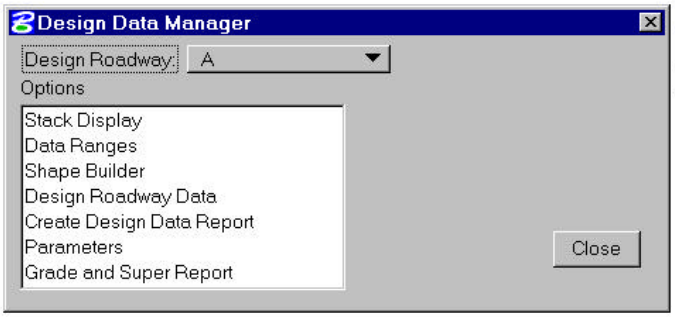
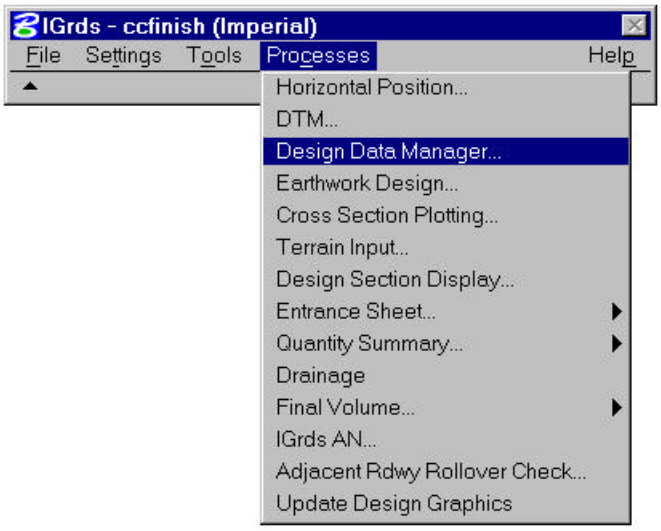
CHAPTER 6

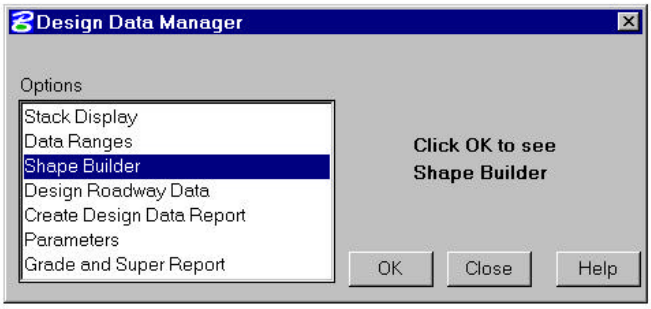
DESIGN DATA

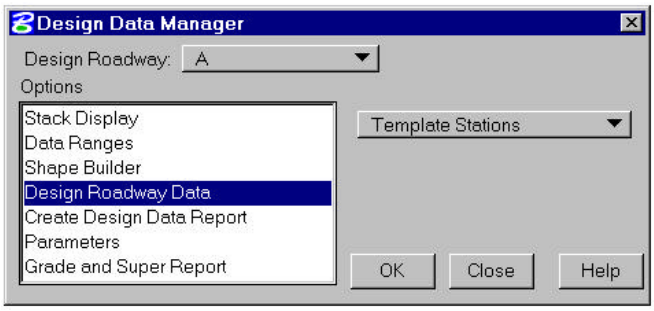




Stack Display
Data Ranges
Shape Builder
Design Roadway Data
Create Design Data Report
Parameters
Grade and Super Report

Shape Description Browse





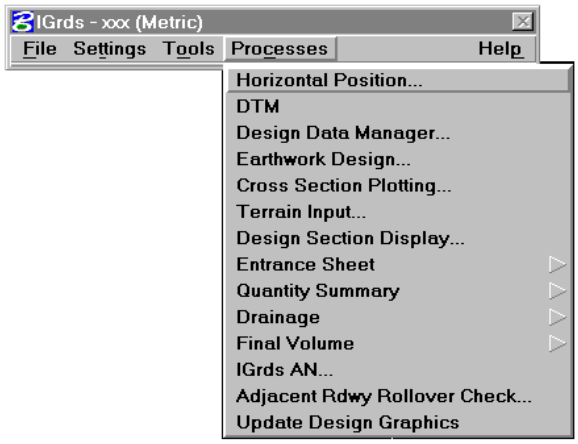
Shape View Browse
Shape View
Define Template Shape
Define Sideslope Shape
Define Median Shape

Template Stations
Sideslope Stations
Median Stations
Geometric Template Modification
Superelevation
Widening
Special Ditches
Erosion Control Ditches
Design Exceptions
Right-of-Way Intercepts
Maximum Slope Intercepts
Slope Rounding
Choker
Median Choker
Compaction Factors
Forced Balance
Added Quantities
Surface Mat. Removal
Template Subcut
Top Soil Placement
Pavement Structure Quantities

DESIGN DATA

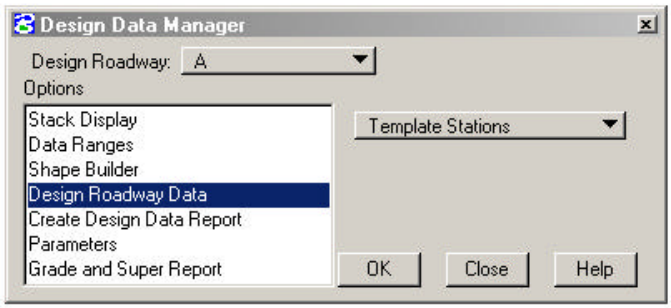
INTRODUCTION

This chapter discusses the creation and management of IGrds design data. Design Data is all of the data used to define design roadway cross sections and their application to design earthwork computations. Design data management functions are accessed from the Processes main menu as shown here:



Selecting Design Data Manager displays the dialog below which provides for selecting one of these processes:

- Stack Display
- Data Ranges
- Shape Builder
- Design Roadway Data
- Create Design Data Report
- Set Parameters
- Grade and Superelevation Report



Each of these Processes and their subprocesses is discussed in detail in the remainder of the chapter. The topic headings are:

Stack Display
Full Section Display

Data Ranges

Shape Builder
Shape Description Browse
Shape View Browse
Shape View
Define Template Shape
Define Sideslope Shape
Define Median Shape

Design Roadway Data
Template Stations
Sideslope Stations
Median Stations
Geometric Template Modification
Superelevation
Widening
Special Ditches
Erosion Control Ditches
Design Exceptions
ROW Slope Intercept
Maximum Slope Intercept
Slope Rounding
Choker
Median Choker
Step Subgrade
Compaction Factors
Forced Balance
Added Quantities
Surface Material Removal
Template Subcut
Top Soil Placement
Pavement Structure Quantities

Parameters
Vertical Exaggeration
Station Granularity

Grade and Superelevation Report

The data types above also reference the following data types that are needed to create design cross sections.

Horizontal Alignments
Vertical Alignments
Terrain Data

The Design Data Manager processes pull it all together.

Figure 6-1 shows the interaction of the Design Data Manager Processes.

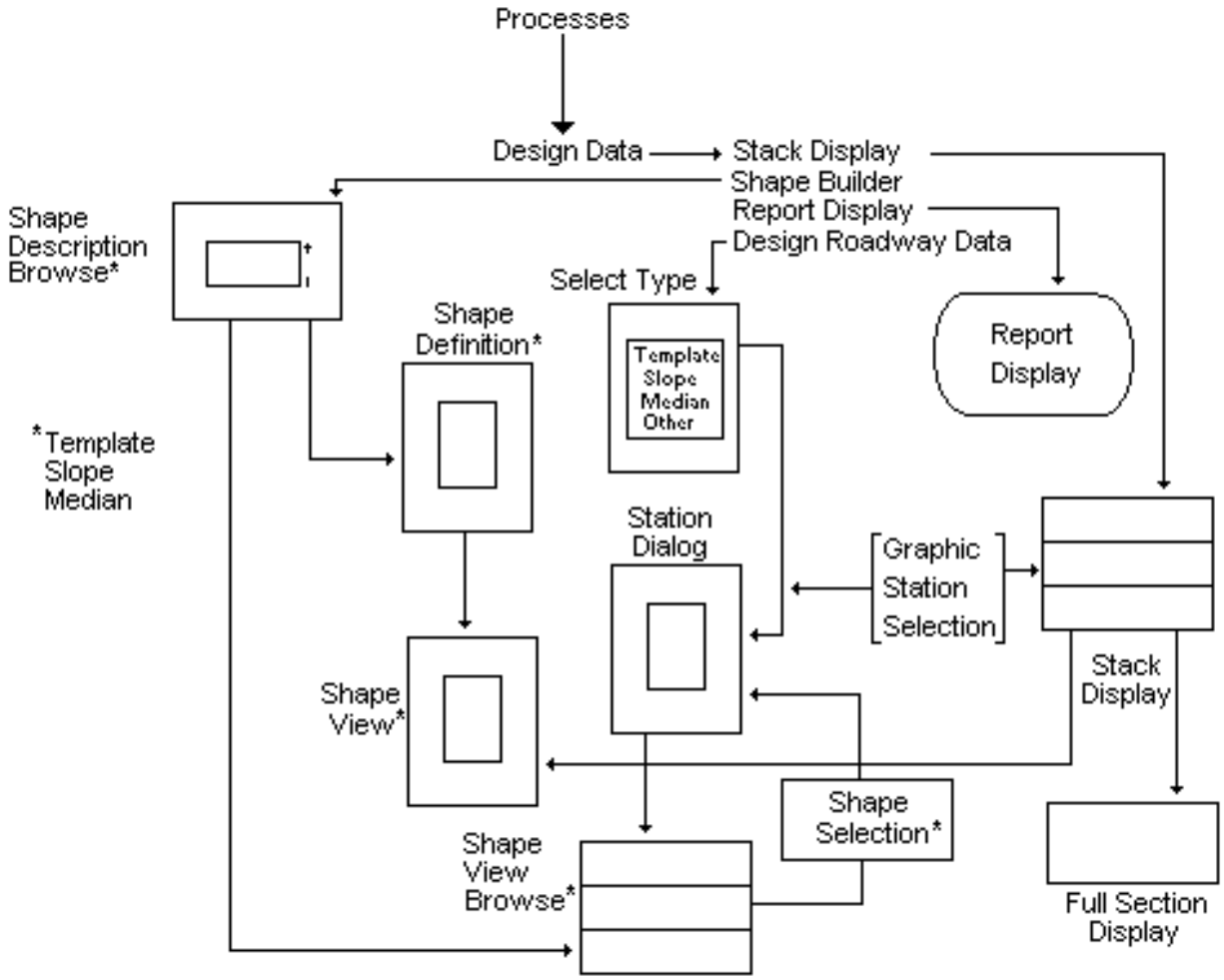
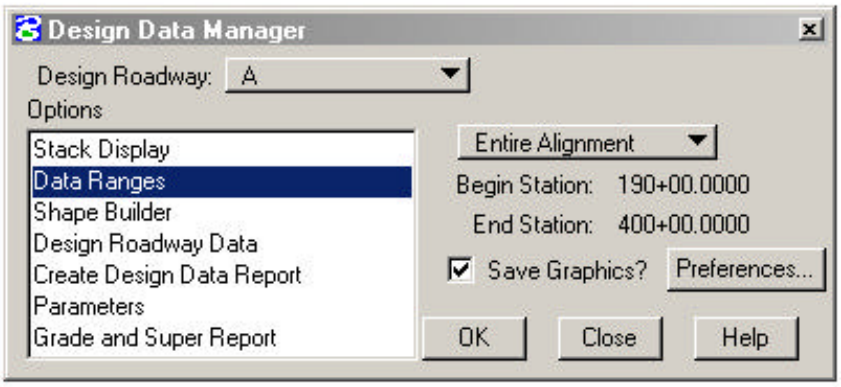


Figure 6-1
Design Data Process Interaction

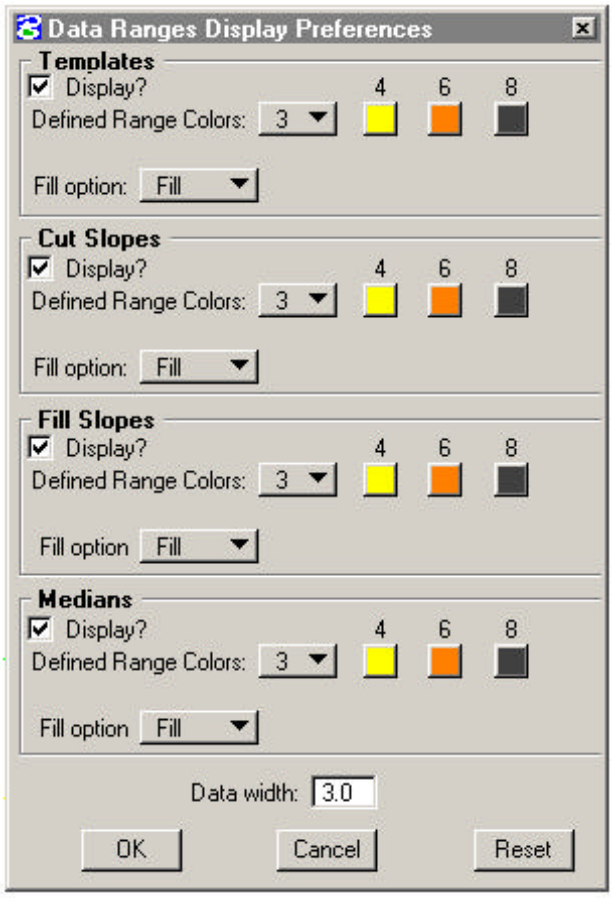
DATA RANGES



This process provides the ability to generate graphic displays of selected items of design data within a specified range of a roadway. The presence of a specified data type is represented by a band of given width and color that runs parallel to the roadway. A change of color indicates a change of the characteristics of the data item.

Design Roadway	Select the desired design roadway.
Stations	Enter the desired station range or select Entire Alignment.
Save Graphics	Check this box to save the currently displayed data range graphics. Otherwise, all the data range graphics for the selected roadway are erased before a new display is generated.
Preferences	Click to display the Data Ranges Display Preferences dialog (described on the next page).
OK	Click to generate the data ranges display.
Close	Click to close the Design Data Manager.
Help	Click to display help for this dialog box.

DATA RANGES DISPLAY PREFERENCES



This dialog is used to select the data types that are desired in the data ranges display and to specify the attributes of the display of each data type.

The attributes of all data types are similar. For this reason, the attributes of a generic data type are described below.

Display	Check to display this data type.
Defined Range Colors	Select the number of colors that will indicate changes of characteristics for this data type.
Colors	Click on a range color and select a new color if necessary.
Fill Option	Select fill or hatch for the range display bands for this data type.
Spacing	Enter the hatch line spacing.
Angle	Enter the hatch line angle.
Data Width	Enter the width of the data range band for all data types.
OK	Click to save the current display preferences.
Cancel	Click to ignore changes to display preferences and close the dialog.
Help	Click to display help for this dialog.

SHAPE BUILDER - GENERAL

Roadway design cross sections in IGrds are made up of pre-defined or user-defined Shape definitions (criteria) for

Templates
Median
Sideslopes (cut or fill)

The combining of these shapes into design cross sections is illustrated on Figure 6-2.

This section discusses processes for defining, storing, displaying, and referencing shapes. Shape definition is independent of project use or any roadway use. Shape definitions may be stored in Shapes Libraries or in project files. Importing and exporting of shapes is discussed in Chapter 2.

The application of shapes to the roadway designs is covered in the section on Design Roadway Data.

The Shape Builder functions provide for:

° Browsing through predefined or user-defined shapes in project or library files via:

- alpha descriptions
- graphic views

° Viewing specific shapes (this function is accessed from several other functions)

° Defining or modifying shapes applied to roadways. (This function is accessed from other functions which place Shape patterns along a roadway.)

Two other shape display functions which interact with the Shape Builder functions are:

° Stack Display - access from Design Data Manager Dialog Box

° Full Section - access from Stack Display

Selecting Shape Builder displays the Shape Description Browse - Dialog.

