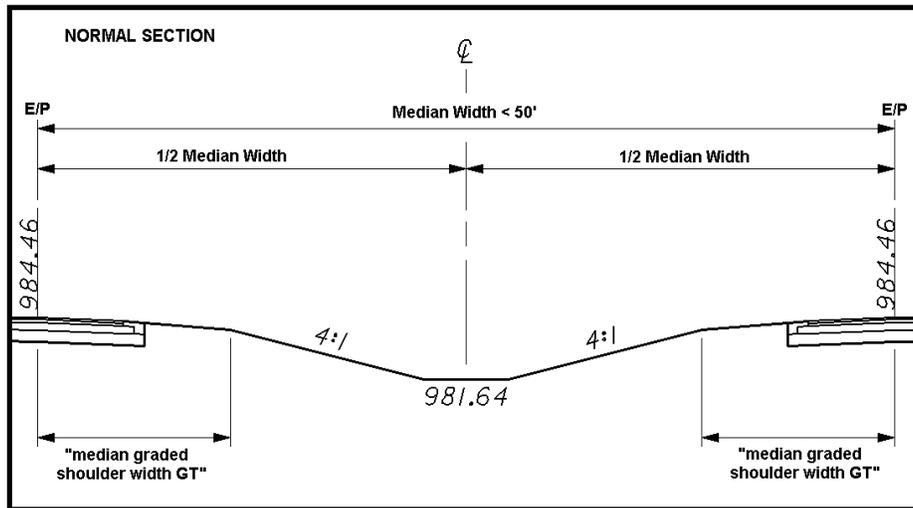
```
define_dgn “~proposed ditch in DGN” \  
  dgn = “proposed dgn file name” \  
  lvname = DR_P_Ditch \  
  wt = 1, ByLevel \  
  co = 11, ByLevel
```

Processing Notes for Depressed Medians

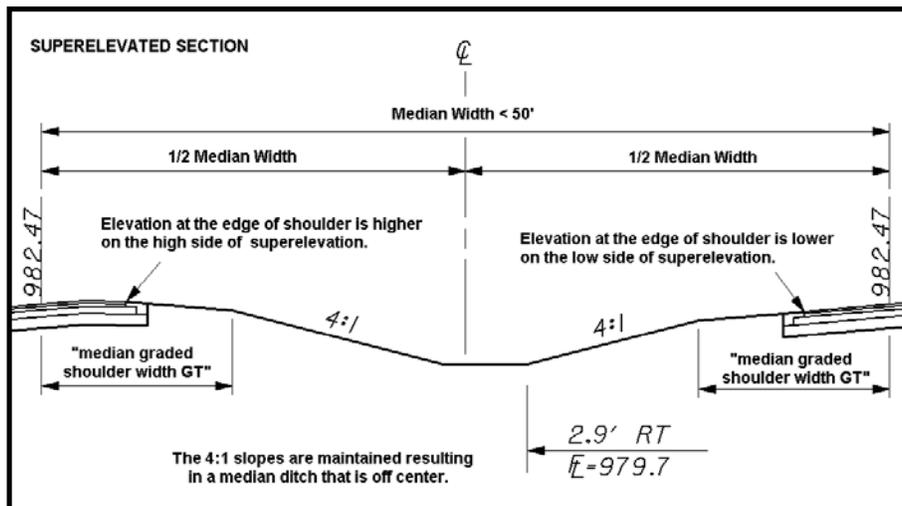
The criteria file will search the MicroStation design file specified by the define variable “**proposed dgn file name**” for elements matching the symbology specified by the DGN Variable “**~median barrier in dgn**”. If no median barrier is encountered, a depressed median will be drawn according to figure 304-1 of the Location and Design Manual, Volume 1 - Roadway design. The median slopes will be placed as detailed in the following examples:

CASE 1 - Medians less than 50' wide.

In this case, a 4:1 slope is used for the median as shown in the two figures below. Since the median slopes are greater than 6:1, the value of “**median graded shoulder width GT**” is used to establish the width of the graded shoulder.