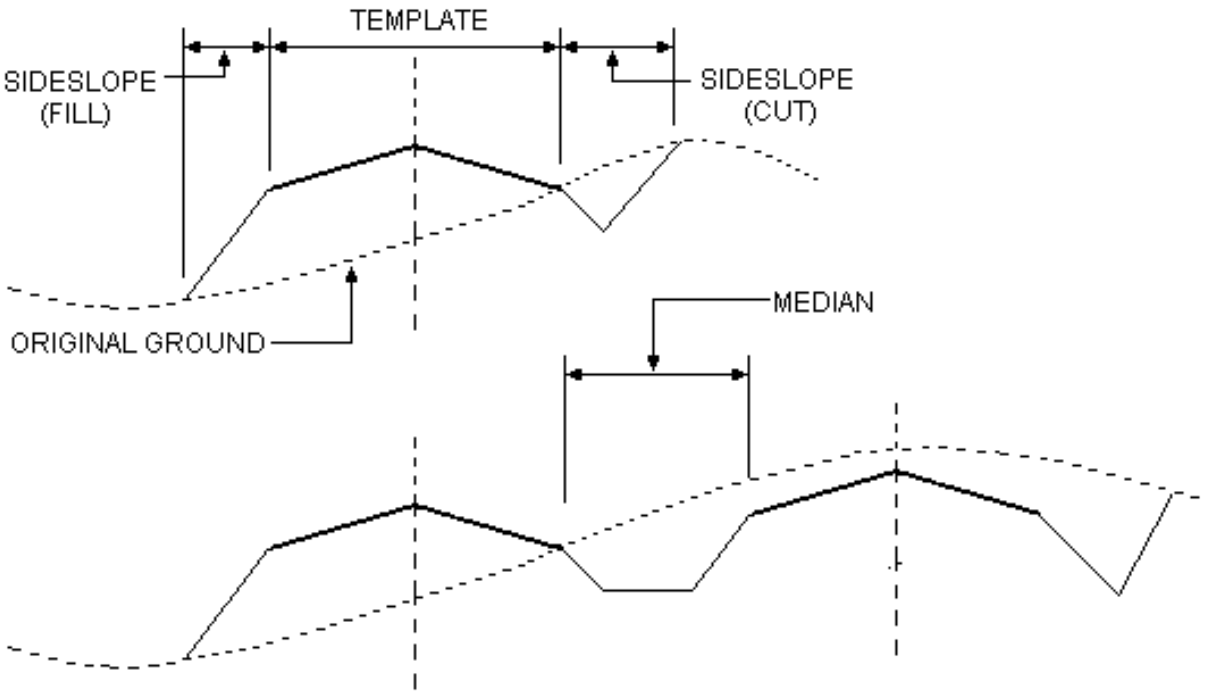
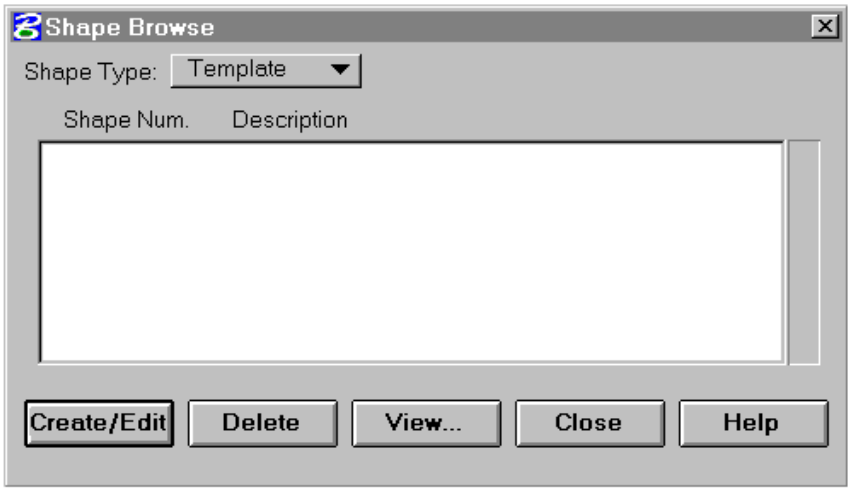


Figure 6-2
Template, Sideslope, And Median Shapes

SHAPE BUILDER - SHAPE DESCRIPTION BROWSE (Template, Sideslope, Median)



This process displays Shape descriptions for review. It also provides access to the:

Shape Definition Processes

- Add New Shapes
- Modify/Delete Shapes
- View Shapes

Shape View Browse Processes

- View Shapes
- Select Shapes

Shape Type	Select desired type • Template • Sideslope • Median

Shape number and descriptions are displayed in the scrolled area.

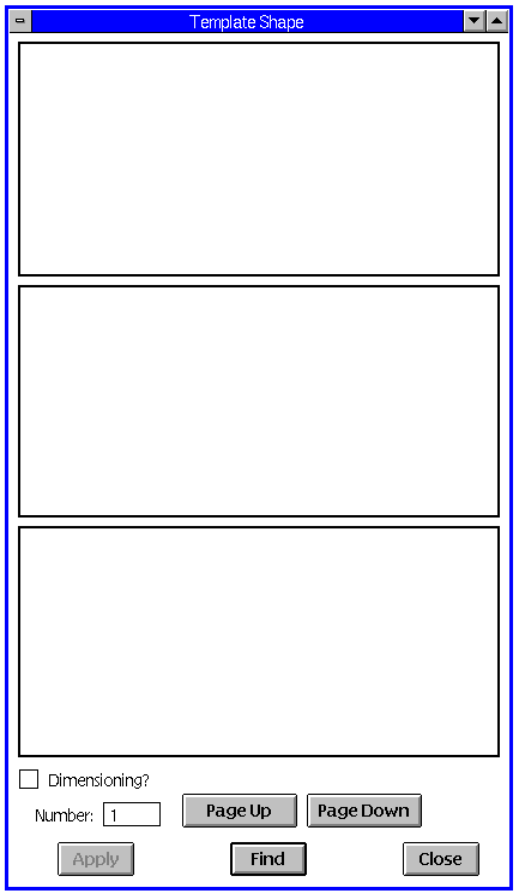
Edit	Highlight the desired shape and click to display the shape description edit dialog box. If no shape is highlighted, a blank dialog for defining a new shape will be displayed.
Delete	Highlight the desired shape and click to delete the shape.
View	Highlight the desired shape and click to display the desired shape or click without highlighting to display the Graphic-Browse dialog.
Close	Click to dismiss dialog box.
Help	Click to display help for this command.

Note: Shapes can be imported from a previous project or master library, or exported from the current project. For instructions see Chapter 2.

SHAPE VIEW BROWSE (Template, Sideslope, Median)

Access from:

Shape Description Browse, or
Design Roadway Data



This process displays either dimensioned or undimensioned views of previously stored shape patterns from the current working files.

You can browse through available shapes and select shapes for use in the Design Roadway data dialog.

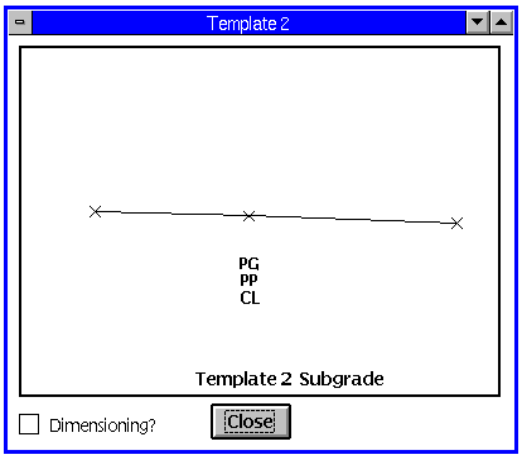
Dimensioning?	Push the button in for dimensioned views, or leave out for undimensioned views.
Number	Enter a Shape Number to display a new set of views (the entered shape will be the center view).
Page Up	Click to display the previous set of shape views. (Lower numbers)
Page Down	Click to display the next set of views. (Higher numbers)

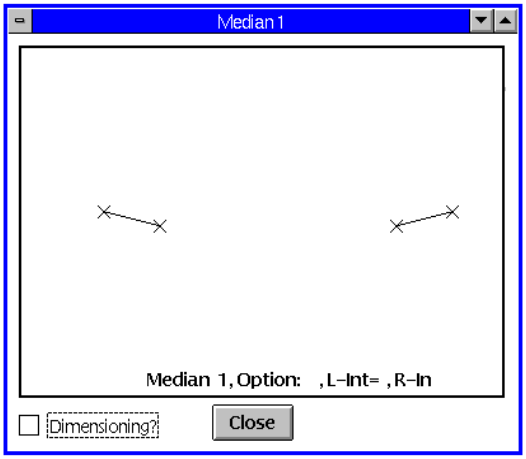
Apply	When using in conjunction with the Template, Sideslope, or Median stationing dialogs, the ID in the number field is used in respective stationing dialog.
Find	Search for and display the graphic of the shape ID in the number field. It will be displayed in the center view box unless the first or last shape in the file
Close	Click to dismiss dialog box.

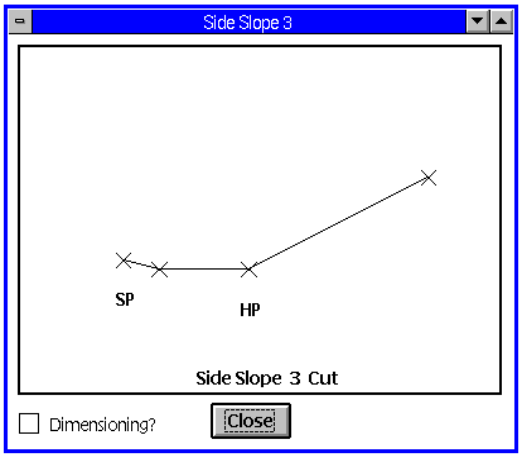
SHAPE VIEW (Template, Sideslope, Median)

Access from:

Shape Description Browse
Design Roadway Data







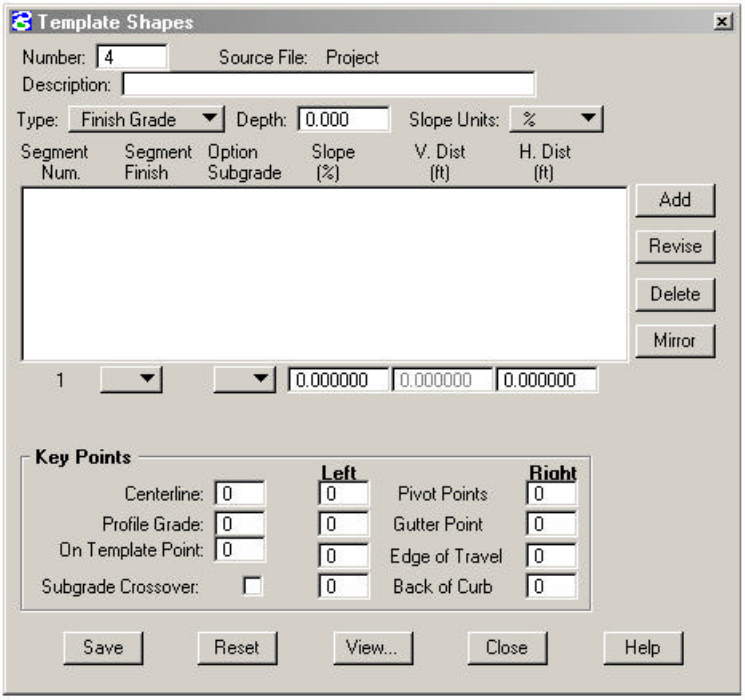
This process displays either a dimensioned or undimensioned view of a Template, Sideslope, or Median Shape.

Dimensioning?	Push to display view with dimensions shown.
Close	Click to remove the view from the screen.

DEFINE TEMPLATE SHAPE

Access from:

Shape Description Browse



This process provides for defining or modifying the segments that comprise the Template shapes. See Figures 6-2, 6-3, and 6-4.

Number	Enter/revise shape number. Only use shape numbers from 1-9999. Numbers above 9999 will store in the template table, but cause erroneous results when running earthwork design and volumes.
Description	Enter/revise shape description.
Type	Select type (finish grade, subgrade).
Depth	Enter/revise surface depth.
Slope Units	Select units Imperial: ft/ft, in/ft, % Metric: %

Up to 99 segments may be defined for the shape. Segment data is displayed in the scrolled area and values are entered or modified in the fields below the scrolled area. See menu above left.

Segment Data Controls

Add Click to add data for a segment below the segment highlighted.

Revise Click to revise the highlighted segment.

Delete Click to delete the highlighted segment.

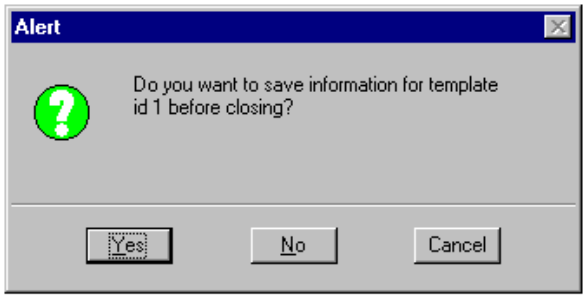
Mirror Click to add mirror image segments to the list.

Segment Data Values Enter/Revise data values as desired for each segment in the fields below scrolled area.

Segment Option Finish

- Blank - Normal Super - Normal super-elevation applied to the segment.
- F - Same Slope Subgrade - Subgrade segment extended until daylight (IGrds only uses this with finished grade template). Normal Superelevation applied to the segment. Only one F option can be used on each side of the centerline. The F option segment must be adjacent to the centerline.
- H - Hold No Super - No superelevation applied to the segment.
- R - Rollover - No superelevation applied to the segment, a rollover check is performed. The default rollover rate is 8%. This value can be changed, if desired, by editing the IGrds parameter file. The rollover rate may be changed by the designer for this segment in the text field just below the option button where the R was selected. A maximum of two rollover segments may be coded on each side of the centerline.
- T - Truck Lane - One-half normal superelevation applied to the segment, truck lane.

	• V - Vertical Segment - Vertical distance, no super-elevation applied to the segment.
	• L - High Side Limit - When super- elevating, the L segment option implies that the segment is limited to a specific cross slope. The limiting slope may be entered in the text field just below the option button where the L was selected. • M - Low Side Limit - The M option is actually the reverse of the L option. It implies that on the low side of superelevation, the segment will be limited to a specific cross slope and will superelevate normally on the high side. The limiting slope is entered in the text field just below the option button where the M was selected. • U - User Defined - With the U segment option the user agency or the designer establishes rules that affect how a segment behaves in superelevation situations. For different slope ranges of the superelevation rate, the user may specify the segment rate and option. The U segment option tables are stored in the ha.tbl file in the custom subdirectory of the IGrds release directory. After selecting the U option button, the user may select the U option number button which is just below the U option button to get the proper U option number.
Segment Option Subgrade	Generally, all the segment options described above for Segment Option Finish are available for Subgrade. When a particular option is unavailable according to the selected finish grade option, then it is disabled and cannot be selected.
Slope	Enter the slope for the segment in the specified units.
VDist	Enter vertical distance (V option only)
HDist	Enter horizontal distance.

Key Points	Enter/Revise Point numbers as desired. Finish Grade Key Points note: When On-Template Point is used, the Back of Curb, Edge of Traveled Way, and Gutter Point Key Points should be entered without reference to the dummy segment, in the same manner as Geometric Template Modification.
Subgrade Crossover	Push to activate.
Save	Click to save values as shown.
Reset	Click to return values to those of the previous save.
View	Click to display a graphic view of the template. If the On-Template option is being used, the dummy segment will be displayed in its correct relative position to the rest of the template.
Close	Click to dismiss the dialog box. If edits have been made to the template without doing a save, an alert box similar to the one below will appear: 
Yes	Save the changes and exit the shape builder.
No	Do not save changes and exit the shape builder.
Cancel	Close this alert box and return to the shape builder.
Help	Click to display help for this dialog box.