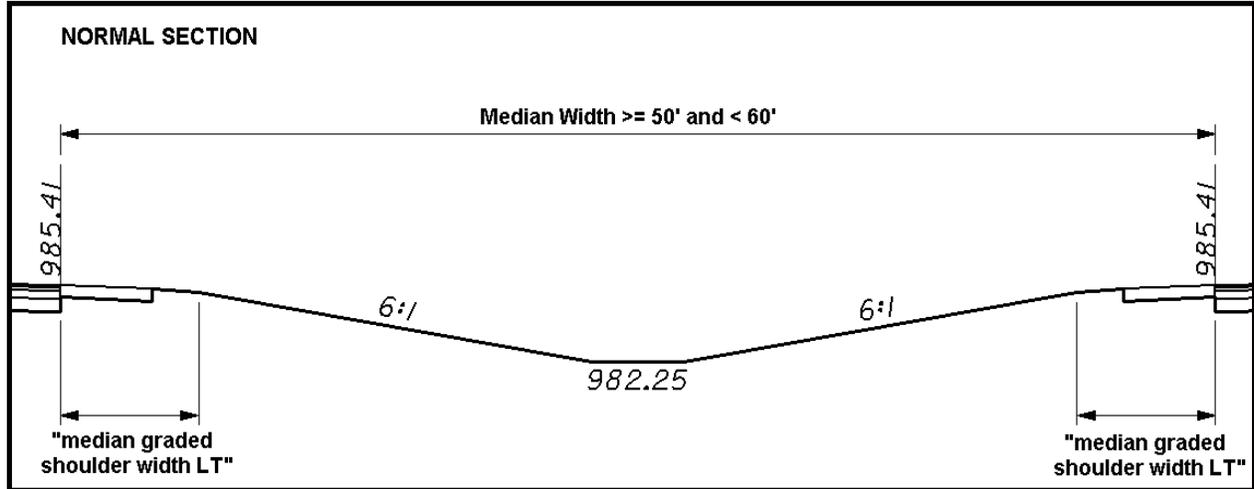
In superelevated and bifurcated sections, the elevation at the edge of the shoulder will be higher on one of the two roadways. The 4:1 slope will be maintained from the edge of the graded shoulder in superelevated sections, causing the intersection of the two slopes to be off center as shown below:



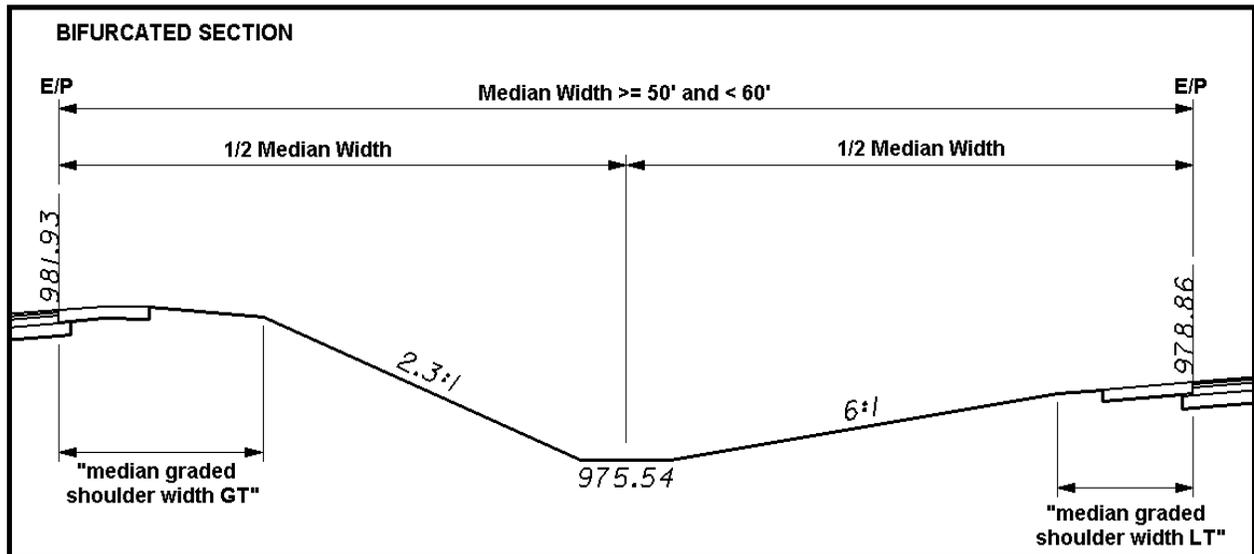
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CASE 2 - Medians greater than or equal to 50' wide and less than 60' wide.

In this case, a 6:1 slope is used for the median as shown in the figure below:



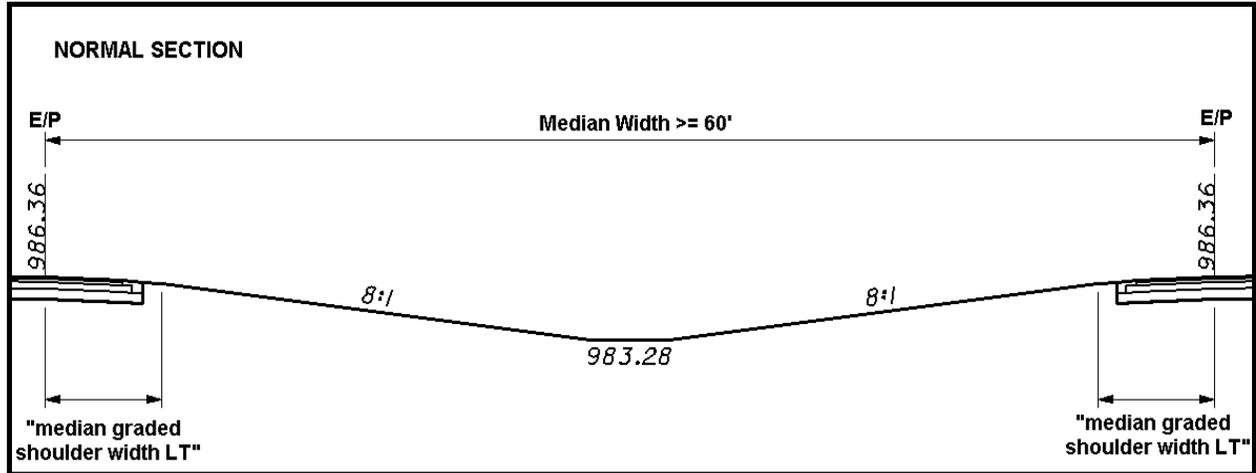
In superelevated and bifurcated sections, the location of the median ditch is always held in the center of the median. The criteria will first examine the elevation at the edge of the paved shoulders in order to determine which one is lower. Once the lower shoulder is identified, the criteria will draw the graded shoulder and then a 6:1 slope to the center of the median. The criteria will next skip over to the higher shoulder and draw a line at whatever slope is necessary in order to connect the graded shoulder with the 6:1 slope from the lower side.



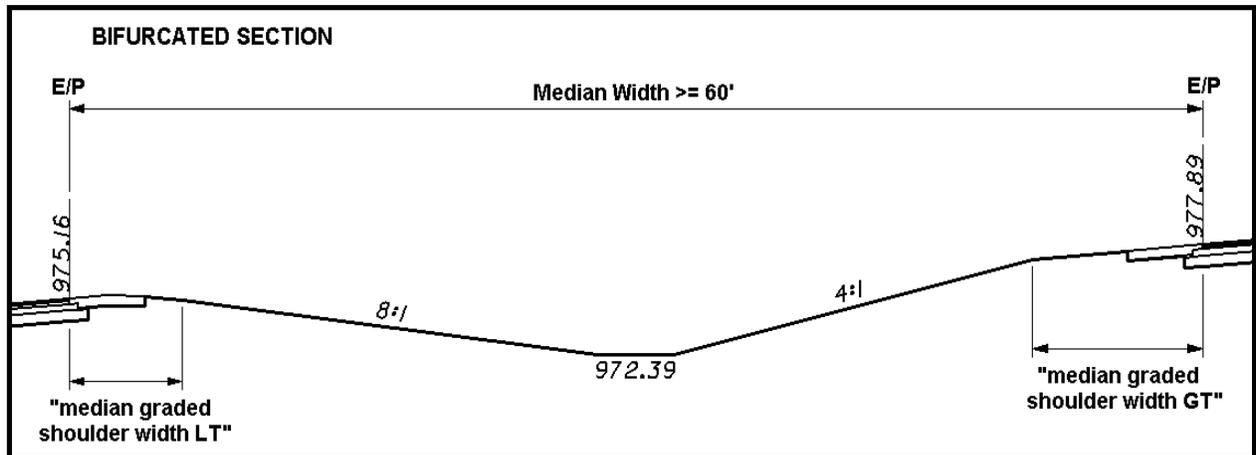
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CASE 3 - Medians greater than or equal to 60'

In this case, an 8:1 slope is used as shown below:



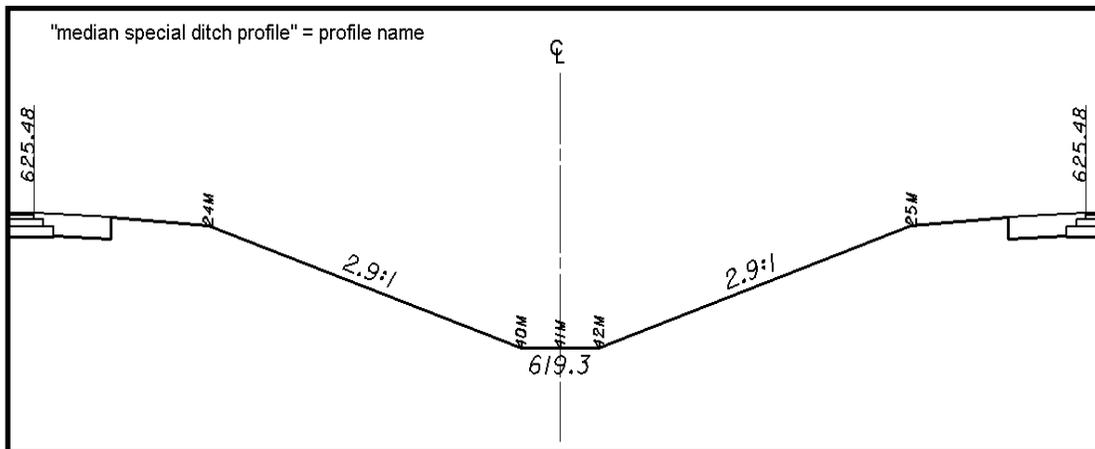
For superelevated and bifurcated sections, the location of the median ditch is always held in the center of the median. The 8:1 slope is drawn from the lower side to the center of the median. The slope for the higher side is drawn from the edge of the graded shoulder to meet the 8:1 slope drawn from the lower side, as shown below:



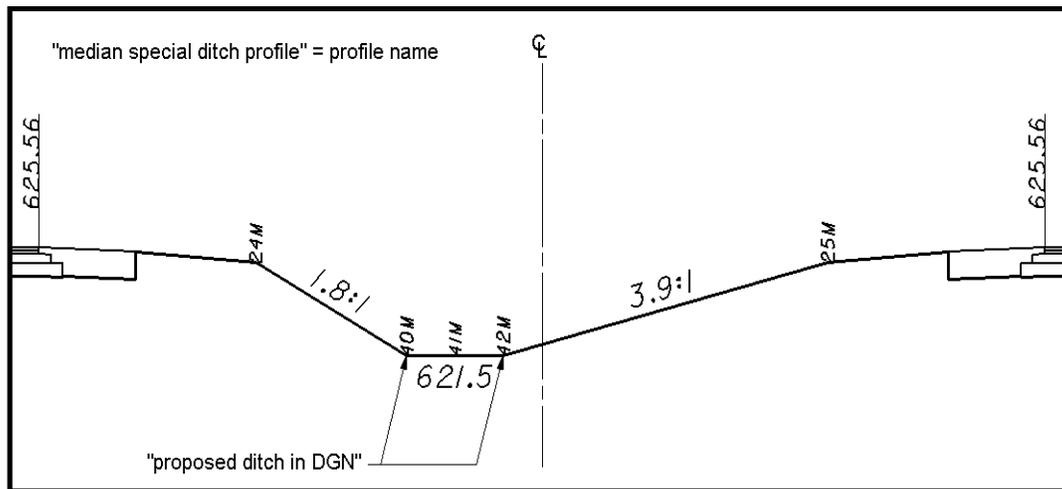
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CASE 4 - Defining the median slopes with a COGO profile and a graphic ditch line

The criteria will allow the designer to specify a COGO profile to use for the median ditch elevations. As each cross sections is processed, the criteria will check to see if a COGO profile matching the name specified by the variable “**median special ditch profile**” exists and if the station of the current cross section is within the limits of the profile. If it is, the median slopes will be drawn to meet the elevation of the profile. The ditch will be centered in the median as shown below.



In some cases, the median ditch may need to be placed off center. The criteria will allow the designer to graphically draw a proposed ditch line in the median for the criteria to follow. The criteria will search the MicroStation design file specified by the variable “**proposed dgn file name**” for MicroStation elements meeting the symbology defined by the DGN variable “**~proposed ditch in DGN**”. The criteria will draw the median slopes to intersect the proposed ditch lines. The elevation of the ditch is determined by intersecting the profile specified by the variable “**median special ditch profile**”.



Note: The criteria will not use the graphic ditch line without a COGO profile. Users must store a COGO profile

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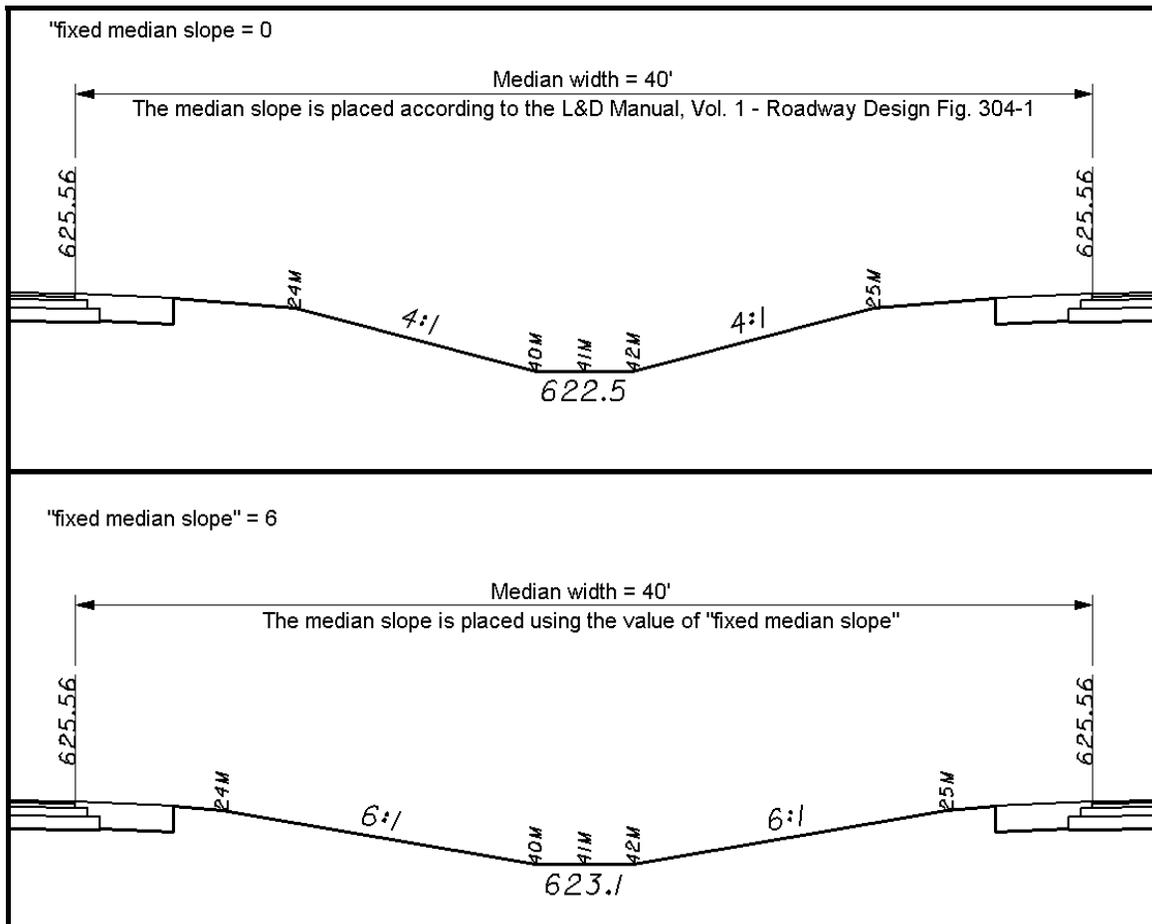
for the median ditch in order to have the criteria intersect the graphic ditch lines.

CASE 5 - Drawing the median using a fixed slope.

The criteria has been developed to place median slopes based on the width of the median as defined in Figure 304-1 of the Location and Design Manual, Volume 1 - Roadway Design. The slopes used by the criteria detailed in CASE 1 through CASE 3 of this criteria documentation and are summarized in the table below.

Median Width	Slope
< 40'	Typically median barrier is placed.
>= 40' and < 50'	4:1
>= 50' and < 60'	6:1
>= 60'	8:1