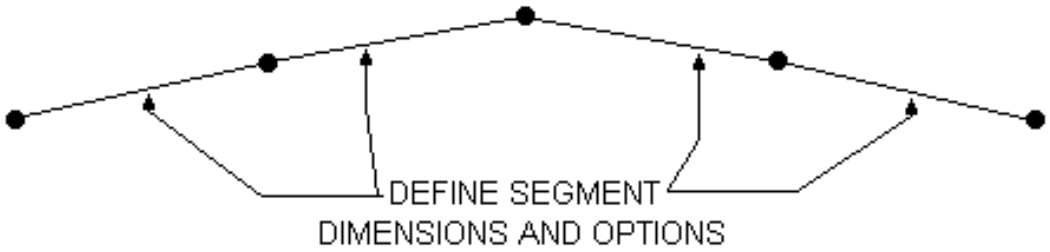


Figure 6-3
Template Segments

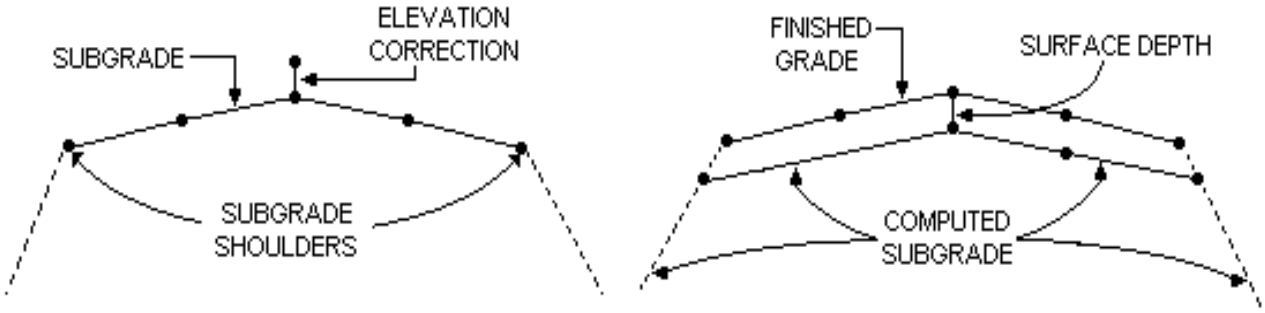
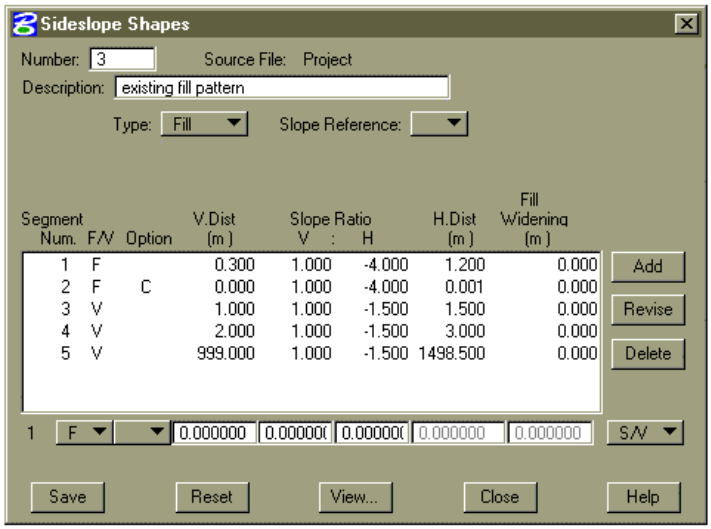


Figure 6-4
Subgrade And Finished Grade Templates

DEFINE SIDESLOPE SHAPE

Access from:

Shape Description Browse



This process provides for defining or modifying sideslope shapes (Cut, Fill, or Ditch).

See Figure 6-5.

The sideslope shape process has been expanded to allow up to ten special ditches to be applied to a single sideslope pattern (fixed segments only). Special Ditches are associated with sideslope fixed segments by using the Ditch ID control described in this section. For more information on special ditches, see page 6-43.

Number	Enter/revise number.
Description	Enter/revise Shape Description.
Type	Select type option • Cut • Fill • Ditch (Erosion Control)
Slope Reference	Select reference point option. • blank Reference point is template shoulder point. • B - Reference point is roadway baseline. Enter the minimum and maximum distance. • T - Reference point is template centerline. Enter the minimum and maximum distance. • S - Reference point is constant distance from shoulder point. Enter a constant distance.
	• C - Erosion Ditch - Enter constant distance from Catch Point (only applicable when a Ditch (Erosion Control) has been defined)..

Bench Tolerance	Enter distance (only applicable when a benching segment has been defined).
Segment Data Controls	
Add	Click to add to segment data below the segment highlighted.
Revise	Click to revise the highlighted segment in the fields below.
Delete	Click to delete the highlighted segment.

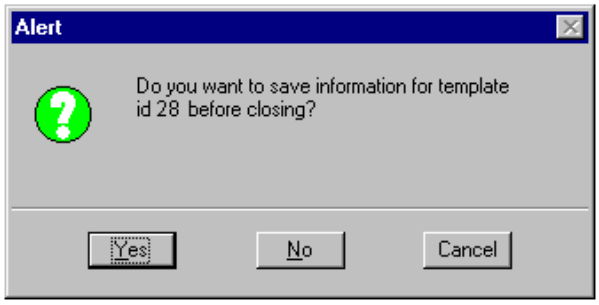
Enter/Revise data values in the fields scrolled area below.

Segment Data	
F/V	Select F for fixed segment or V for variable segment.
Sideslope Option	Fixed slope option selections: blank - Build as defined L - Daylight location flagged S - Special ditch hold slope If a 3D geometry element is specified as the special ditch grade, then the segment will be extended to the elevation of the 3D element. The horizontal or offset component of the 3D geometry element will be ignored. D - Special ditch hold distance If a 3D geometry element is specified as the special ditch grade, then the segment will be extended to the elevation of the 3D element. The horizontal or offset component of the 3D geometry element will be ignored. I - First terrain intercept C - Last terrain intercept

	T - Special Ditch The T option specifies that the end of the segment being defined will coincide with the elevation and offset of the 3D geometry element. The beginning of the segment will be calculated by projecting the slope of the segment backwards toward the previous segment until an intersection occurs with the previous segment (or an extension of the previous segment). The ending point of the previous segment will be moved to this intersection point. E - Special Ditch The E option specifies that the end of the segment being defined will coincide with the elevation and offset of the 3D element. The beginning of the segment will be calculated by projecting the distance of the segment being defined backwards toward the previous segment thereby establishing the elevation of the point along the previous segment (or an extension of the previous segment). Again, the ending point of the previous segment will be moved to this point (elevation and offset). G- Special Ditch The G option specifies that the end of the segment being defined will coincide with the elevation and offset of the 3D element. Variable slope option selections: blank - Build as defined B - Bench first segment R - Bench segment no catch test L - Daylight location flagged
Ditch ID	Select the ID of the special ditch which will control this segment. Special Ditch IDs are numbered 0 through 9. Special ditches are defined using the special Ditch Data Type. See page 6-43. This option button only appears if sideslope options "S", "D", “G”, “T”, or “E” are selected.

V. Dist.	Enter vertical distance, when applicable. (See Segment Slope/Distance option.)
Slope Ratio	
V	Enter Vertical distance, when applicable.
H	Enter Horizontal distance, when applicable. (See Segment Slope/Distance option.)
H. Dist.	Enter horizontal distance, when applicable. (See Segment Slope/Distance option.)
Fill Widening	Enter fill widening, when applicable. (Only available for fill patterns.)
Select Option	
S/V	Slope Vertical. Enter shape ratio and vertical distance.
S/H	Slope Horizontal. Enter slope ratio and horizontal distance.
Flat	Flat Segment. Slope ratio automatically set to 0:1. Enter horizontal distance.
Vert	Vertical Segment. Slope ratio automatically set to 1:0. Enter vertical distance.

Save	Click to save values as shown.
Reset	Click to return values to those of the previous save.
View	Click to display a dimensioned view of the shape.
Close	Click to dismiss the dialog box. If edits have been made to the sideslope without doing a save, an alert box similar tot he one below will appear:



Yes	Save the changes and exit the shape builder.
No	Do not save changes and exit the shape builder.
Cancel	Close this alert box and return to the shape builder.
Help	Click to display help for this dialog box.

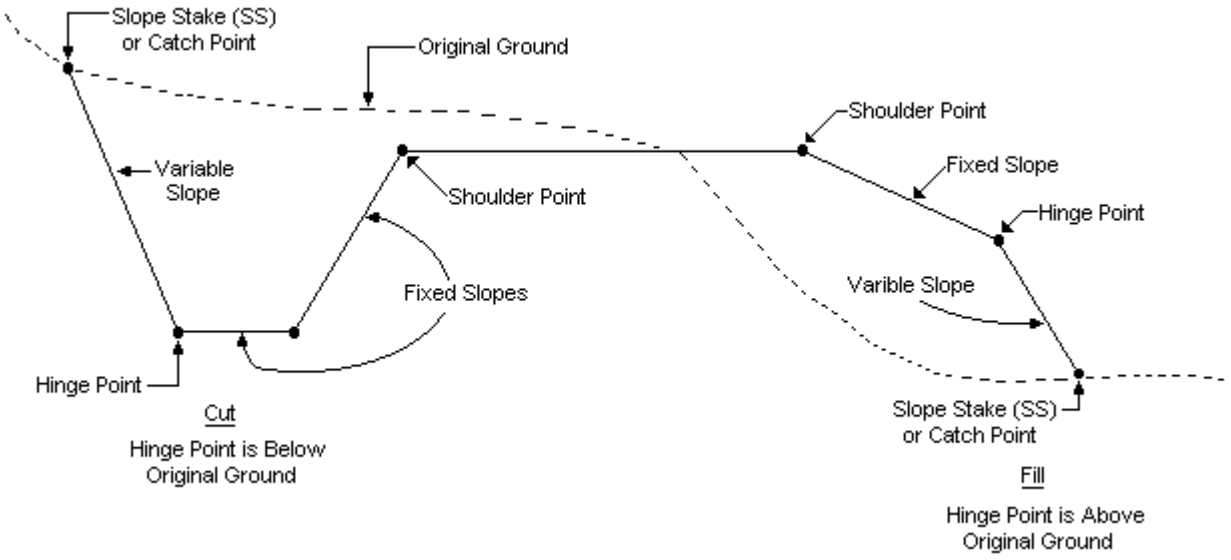
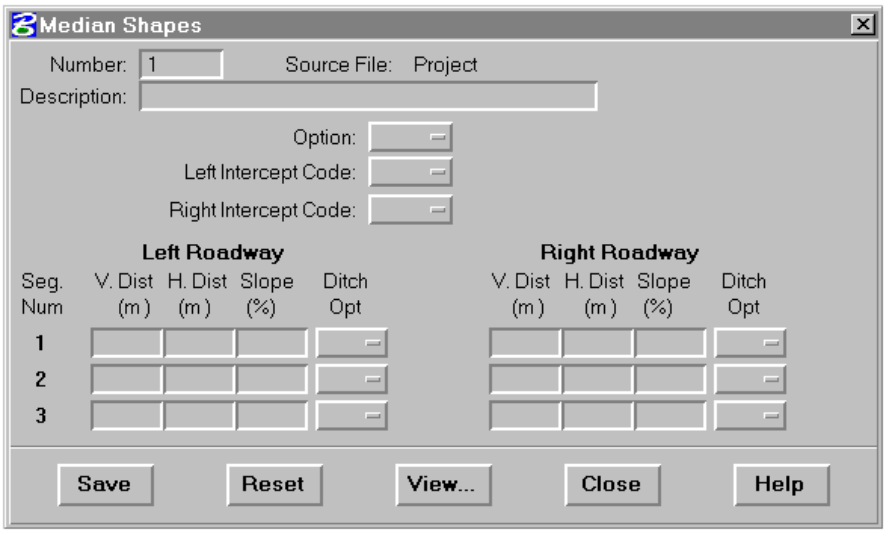


Figure 6-5
Cut And Fill Sideslopes

DEFINE MEDIAN SHAPE

Access from:

Shape Description



This process provides for defining or modifying median shapes. See Figure 6-6.

The median shape process has been expanded to allow multiple special ditches to be applied to either side of a median pattern. Special Ditches are associated with median segments by using the Ditch ID control described in this section. Median Shape definition has changed to allow "S" or "D" options to be applied to each segment in the pattern. For more information on Special Ditches, see page 6-43.

Number	Enter/revise shape number.
Description	Enter/revise Shape Description.
Option	The Median options are: • Blank - Normal resolution of overlap and intersection of median patterns by the median intercept codes. • L - This option selects the pattern which results in the lowest ditch, then extends segment 1 of the highest pattern to intersect the low pattern. • B - This builds a vee bottom median ditch at the specified horizontal distance from the terrain baseline and at the specified vertical distance from the shoulder of the roadway segment used. Only use segment 1 of the left or right roadway to specify this data.

Left Intercept Code

The intercept codes are defined as follows:

- When Median segments overlap, but do not intersect:
  - ◊ Blank - The last segment of the median pattern at the lowest elevation connects to the shoulder point of the other roadway.
  - ◊ 1 - The last segment of the median pattern of the lowest elevation connects to segment 1 of the other pattern.
  - ◊ 2 - The last segment of the median pattern of the lowest elevation connects to segment 2 of the other pattern.
  - ◊ 3 - The last segment of the median pattern of the lowest elevation connects to segment 3 of the other pattern.
- When Median segments intercept more than once:
  - ◊ Blank - Uses the first intersection of the higher median pattern.
  - ◊ 1 - Uses the first intersection on segment 1 of the higher median pattern.
  - ◊ 2 - Uses the first intersection on segment 2 of the higher median pattern.
  - ◊ 3 - Uses the first intersection of segment 3 of the higher median pattern.

Right Intercept Code	(See Left Intercept Codes)
Left & Right Roadway Median Segments	Enter values as desired.
Vertical Dist.	Enter the vertical distance of the segment.
Horizontal Dist.	Enter the horizontal distance of the segment.
Slope	Enter the slope of the segment. The vertical and horizontal distances will be recomputed reflecting the slope.
Ditch Option:	S - This option specifies the slope of the segment is held when it intercepts the special ditch grade. D - This option specifies the distance of the segment is held when it intercepts the special ditch grade. G - This option specifies the distance and elevation of the segment is defined by a 3D geometry element.
Ditch ID:	Select the ID of the special ditch which will control this segment. Special Ditch ID's are numbered 0 through 9. Special Ditches are defined using the Special Ditch Data Type. See Page 6-43. This option only appears if Ditch options "S", "D", or “G” are selected.

Save	Click to save values as shown.
Reset	Click to return values to those of the previous save.
View	Click to display a dimensioned view of the shape.
Close	Click to dismiss the dialog box.
Help	Click to display help for this dialog box.