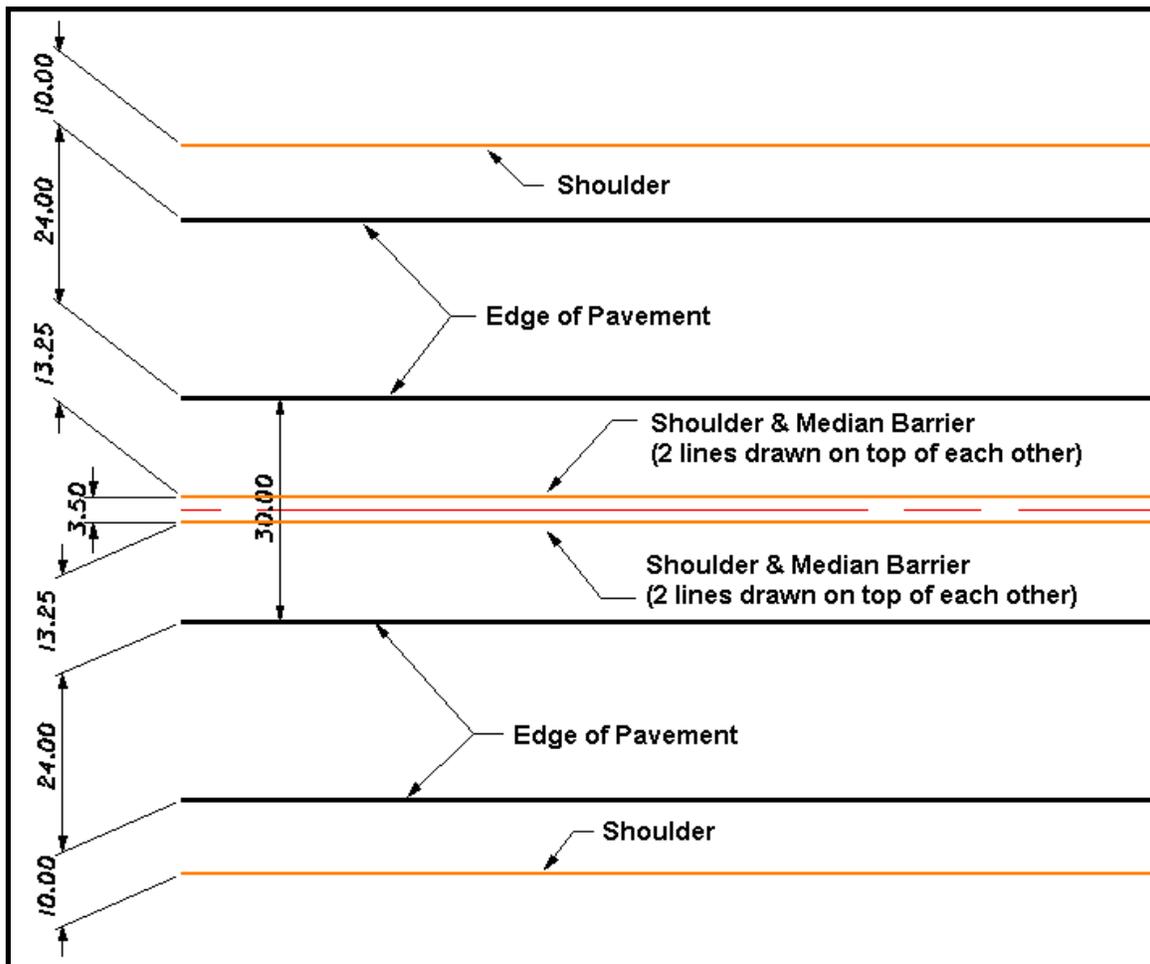
There are cases where the designer may wish to override the default slopes. The variable “**fixed median slope**” can be used to specify the slope for the median. If the variable is set to 0, the slopes shown in the table above will be used to draw the median. If the value of “**fixed median slope**” is set to anything other than 0, the new value will be used for the median slope, regardless of the median width.



PROCESSING NOTES FOR BARRIER MEDIANS

Median barrier is normally used in cases where the median width is 40' or less. The criteria will search for lines representing the median barrier as specified by the DEFINE_DGN variable “~median barrier in dgn”. The design file specified by the variable “proposed dgn file name” is searched for these lines. If a line is found matching the symbology defined by the variable “~median barrier in dgn”, a median barrier will be drawn.

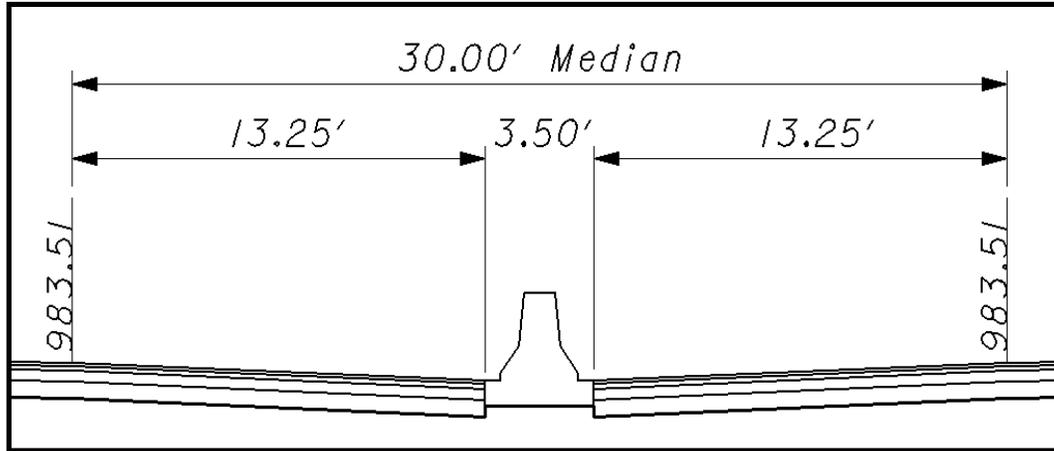
The placement of the plan view MicroStation graphics for the proposed shoulder and median barrier are very important in determining how the barrier is drawn in the cross sections. Separate shoulder lines and median barrier lines must be drawn in the plan view MicroStation design file in order for the barrier to be drawn correctly on the finished cross sections. Even if the shoulder is adjacent to the proposed barrier, two lines representing the shoulder and the barrier must be drawn on top of each other. Consider the plan view graphics below:



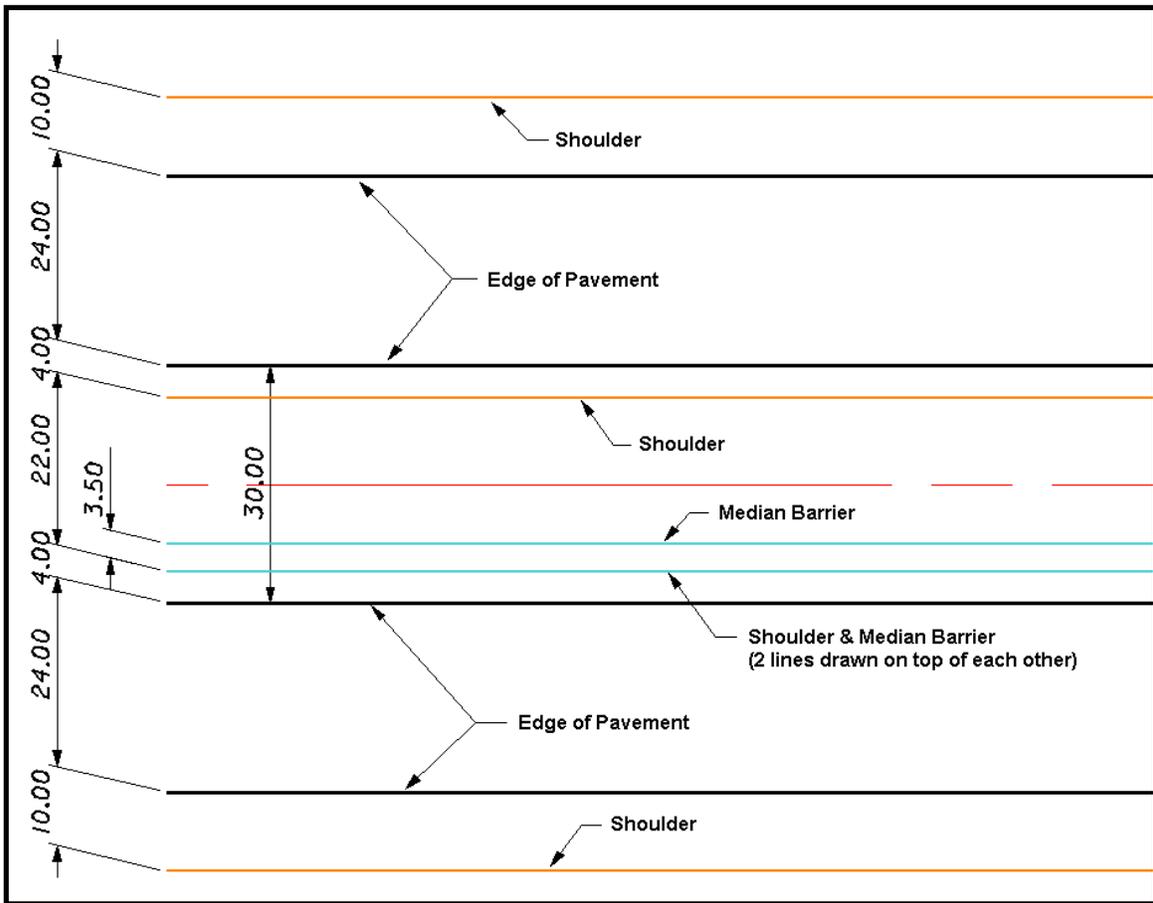
The shoulder criteria will draw the shoulder at the width determined by intersecting the shoulder lines in the MicroStation design file. The median barrier will be drawn at the width specified by the median barrier lines. In the example above, the median width is 3.5' which corresponds to a Type B barrier. The resulting cross