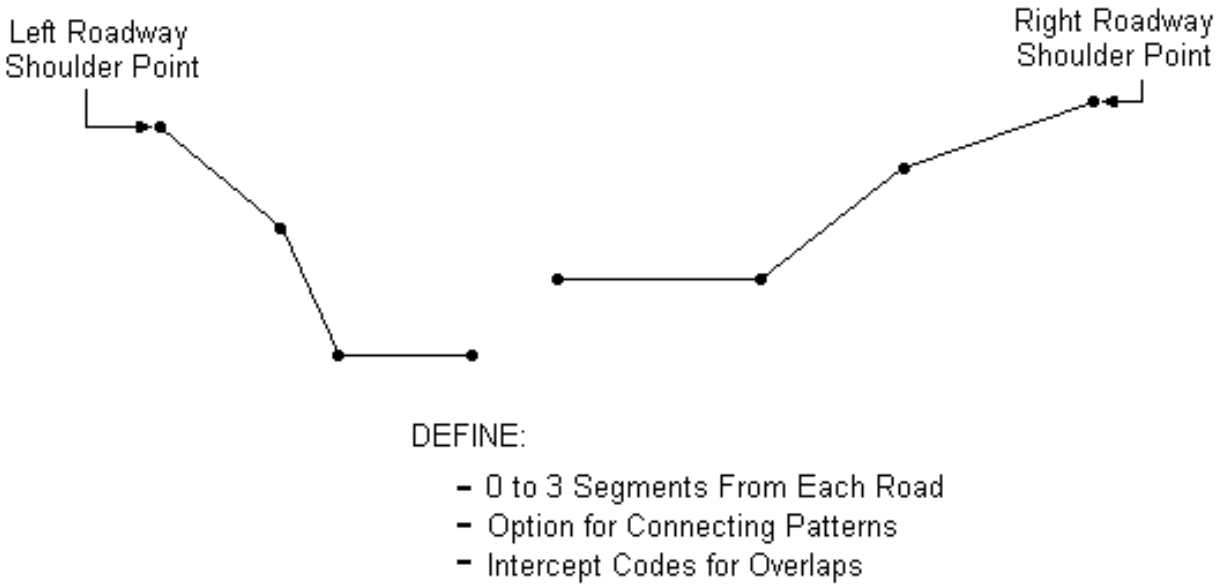
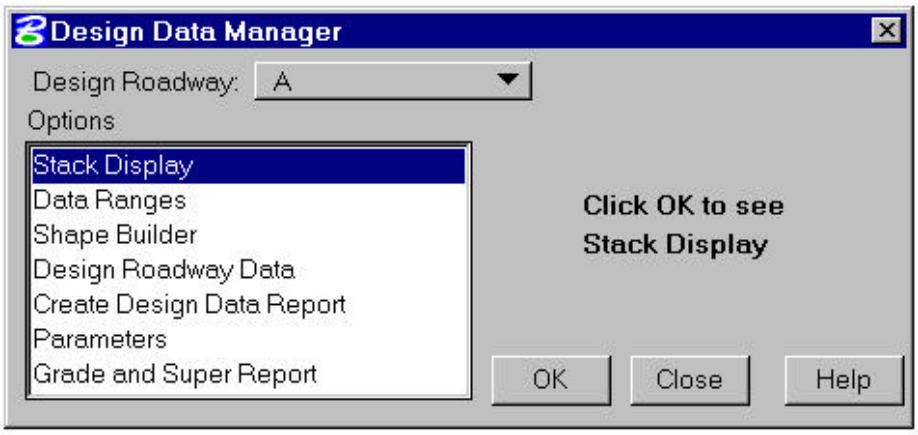


Figure 6-6
Median Shapes

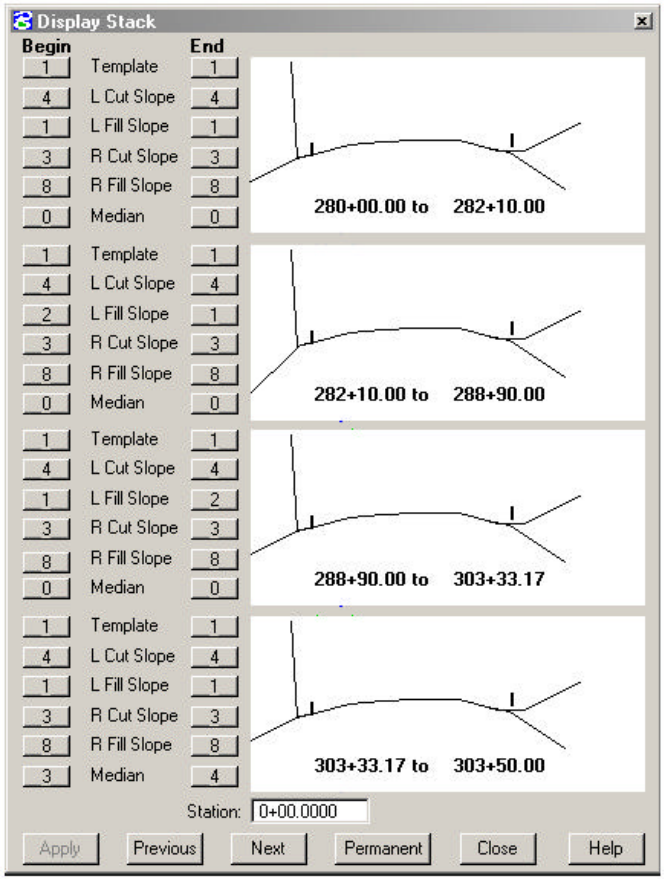
STACK DISPLAY



This process provides for graphic review of design data along a roadway. It produces the schematic display shown on the following page with 1 to 4 successive views. Each view covers a range of stations where design data remains constant.

Design Roadway	The active roadway is displayed. Click on field to change roadway.
OK	Click to produce Stack display.
Close	Click to end the process.
Help	Click to display help for this dialog box.

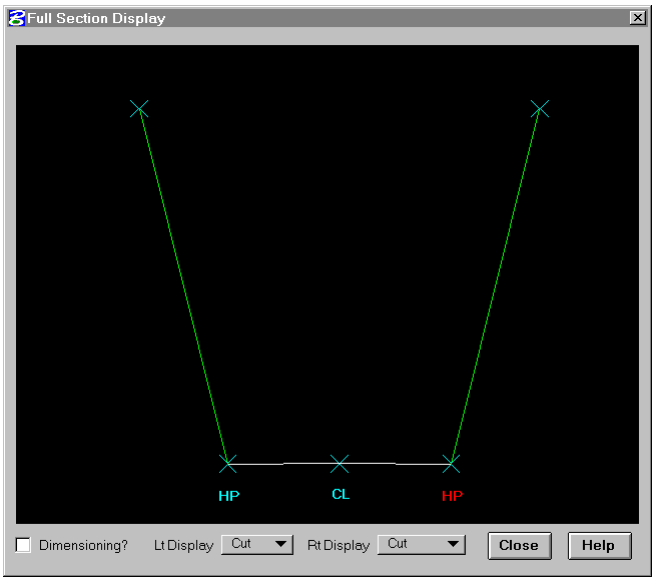
Range Shapes Range Views



Station	Enter the station near the desired shape view or digitize its location.
Apply	Click to display the shape view near the station displayed in "Station" (at the top of the Stack Display).
Previous	Click to display the shape views before the set currently displayed.
Next	Click to display the shape views after the set currently displayed.
Permanent	Click to display the current stack of shape views in permanent graphics. A prompt to digitize the location of the stack will appear. Digitize this location on a top view.
Close	Click to close the stack display.
Help	Click to display help for this dialog.

FULL SECTION DISPLAY

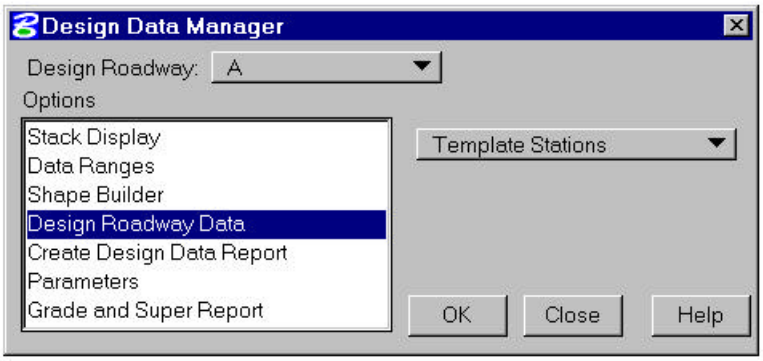
Access from Stack Display by clicking on one of its views.



This display shows a more detailed view of the stack display schematic views.

Dimensioning?	Push the button in for dimensioned views, or leave out for undimensioned views.
Left Display	Select desired display option. • Cut • Fill
Right Display	Select desired display option • Cut • Fill • Median
Close	Click to remove dialog.
Help	Click to display help for this subprocess.

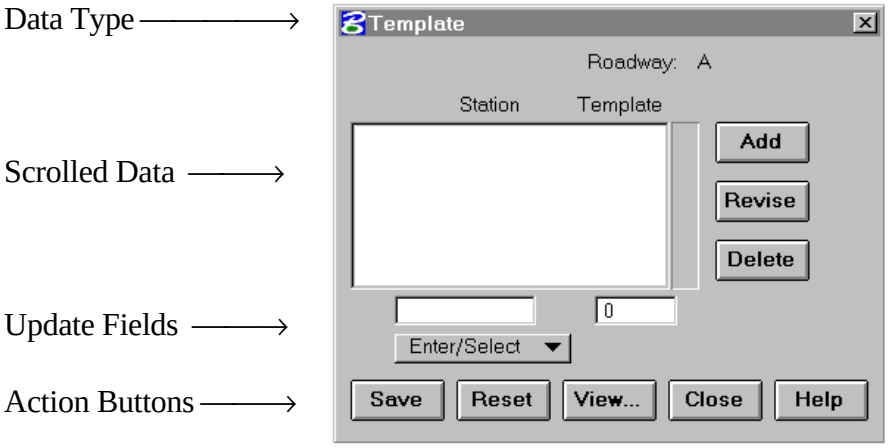
DESIGN ROADWAY DATA



Design Roadway Data consists of various data types which apply at a station or station range along a specified roadway. Selecting "Design Roadway Data" displays this dialog box for selecting data type.

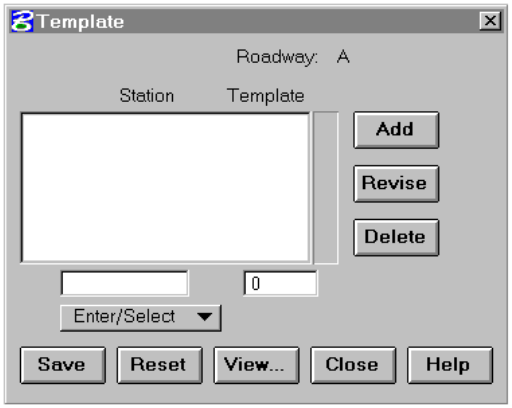
Roadway	The active roadway is displayed. Click on field to change roadway.
Data Type Option	Select desired data type to be addressed.
OK	Click to display scrolled data dialog for the selected data type.
Close	Click to close this dialog box.

Selection of a data type and clicking on **OK** displays a scrolled data dialog box for the data type selected. A typical box is shown below. Each dialog box displays any existing data and provides for reviewing, adding, modifying, and deleting data.



The dialog boxes are similar for all available data types. Instructions for each Data Type are given on the following pages.

TEMPLATE STATIONING



This subprocess provides for adding, modifying, or reviewing Template Stationing data records. Each record defines the location of a Template shape.

When the subprocess is selected, all existing records for the specified roadway will be displayed in the scrolled area. Clicking on a record will highlight it for further action. Current data will be displayed in the edit fields below the scrolled area.

Roadway	The active roadway is displayed. It cannot be changed in this subprocess. To change, use the roadway selection option button on either the Design Data Manager or Set Active Roadway menu.
Record Actions	
Add	Click to add a new data record by entering data in the fields below the scrolled area. The new record will be placed in the list according to its Station.
Revise	Click to revise the highlighted record by revising the field below the scrolled area.
Delete	Click to delete the highlighted record.
Record Data	
Station	Select Option • Enter/Select Enter station for template shape or select a graphic point to indicate station. • Begin The beginning station of the roadway will be displayed. • End The ending station of the roadway will be displayed.

Template	Select the desired shape from Shape View Browse or enter the desired number.
Save	Click to save the changes made while the dialog has been open.
Reset	Click to reset all data to the status when the last save was made for this roadway and data type.
View	Click to activate Shape View Browse.
Close	Click to dismiss the dialog. If changes have been made an opportunity to save will be given.
Help	Click to display help for this subprocess.

Notes:

Define every roadway by a template at the beginning and ending stations. You may specify other templates between the beginning and ending stations. Consecutive templates may have the same template number.

If there is a cross section station in between the stations of the consecutive templates, then the templates must have the same number of segments. Use dummy segments (0.01 foot or meter width) to create the same number of segments in consecutive templates.

The segment options of the same number segments of the two templates must also be the same. The system calculates an actual design cross section as a transition between the two consecutive templates.

The transition methodlogy between the two templates is controlled by a flag within the ha.tbl. (See the Concepts Manual for a discussion of the two approaches.)

Give two templates at the same (actually .01 feet or meters apart) station to change the number of segments on a template. The two templates should have the same shape, but can differ in number of segments. See Figure 6-7.

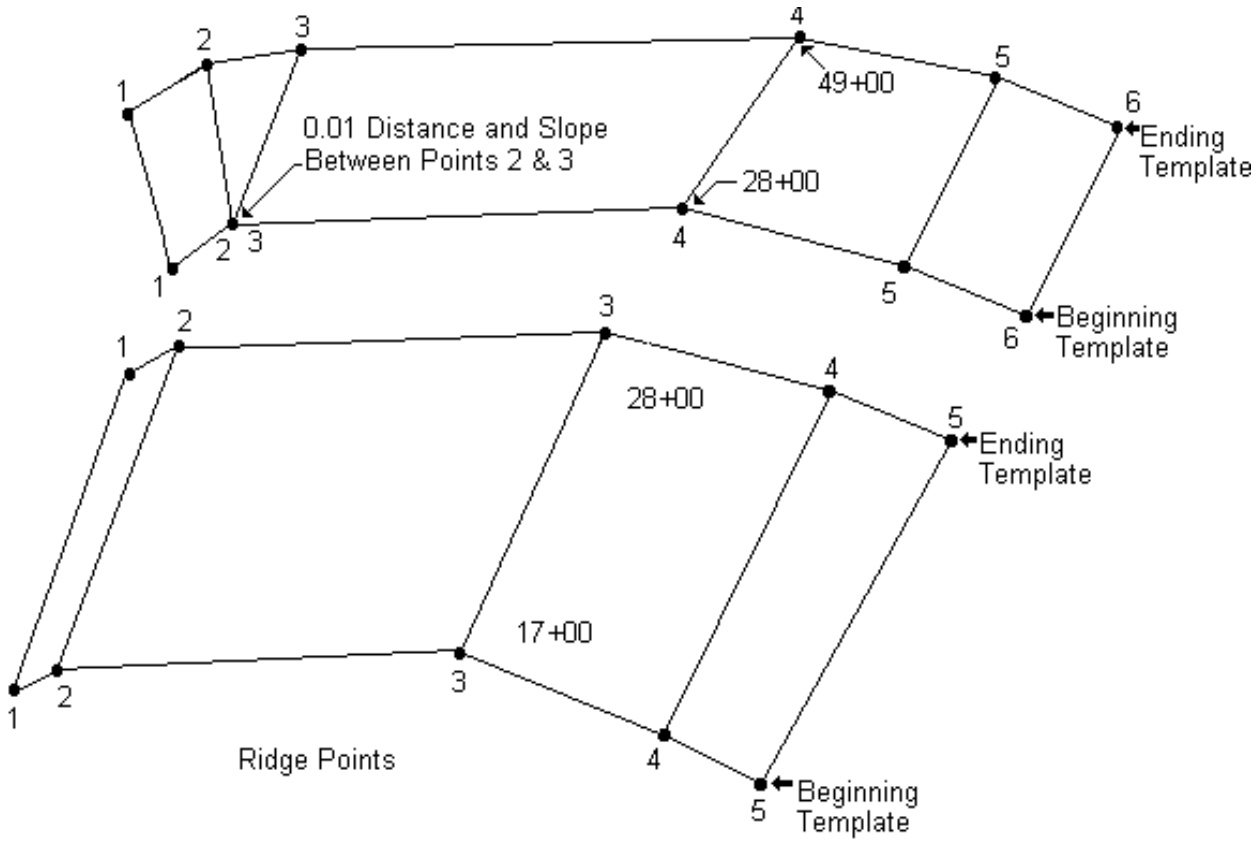
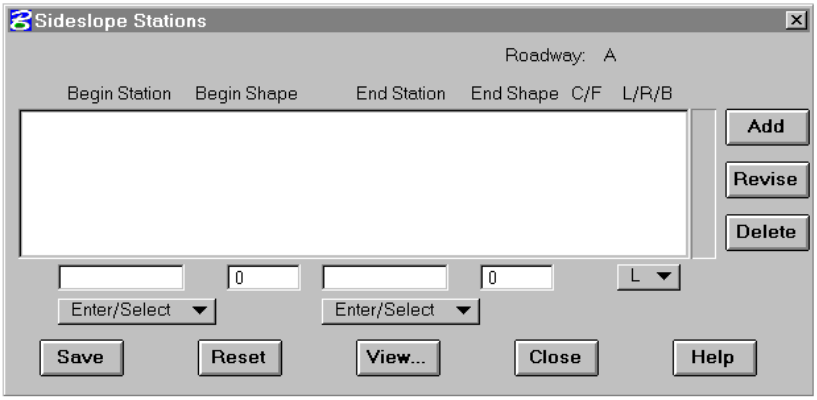


Figure 6-7
Template Stationing

SIDESLOPE STATIONING



This subprocess provides for adding, modifying, or reviewing Sideslope Stationing data records. Each record defines the station range over which a Sideslope Shape applies. Each record may refer to cut or fill shapes and may apply to left, right, or both sides.