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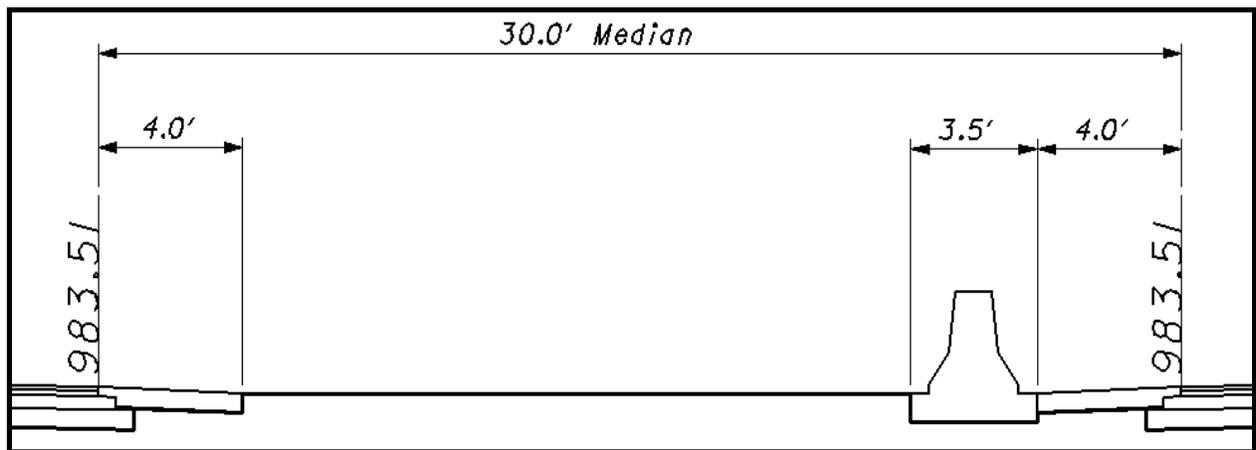
section is shown in the figure on the following page.



In cases where the median barrier is adjacent to only one of the proposed shoulders, a grass median will be placed between the barrier and the opposite shoulder. Consider the plan view graphics shown in the figure below:



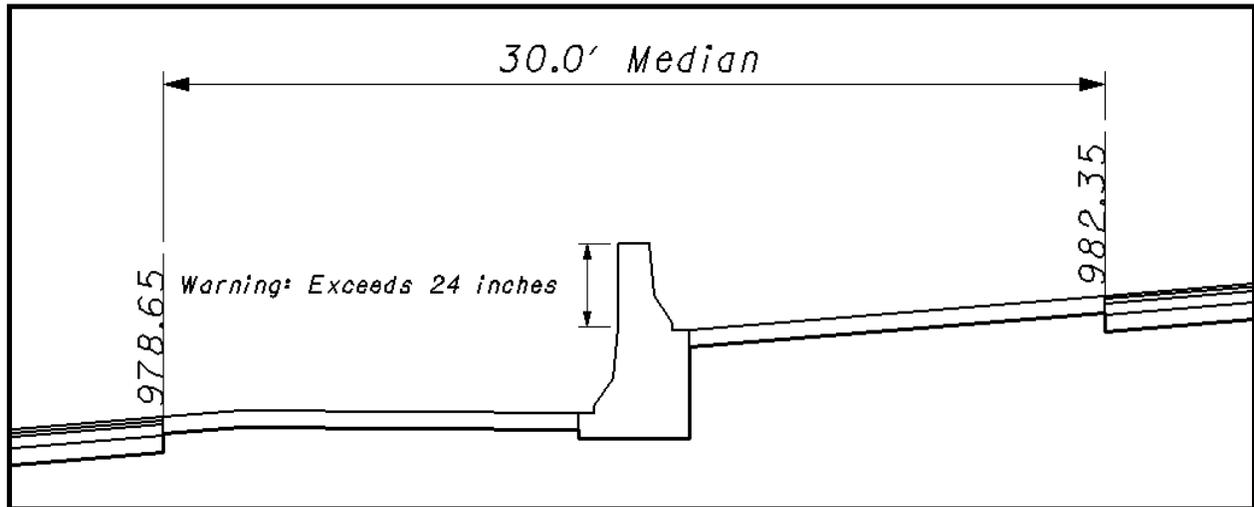
The plan view graphics shown above will result in the median shown in the figure on the following page.



NOTE: The grass portion of the median is drawn by connecting a straight line from the shoulder to the barrier as shown above. It will be necessary for the designer to evaluate the desired drainage flow for the cross sections and to modify the cross section graphics accordingly.

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In superelevated or bifurcated sections, a Type C barrier will be drawn, as shown below. The width of the barrier is determined from the median barrier lines drawn in the design file specified by the variable “**dgn file name**”.



In a bifurcated section, it is possible that the height of the Type C barrier may exceed the specifications of Standard Drawing MC-9.3. In this case, a warning is issued to the user as shown above.

Labels and Symbology

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

Station and elevation labels are placed on level XS_P_Annotation. The text size for the station and elevation labels is determined by the value of the Define Variable “**xs annotation scale**” which is defined in DEFINE.X. See the documentation for DEFINE.X for more information.

Marked Points

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The criteria places text in the design file at the “key points” of the median. This text is placed on the level XS_P_Text_MarkedPoint as shown in the figure below. Using GEOPAK's Profile Grade Report, users can instruct the software to search for this key point text to create a COGO chain and/or profile by measuring the offset and elevations at the locations of the key point text on each cross section. For more information on creating COGO chains and profiles from the “key point” text, see the ODOT GEOPAK Road training guide, Part 2, Chapter 9 - Limits of Construction.