Sideslope shape patterns can be linearly transitioned over a station range. This is accomplished by specifying a Begin Shape pattern at the begin station and an End Shape pattern at the end station that have different dimensions. The shape patterns must be of the same type (i.e., cut or fill). If only a Begin Shape is specified, it will be used over the entire range. When transitioning sideslope patterns, the same number of fixed and variable segments must be specified at the begin and end. All segments will be transitioned if their geometry is different at the begin or end. Sideslope pattern segment options must also match for the begin and end patterns.

When the subprocess is selected, all existing records for the specified roadway will be displayed in the scrolled area. Clicking on a record will highlight it for further action. Current data will be displayed in the edit fields below the scrolled area.

Roadway	The active roadway is displayed. It cannot be changed in this subprocess. To change, use the roadway selection option button on either the Design Data Manager or Set Active Roadway menu.
Record Actions	
Add	Click to add a new data record by entering data in the fields below the scrolled area. The new record will be placed in the list according to its Station.
Revise	Click to revise the highlighted record by revising the field below the scrolled area.
Delete	Click to delete the highlighted record.

Record Data	
Begin Station	Select Option • Enter/Select Enter beginning station for slope pattern or select a graphic point to indicate station. • Begin The beginning station of the roadway will be displayed.
Begin Shape No.	Select the desired shape to apply at the beginning of the range from the Shape View Browser or enter the desired number. The begin and end shapes must both be cut or fill over a station range. Also for either cut or fill shapes, the number of fixed segments in the begin and end shapes must be the same. After entering the begin shape, the end shape will automatically be set to the same shape number. If this is not desired, the default setting in the .ini file: "default sideslope end shape to begin shape" can be changed from "yes" to "no".
End Station	Select Option • Enter/Select Enter ending station for slope pattern or select a graphic point to indicate station. • End The ending station of the roadway will be displayed.
End Shape No.	Select the desired shape to apply at the end of the range from Shape View Browse or enter the desired number.
C/F	The selected shape type, C (cut) or F (fill) is displayed.
LRB	Side of application, select L, R, or B.

Save	Click to save the changes made while the dialog has been open. If a non-existent shape is specified, an error message box will appear and the data will not be stored.
Reset	Click to reset all data to the status when the last save was made for this roadway and data type.
View	Click to activate Shape View Browse.
Close	Click to dismiss the dialog. If changes have been made an opportunity to save will be given.
Help	Click to display help for this subprocess.

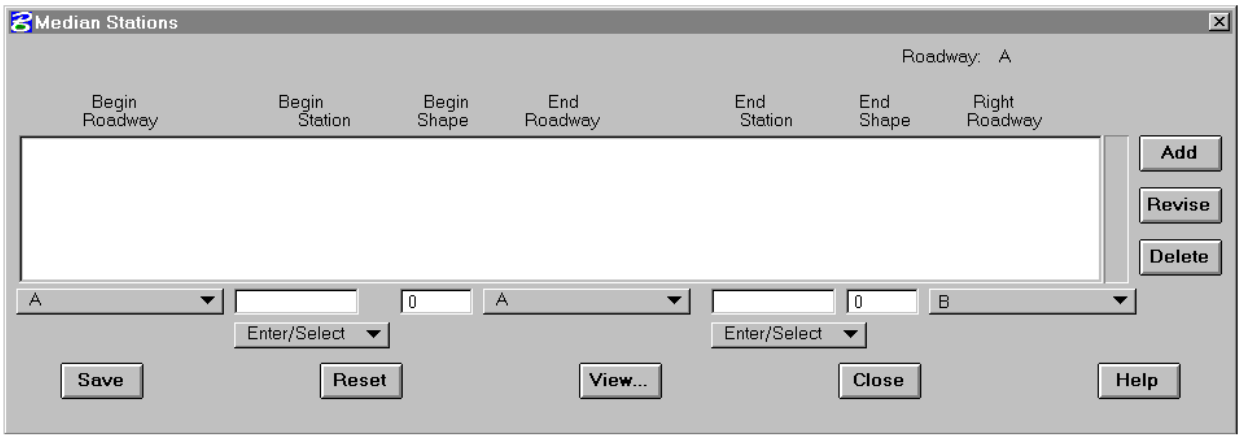
Notes:

Sideslopes can exist before the beginning station, after the ending station, or in between existing stations.

The program automatically computes continuity of stationing. When sideslope data (or data record) is added or deleted, the program adjusts adjacent records to eliminate any gaps between existing stations.

One sideslope for each side of the roadway for both cut and fill conditions should be defined. In the case of connecting adjacent roadways, median data may be used. If no sideslope or median data is provided, IGrds will connect the roadway template shoulder point to the original ground with a one to one slope in both cut and fill. If both median and sideslope data is specified for the same side of a roadway at a station, the median data will be used.

MEDIAN STATIONING



This subprocess provides for adding, modifying, or reviewing Median data records. Each record defines the station range over which a Median Shape applies.

Median shape patterns can be linearly transitioned over a station range. This is accomplished by specifying a Begin Shape pattern at the begin station and an End Shape pattern at the end station that have different dimensions. If only a Begin Shape is specified, it will be used over the entire station range. When transitioning median patterns, the same number of segments must be specified on the begin and end patterns. The corresponding segments of each pattern must have the same segment option. All segments will be transitioned if their geometry is different at the begin or end.

When the subprocess is selected, all existing records for the specified roadway will be displayed in the scrolled area. Clicking on a record will highlight it for further action. Current data will be displayed in the edit fields below the scrolled area.

Roadway	The active roadway is displayed and must be the left roadway of the median. It cannot be changed in this subprocess. To change, use the roadway selection option button on either the Design Data Manager or Set Active Roadway menu.
Record Actions	
Add	Click to add a new data record by entering data in the fields below the scrolled area. The new record will be placed in the list according to its Station.
Revise	Click to revise the highlighted record by revising the field below the scrolled area.
Delete	Click to delete the highlighted record.
Record Data	
Begin Roadway	Select applicable roadway.
Begin Station	Select Option • Enter/Select Enter beginning station for Median pattern or select a graphic point to indicate station. • Begin The beginning station of the roadway will be displayed.
Begin Shape	Select the desired shape to apply at the beginning of the range from the Shape View Browser or enter the desired number. After entering the begin shape, the end shape will automatically be set to the same shape number. If this is not desired, the default setting in the .ini file: "default median end shape to begin shape" can be changed from "yes" to "no"

End Roadway	Select applicable roadway.
End Station	Select Option • Enter/Select Enter ending station for median pattern or select a graphic point to indicate station. • End The ending station of the roadway will be displayed.
End Shape No.	Select the desired shape to apply at the end of the range from the Shape View Browser or enter the desired number.
Right Roadway	Select applicable roadway.
Save	Click to save the changes made while the dialog has been open.
Reset	Click to reset all data to the status when the last save was made for this roadway and data type.
View	Click to activate Shape View Browse.
Close	Click to dismiss the dialog. If changes have been made an opportunity to save will be given.
Help	Click to display help for this subprocess.

Note: Medians can be added before the beginning station, after the ending station, or in between existing stations.

For storage purposes, the system computes and stores beginning and ending stations for the median pattern on the left roadway

*Since the median data must be stored under the left roadway, **do not store** this median data again under the right roadway.*

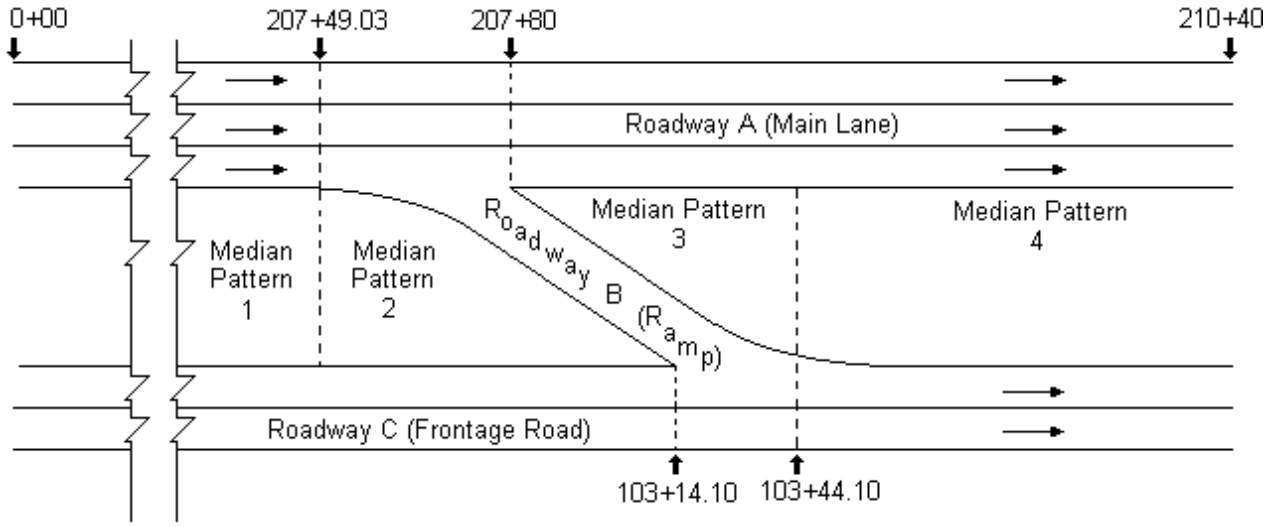
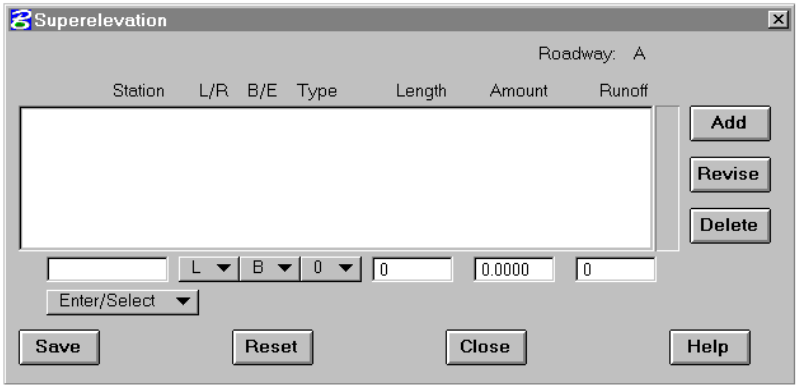


Figure 6-8
Median Stationing

SUPERELEVATION



This subprocess provides for adding, modifying, or reviewing Superelevation data records. Each record defines a Superelevation transition. Beginning and ending transitions must be compatible.

Superelevation data can be computed automatically using Horizontal Alignment process options. This process can be used to review/modify data which was computed automatically.

When the subprocess is selected, all existing records for the specified roadway will be displayed in the scrolled area. Clicking on a record will highlight it for further action. Current data will be displayed in the edit fields below the scrolled area.

Roadway	The active roadway is displayed. It cannot be changed in this subprocess. To change, use the roadway selection option button on either the Design Data Manager or Set Active Roadway menu.
Record Actions	
Add	Click to add a new data record by entering data in the fields below the scrolled area. The new record will be placed in the list according to its Station.
Revise	Click to revise the highlighted record by revising the field below the scrolled area.
Delete	Click to delete the highlighted record.

Record Data	
Station	Select Option • Enter/Select Enter beginning station for superelevation or select a graphic point to indicate station. • Begin The beginning Station of the roadway will be displayed. • End The ending station of the roadway will be displayed.
L/R	Select direction of curve L or R.
B/E	Select B or E to indicate whether the transition is Begin or End.
Type	Select the desired superelevation type (0-4). See Figure 6-9.
Length	Enter desired length of transition. See Figure 6-9. Decimal Lengths are allowed.
Amount	Enter Superelevation amount to be applied to the specified segment.
Runoff	Enter desired runoff superelevation rate (applicable to Type 0 only).
Save	Click to save the changes made while the dialog has been open.
Reset	Click to reset all data to the status when the last save was made for this roadway and data type.
Close	Click to dismiss the dialog. If changes have been made an opportunity to save will be given.
Help	Click to display help for this subprocess.

Note: If superelevation has been automatically calculated for the alignment, then care should be taken when modifying superelevation data to avoid mismatches in transition lengths, spiral lengths, etc.

Superelevation Type 0 or 4 must be used for compound and reverse superelevation.

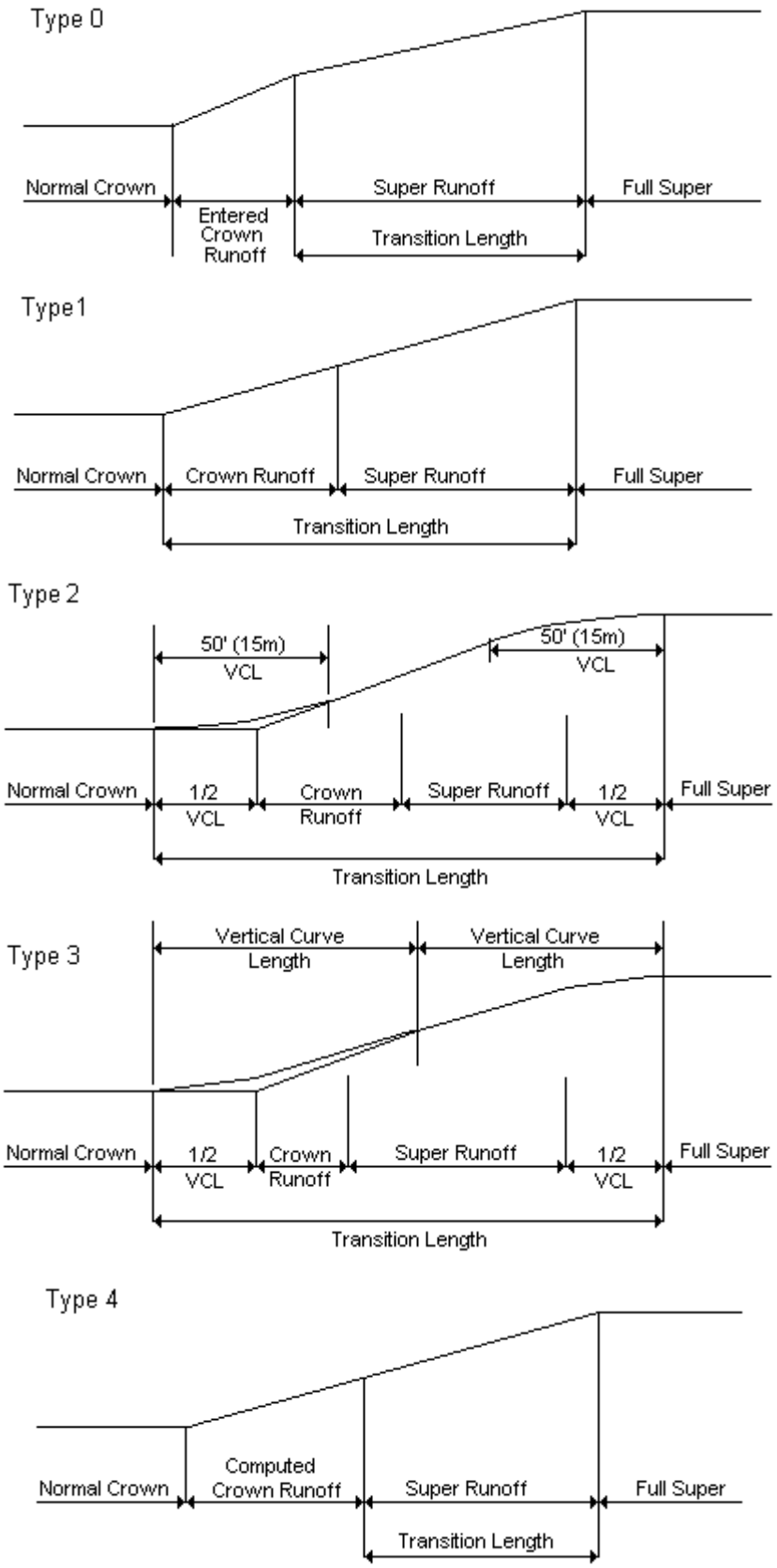
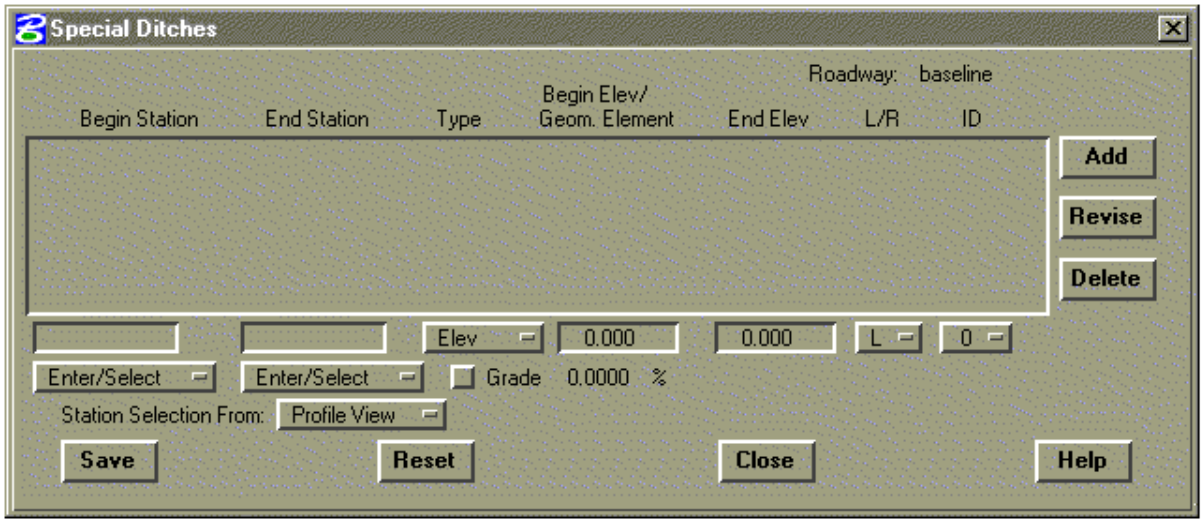


Figure 6-9
Superelevation Types

SPECIAL DITCH



This subprocess provides for adding, modifying, or reviewing Special Ditch data records. Each record defines a straight run of a Special Ditch.

Up to ten Special Ditches can be defined on each side of a roadway at a single station. Each ditch is assigned an ID from 0 through 9. Special Ditches are assigned to sideslope and/or median segments by ID when the shapes are defined. See page 6-33 for Sideslope shape definition and page 6-36 for Median shape definition.

When the subprocess is selected, all existing records for the specified roadway will be displayed in the scrolled area. Clicking on a record will highlight it for further action. Current data will be displayed in the edit fields below the scrolled area.

Roadway	The active roadway is displayed. It cannot be changed in this subprocess. To change, use the roadway selection option button on either the Design Data Manager or Set Active Roadway menu.
Record Actions	
Add	Click to add a new data record by entering data in the fields below the scrolled area. The new record will be placed in the list according to its Station
Revise	Click to revise the highlighted record by revising the field below the scrolled area.
Delete	Click to delete the highlighted record.

Record Data

Begin Station Select Option

- Enter/Select
  Enter beginning station for special ditch or select a graphic point to indicate station.

- Begin
  The beginning Station of the roadway will be displayed.

End Station Select Option

- Enter/Select
  Enter ending station for slope pattern or select a graphic point to indicate station.

- End
  The ending station of the roadway will be displayed.

Select Station From Select Option

- Plan View
  Allows station selection from Plan View.

- Profile View (Default)
  Allows station selection from the profile view.

Type Select option.

- Elev
  Ditches are to be entered by Begin Sta/Elev and End Sta/Elev.

- Geom
  Ditch is to be defined by a 3D Geometry element. (The Geometry element may have an independent profile. See 4-102A.)

Begin Elev/ Geom. Elements	If Type is set to Elev., enter the ditch elevation at the beginning of the ditch. Note that Begin Elev can be graphically, picked from the Vertical Reference line plane. If Type is set to Geom, enter or select the IGrds geometry or MicroStation element to be used to define the ditch location.
End Elev	Enter ditch elevation at the end of the ditch note that the End Elev can be graphically picked from the reference line plane.
L/R	Select L or R to indicate the side of the roadway the ditch is to be placed.
ID	Select the ID to be assigned to the Special Ditch. Values are 0 through 9.
Grade	Check this box if the ditch grade is to be optionally entered. When this item is checked, an option button will appear to allow selection of which parameter (Begin Station, Begin Elevation, End Station, End Elevation) will be computed by the system. This item will appear only when Type is set to Elev.
Compute	Select option. (This item will appear only when the Grade box is checked. • Begin Station - The system will compute the begin station given the entered Grade, Begin Elevation, End Station, and End Elevation. • Begin Elevation - The system will compute the begin elevation given the entered Grade, Begin Station, End Station, and End Elevation. • End Station - The system will compute the end station given the entered Grade, Begin Station, Begin Elevation, and End Elevation.

	• End Elevation - The system will compute the end elevation given the entered Grade, Begin Station, Begin Elevation, and End Station.
Save	Click to save the changes made while the dialog has been open.
Reset	Click to reset all data to the status when the last save was made for this roadway and data type.
Close	Click to dismiss the dialog. If changes have been made an opportunity to save will be given.
Help	Click to display help for this subprocess.

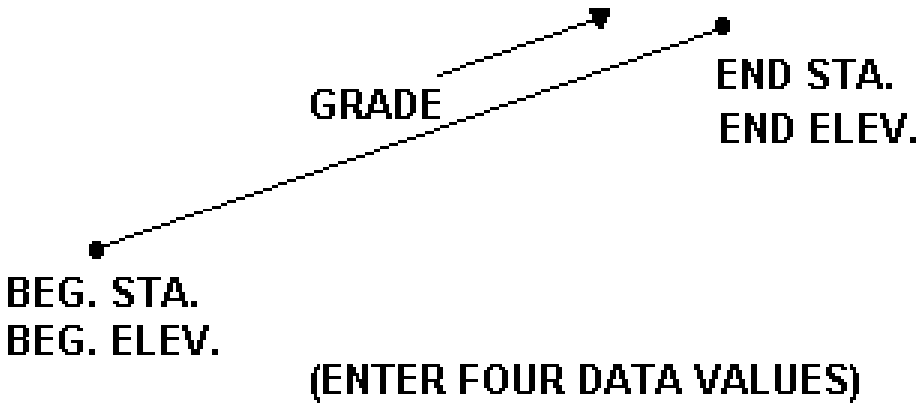
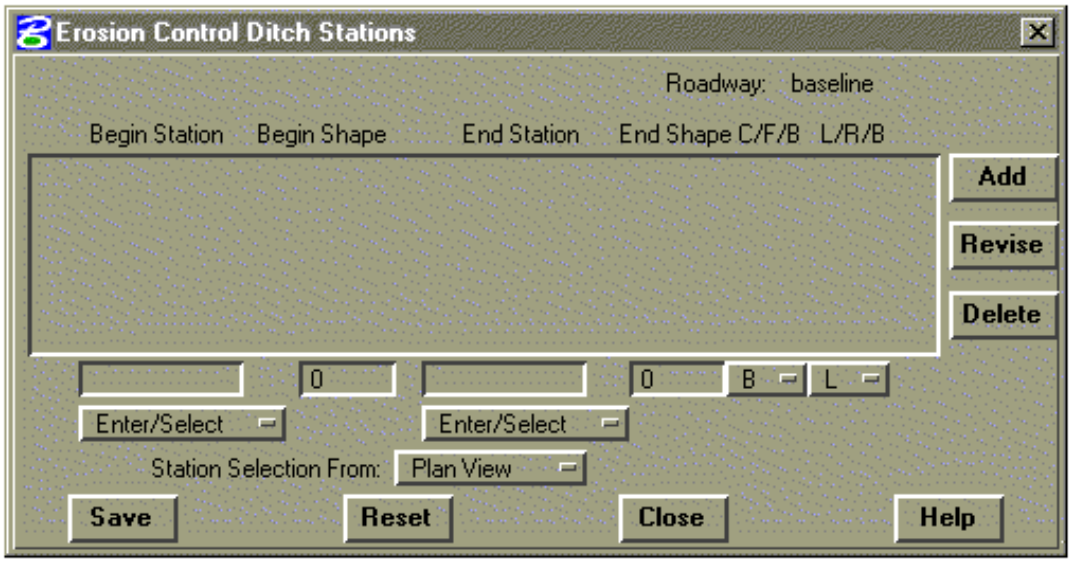


Figure 6-10
Special Ditch

EROSION CONTROL DITCH STATIONING



This subprocess provides for adding, modifying, or reviewing Erosion Control Ditch Stationing data records. The Erosion Control Ditch Shape is set with Define Sideslope Shape. (See *Define Sideslope Shape*, page 6-18.) Each record defines the station range over which an Erosion Control Ditch Shape applies. Each record may refer to cut, fill, or both shapes and may apply to left, right, or both sides.

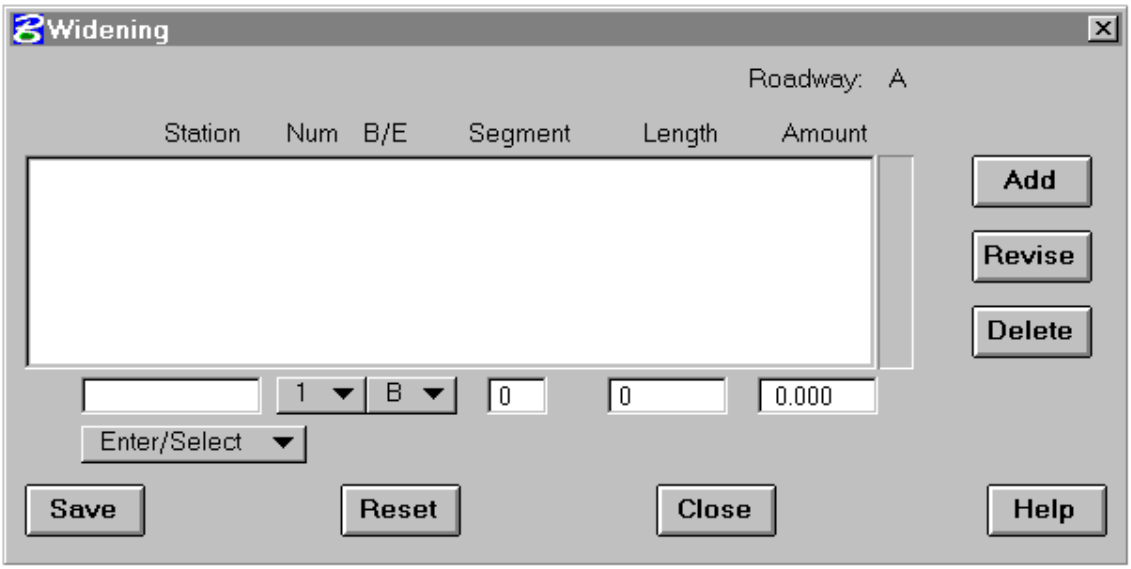
Erosion Control Ditch shape patterns can be linearly transitioned over a station range. This is accomplished by specifying a Begin Shape pattern at the begin station and an End Shape pattern at the end station that have different dimensions. If only a Begin Shape is specified, it will be used over the entire range. When transitioning Erosion Control Ditch patterns, the same number of fixed and variable segments must be specified at the begin and end. All segments will be transitioned if their geometry is different at the begin or end. Erosion Control Ditch pattern segment options must also match for the begin and end patterns.

When the subprocess is selected, all existing records for the specified roadway will be displayed in the scrolled area. Clicking on a record will highlight it for further action. Current data will be displayed in the edit fields below the scrolled area.

Roadway	The active roadway is displayed. It cannot be changed in this subprocess. To change, use the roadway selection option button on either the Design Data Manager or Set Active Roadway menu.
Record Actions	
Add	Click to add a new data record by entering data in the fields below the scrolled area. The new record will be placed in the list according to its Station
Revise	Click to revise the highlighted record by revising the field below the scrolled area.
Delete	Click to delete the highlighted record.
Record Data	
Begin Station	Select Option • Enter/Select Enter beginning station for ditch pattern or select a graphic point to indicate station. • Begin The beginning station of the roadway will be displayed.
Begin Shape No.	Enter the desired shape number at the beginning of the range
End Station	Select Option • Enter/Select Enter ending station for ditch pattern or select a graphic point to indicate station. • End The ending station of the roadway will be displayed.
Shape No.	Enter the desired shape number.

Select Station From	Select Option • Plan View (Default) Allows station selection from Plan View. • Profile View Allows station selection from the profile view.
C/F/B	The ditch selected applies for sideslope types: C (cut), F (Fill), or B (Both).
L/R/B	Side of application, select L, R, or B.
Save	Click to save the changes made while the dialog has been open. If a non-existent shape is specified, an error message box will appear and the data will not be stored.
Reset	Click to reset all data to the status when the last save was made for this roadway and data type.
Close	Click to dismiss the dialog. If changes have been made an opportunity to save will be given.
Help	Click to display help for this subprocess.

WIDENING



This subprocess provides for adding, modifying, or reviewing widening data records. Each record defines a transition. Beginning and ending transitions must be compatible.

When the subprocess is selected, all existing records for the specified roadway will be displayed in the scrolled area. Clicking on a record will highlight it for further action. Current data will be displayed in the edit fields below the scrolled area.

Roadway	The active roadway is displayed. It cannot be changed in this subprocess. To change, use the roadway selection option button on either the Design Data Manager or Set Active Roadway menu.
Record Actions	
Add	Click to add a new data record by entering data in the fields below the scrolled area. The new record will be placed in the list according to its Station
Revise	Click to revise the highlighted record by revising the field below the scrolled area.
Delete	Click to delete the highlighted record.

Note: If automatic curve widening has been calculated for the alignment, than these records will appear in the scrolled data area. They are identified as widening numbers 4 and 5 and care should be taken when editing these data to avoid mismatches between transition lengths, spiral lengths, etc.

Record Data

Station Select Option

- Enter/Select

  Enter station for full widening or select a graphic point to indicate station.

- Beginning

  The beginning Station of the roadway will be displayed.

- Ending

  The ending station of the roadway will be displayed.

Num Select Widening Number 1 or 2.

B/E Select B for a beginning widening transition or E for an ending transition.

Seg Enter Template Segment Number for which widening applies. When using an "on template" be sure to drop the "dummy segment" before determining the template segment number.

Length Enter length of Widening transition.

Amount Enter ± widening amount to be applied to the specified segment.

Save Click to save the changes made while the dialog has been open.

Reset Click to reset all data to the status when the last save was made for this roadway and data type.

Close Click to dismiss the dialog. If changes have been made an opportunity to save will be given.

Help Click to display help for this subprocess.

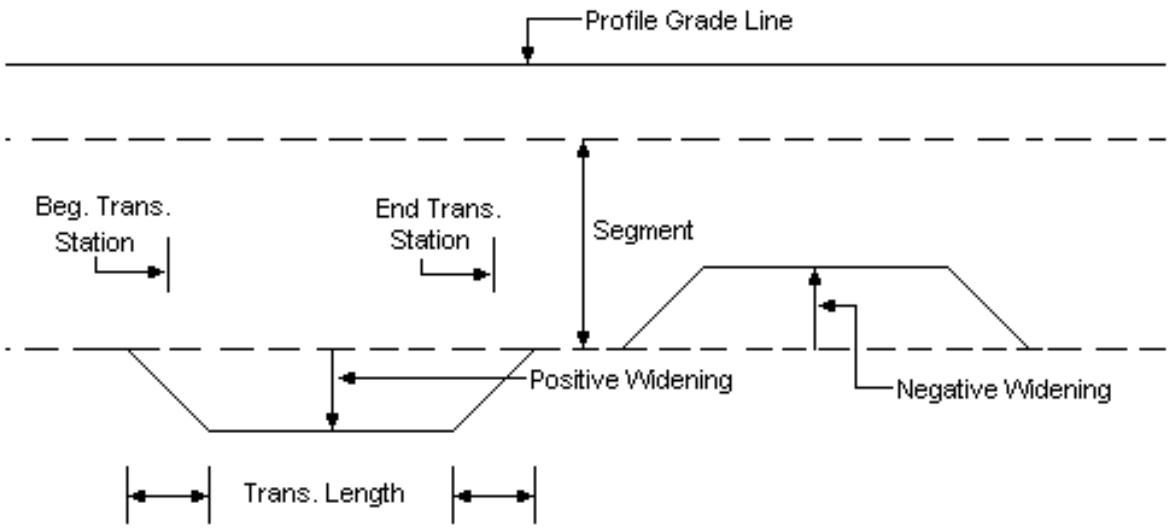
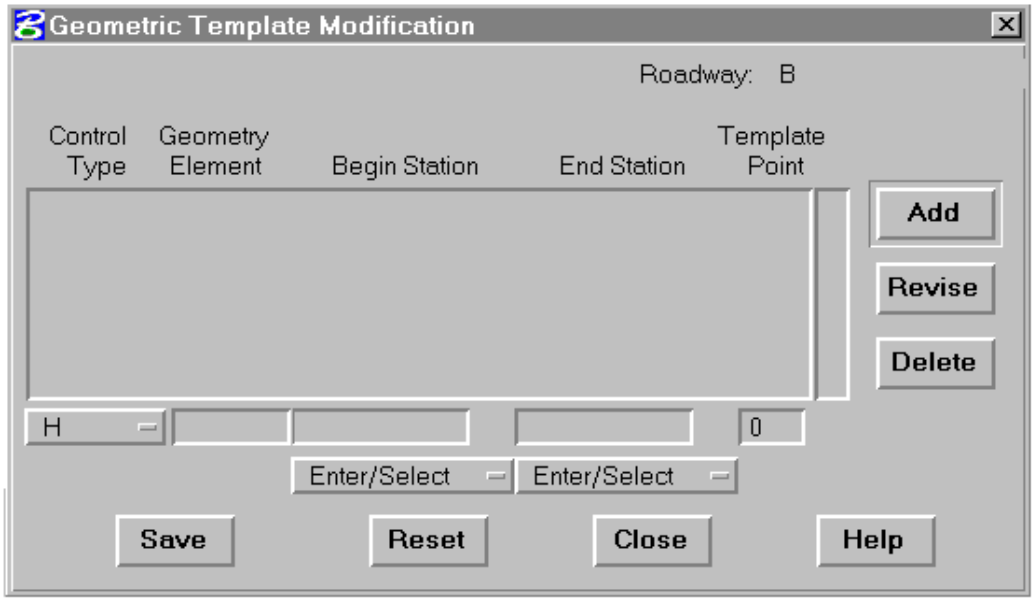


Figure 6-11
Widening

GEOMETRIC TEMPLATE MODIFICATION



This subprocess provides the means for defining lateral shifts in template points over a specified station range based upon the location of line, arc, or chain geometry elements defined along the roadway in plan view. Any, or all template points at a given station (except the centerline point), can be modified. A simple example is shown on Figure 12.

When the subprocess is selected, all existing records for the specified roadway will be displayed in the scrolled area. Clicking on a record in the area will highlight it for further action. Current data is displayed in the edit fields in the edit fields below the scrolled area.

Roadway	The active roadway is displayed. It cannot be changed in this subprocess. To change it, use the roadway selection option button on either the Design Data Manager or Set Active Roadway menu.
Record Actions	
Add	Click to add a new data record by entering data in the fields below the scrolled area. The new record will be placed in the list according to its Station.
Revise	Click to revise the highlighted record by revising the field below the scrolled area.
Delete	Click to delete the highlighted record.

Record Data

Geometry Type

Select Option H, H & V, H & VS.

- Select H for horizontal control only.
- Select H & V for horizontal and vertical control.
- Select H & VS for horizontal and vertical slope control.

Geometry Element

Select a geometry element to be used to define lateral shifts in template points. (This process automatically loads the first four data fields.)

If not selected, enter the number of the geometry element desired as a template point reference line.

Begin Station

Select Option

- Enter/Select
  If not filled in through automatic selection, enter the station of the beginning of the template modification or select a graphic point to indicate the station.
- Begin
  The beginning station of the roadway will be displayed.

End Station

Select Option

- Enter/Select
  Enter ending station for Geometric Template Modification pattern or select a graphic point to indicate station.
- End
  The ending station of the roadway will be displayed.

Template Point	Enter the number of the template point to which the modification data is to be applied. When using an "on template" be sure to drop the "dummy segment" before determining the template point number.
Save	Click to save the changes made while the dialog has been open.
Reset	Click to reset all data to the status when the last save was made for this roadway and data type.
Close	Click to dismiss the dialog. If changes have been made an opportunity to save will be given.
Help	Click to display help for this subprocess.

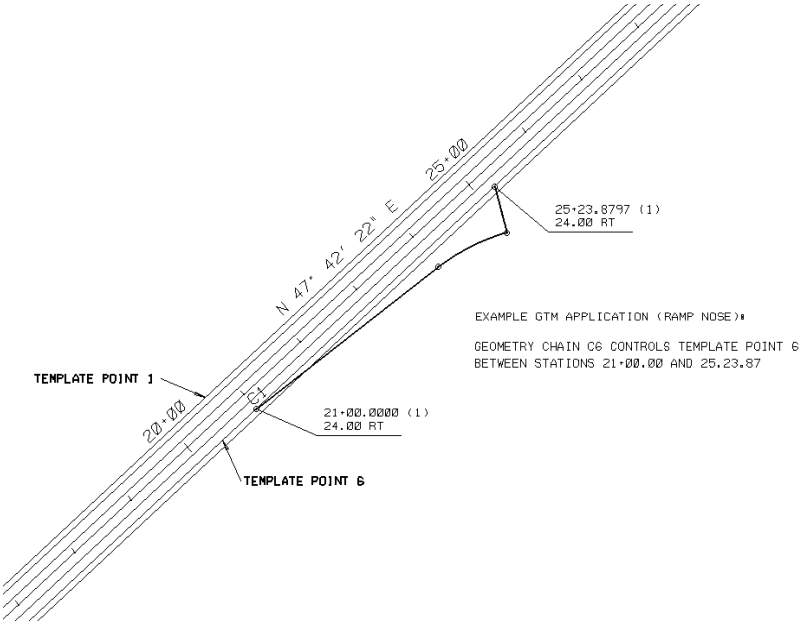


Figure 12

Notes:

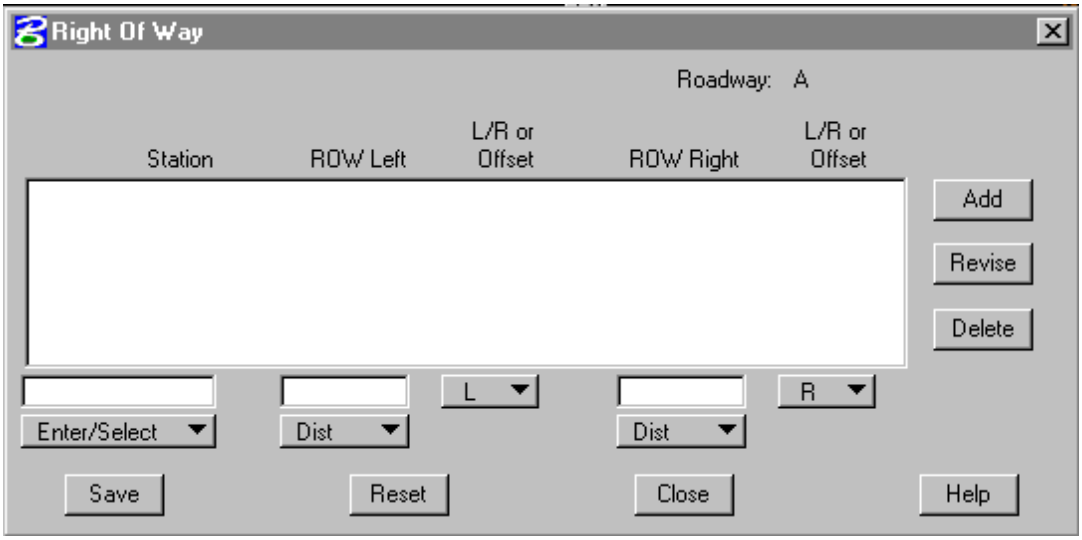
Since Geometric Template Modification (GTM) data can be used as an alternate means to accomplish widening, do not combine its use with Widening data over the same station range.

When utilizing GTM to define curve widening, an added lane or a ramp take-off, be sure to supply geometry elements that define the entire change in location of the template point being modified. This includes transitions as well as the full change in desired width.

For added lanes, or the like, that require differing cross slopes, provide template definitions containing two points at the same location and a separate cross slope that can be used when point separation occurs along the GTM line.

When GTM is used, original ground cross sections must be generated at key locations in the affected area since IGrds will only create design sections where original ground exists. Where DTM models are used, these additional original ground sections can easily be generated using the cross section from DTM command.

RIGHT-OF-WAY



This subprocess provides for adding, modifying, or reviewing Right-of-Way data records. Each record defines specifications for right-of-way data at a station. A record may include one or two specifications.

When the subprocess is selected, all existing records for the specified roadway will be displayed in the scrolled area. Clicking on a record will highlight it for further action. Current data will be displayed in the edit fields below the scrolled area.

Roadway	The active roadway is displayed. It cannot be changed in this subprocess. To change, use the roadway selection option button on either the Design Data Manager or Set Active Roadway menu.
Record Actions	
Add	Click to add a new data record by entering data in the fields below the scrolled area. The new record will be placed in the list according to its Station
Revise	Click to revise the highlighted record by revising the field below the scrolled area.
Delete	Click to delete the highlighted record.

Record Data

Station Select Option

- Enter/Select
  Enter station for full Right-of-Way or select a graphic point to indicate station.

- Begin
  The beginning Station of the roadway will be displayed.

- End
  The ending station of the roadway will be displayed.

ROW Left Select Option

- Distance
  Enter Distance.

- L/R
  Select L or R to indicate where left distance applies.

- Geometry Element
  Select or enter any linear IGrds geometry or MicroStation element.

- Offset
  Enter offset distance from geometry element.

ROW Right Select Option

- Distance
  Enter distance

- L/R
  Select L or R to indicate where right distance applies.

	• Geometry Element Select or enter any linear IGrds geometry or MicroStation element. • Offset Enter offset distance from geometry element.
Save	Click to save the changes made while the dialog has been open.
Reset	Click to reset all data to the status when the last save was made for this roadway and data type.
Close	Click to dismiss the dialog. If changes have been made an opportunity to save will be given.
Help	Click to display help for this subprocess.

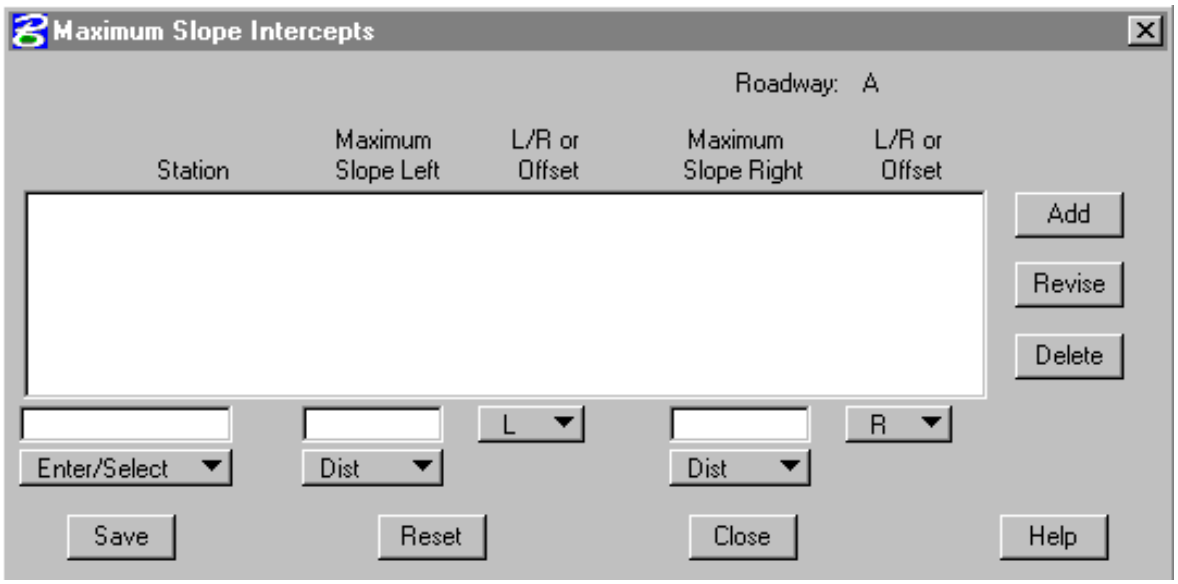
Notes:

At least two data records must be defined (a beginning and ending). Offset Distances between station entries will be uniformly transitioned. Geometric elements will be followed between station entries.

If records exist on the baseline as well as on one or more design roadways, the records from the baseline will be honored and all others will be disregarded.

If records exist on multiple design roadways, only the last design roadway's records will be honored.

MAXIMUM SLOPE INTERCEPTS



This subprocess provides for adding, modifying, or reviewing Maximum Slope Intercept data records. Each record defines specifications for maximum slope intercept data at a station. A record may include one or two specifications.

When the subprocess is selected, all existing records for the specified roadway will be displayed in the scrolled area. Clicking on a record will highlight it for further action. Current data will be displayed in the edit fields below the scrolled area.

Roadway	The active roadway is displayed. It cannot be changed in this subprocess. To change, use the roadway selection option button on either the Design Data Manager or Set Active Roadway menu.
Record Actions	
Add	Click to add a new data record by entering data in the fields below the scrolled area. The new record will be placed in the list according to its Station
Revise	Click to revise the highlighted record by revising the field below the scrolled area.
Delete	Click to delete the highlighted record.

Record Data

Station Select Option

- Enter/Select
  Enter station for Maximum Slope Intercept or select a graphic point to indicate station.

- Begin
  The beginning Station of the roadway will be displayed.

- End
  The ending station of the roadway will be displayed.

Slope Left

- Distance
  Enter Distance.

- L/R
  Select L or R to indicate where left distance applies.

- Geometry Element
  Select or enter any linear IGrds geometry or MicroStation element.

- Offset
  Enter offset distance from geometry element.

Slope Right

- Distance
  Enter distance

- L/R
  Select L or R to indicate where right distance applies.

- Geometry Element
  Select or enter any linear IGrds geometry or MicroStation element.

- Offset
  Enter offset distance from geometry element.

Save	Click to save the changes made while the dialog has been open.
Reset	Click to reset all data to the status when the last save was made for this roadway and data type.
Close	Click to dismiss the dialog. If changes have been made an opportunity to save will be given.
Help	Click to display help for this subprocess.

Notes:

At least two data records must be defined (a beginning and ending). Offset Distances between station entries will be uniformly transitioned. Geometric elements will be followed between station entries.

If records exist on the baseline as well as on one or more design roadways, the records from the baseline will be honored and all others will be disregarded.

If records exist on multiple design roadways, only the last design roadway's records will be honored.

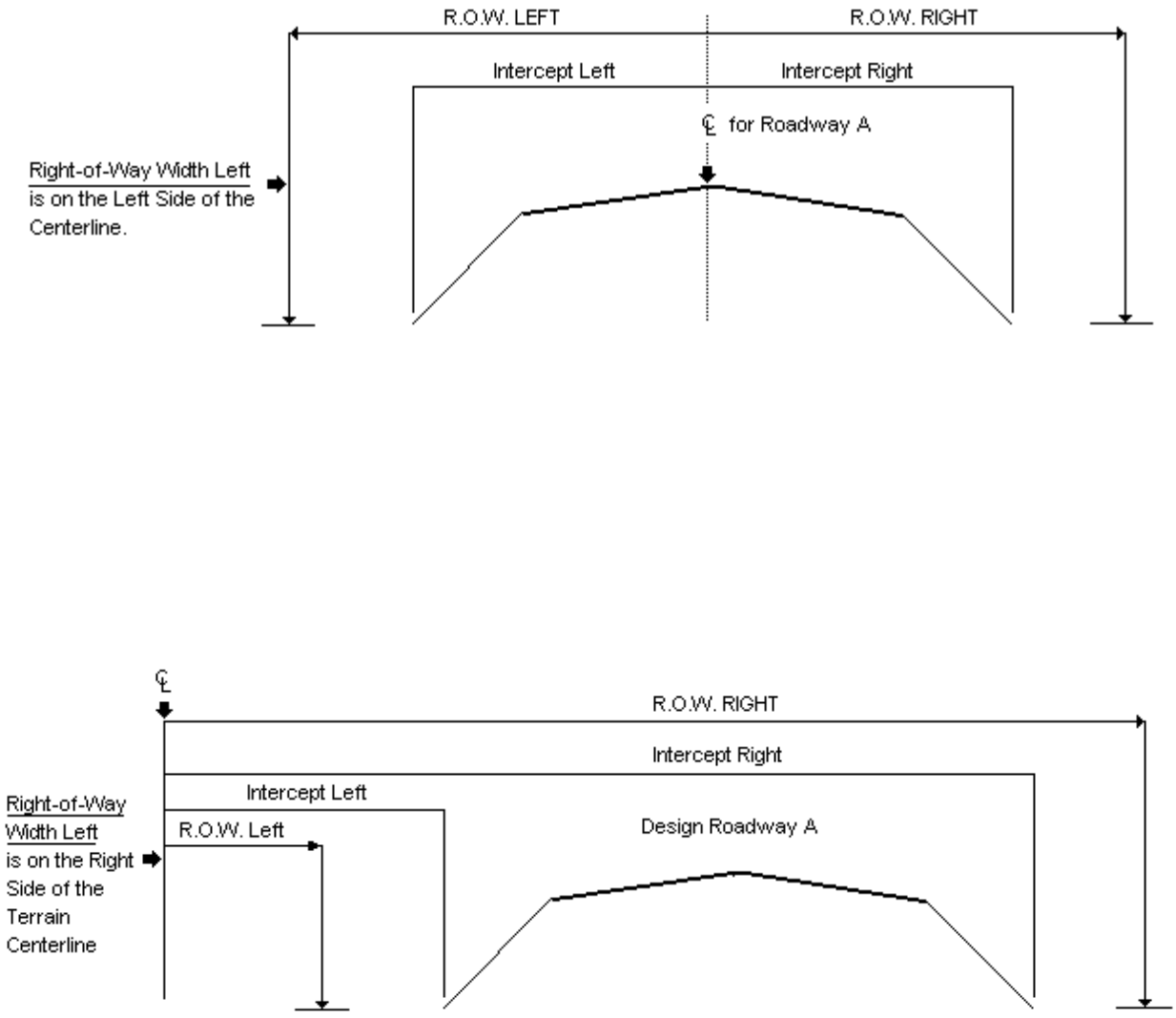
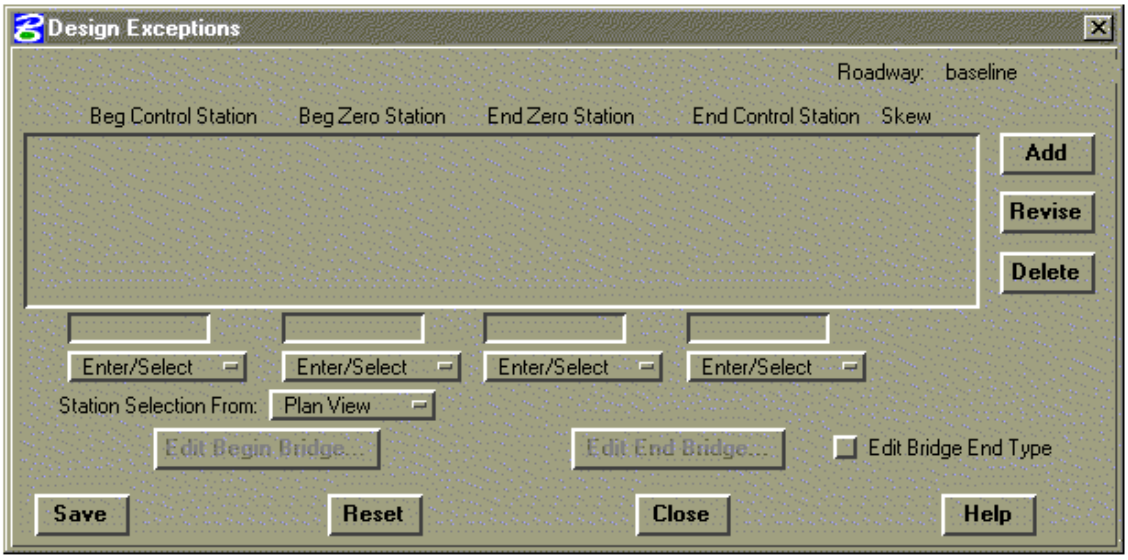


Figure 6-13
ROW and Maximum Slope Intercept

DESIGN EXCEPTIONS



This subprocess provides for adding, modifying, or reviewing Design Exceptions data records. The beginning, ending, and zero stations are specified as shown in Figure 6-14. These are used to except certain sections from design and volume computations.

Volume adjustments are made as specified. There should be a cross section at the Begin, Begin Zero, End Zero, and End Stations.

When the subprocess is selected, all existing records for the specified roadway will be displayed in the scrolled area. Clicking on a record will highlight it for further action. Current data will be displayed in the edit fields below the scrolled area.

Roadway	The active roadway is displayed. It cannot be changed in this subprocess. To change, use the roadway selection option button on either the Design Data Manager or Set Active Roadway menu.
Record Actions	
Add	Click to add a new data record by entering data in the fields below the scrolled area. The new record will be placed in the list according to its Station. (In the second option, all entry is via the Bridge End dialog.)
Revise	Click to revise the highlighted record by revising the field below the scrolled area. (In the second option, all entry is via the Bridge End dialog. The revise button will be grayed out.)
Delete	Click to delete the highlighted record.
Record Data	
Beg Control Station	Select Option • Enter/Select Enter begin station for Design Exception or select a graphic point to indicate station. • Begin The beginning Station of the roadway will be displayed. (In the second option, Beginning Station is computed and is referred to as the control station. Zero stations are not applicable.)
Beg Zero Station	Apply instructions for Beginning Station to Beginning Zero Station.
End Zero Station	Apply instructions for Beginning Station to End Zero Station.

End Control Station	Select Option • Enter/Select Enter ending station for Design Exceptions or select a graphic point to indicate station. • End The ending Station of the roadway will be displayed. (In the second option, End Station is computed.)
Select Station From	Select Option • Plan View (Default) Allows station selection from Plan View. • Profile View Allows station selection from the profile view.
Save	Click to save the changes made while the dialog has been open. (If the second option is applicable, Design Exception and Added Quantity records for the volumes under the bridge end are added.)
Reset	Click to reset all data to the status when the last save was made for this roadway and data type.
Close	Click to dismiss the dialog. If changes have been made, an opportunity to save will be given.
Help	Click to display help for this subprocess.

Note: Design Exceptions of this type cannot be used in the same Base Line station range where a Bridge End Treatment Design Exception is defined.

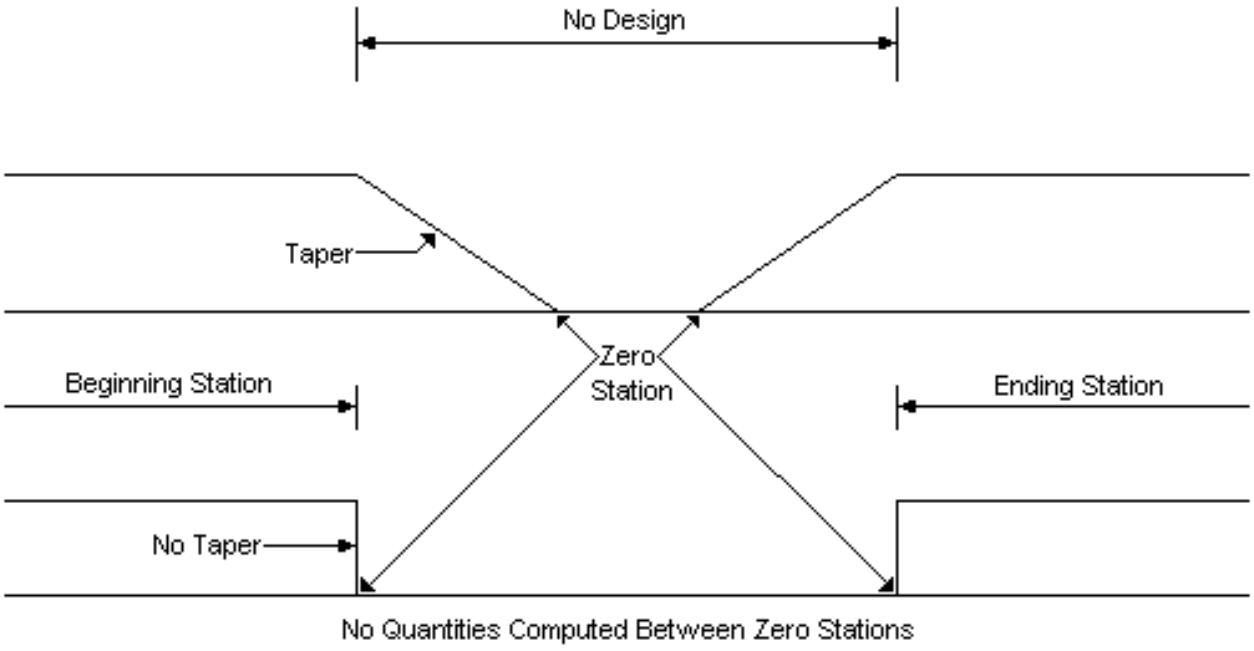
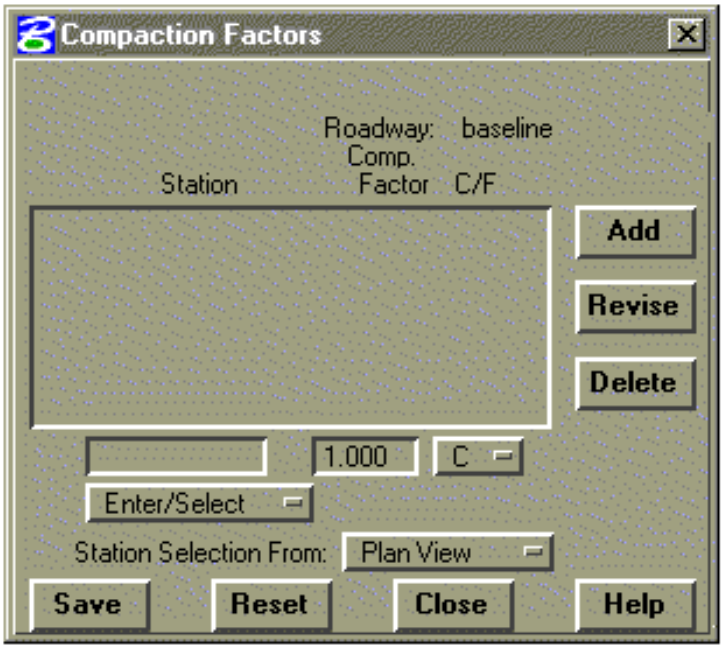


Figure 6-14
Design Exceptions

COMPACTION FACTORS



This subprocess provides for adding, modifying, or reviewing Compaction Factors data records. Each record defines a compaction factor (cut or fill) to be applied beginning at a specified station (see notes).

A compaction factor is a characteristic assigned to a specific earth material which indicates how and to what extent its volume will change when that material, after having been cut from the original ground, is compacted as fill material. This characteristic is expressed as the ratio of a given volume of this material, in its original ground state, divided by the volume that same material would occupy when compacted as fill. Compaction factors produce an adjusted **fill** or **cut** volume to be used in computing earthwork volumes and mass ordinates.

When the subprocess is selected, all existing records for the specified roadway will be displayed in the scrolled area. Clicking on a record will highlight it for further action. Current data will be displayed in the edit fields below the scrolled area.

Roadway	The active roadway is displayed. It cannot be changed in this subprocess. To change, use the roadway selection option button on either the Design Data Manager or Set Active Roadway menu.
Record Actions	
Add	Click to add a new data record by entering data in the fields below the scrolled area. The new record will be placed in the list according to its Station.
Revise	Click to revise the highlighted record by revising the field below the scrolled area.
Delete	Click to delete the highlighted record.

Record Data

Station Select Option

- Enter/Select
  Enter or select the station where the compaction factor specified in this record is to become effective.

- Beginning
  The beginning station of the roadway will be displayed.

- Ending
  The ending station of the roadway will be displayed.

Select Station From Select Option

- Plan View (Default)
  Allows station selection from Plan View.

- Profile View
  Allows station selection from the profile view.

Compaction Factor Enter the value of the compaction factor to be applied beginning at the given station.

C/F Select option.

- C
  Select the C option to apply the compaction factor to cut volumes.

- F
  Select the F option to apply the compaction factor to fill volumes.

Save	Click to save the changes made while the dialog has been open.
Reset	Click to reset all data to the status when the last save was made for this roadway and data type.
Close	Click to dismiss the dialog. If changes have been made an opportunity to save will be given.
Help	Click to display help for this subprocess.

Notes:

The compaction factors are applied to either the cut or fill volumes as specified.

Compaction Factor Applied to Cut

Compaction Factor	*Cut*	*Adjusted Cut*	*Fill*	*Comments*
1.20	*200*	*240*	*50*	*Material Swells*
0.85	*200*	*170*	*50*	*Material Shrinks*

1.20 = 20 percent swell
0.85 = 15 percent shrink

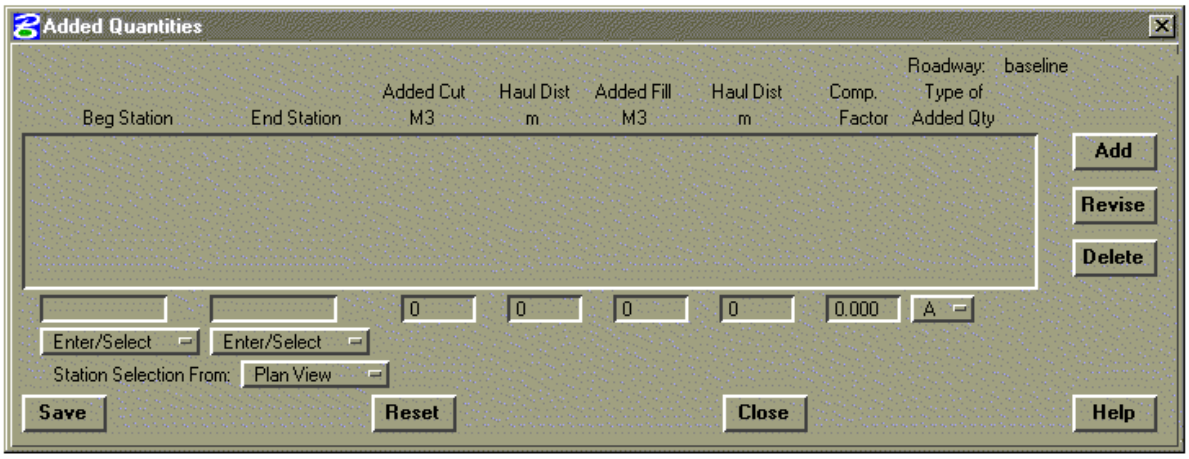
Compaction Factor Applied to Fill

Compaction Factor	*Cut*	*Fill*	*Adjusted Fill*	*Comments*
1.20	*200*	*50*	*60*	*Material Shrinks*
0.85	*200*	*50*	*42.5*	*Material Swells*

1.20 = 20 percent shrink
0.85 = 15 percent swell

The compaction factors are applied in subsequent processing when IGrds computes volumes. Volumes are computed separately for each roadway and the appropriate compaction factor is selected and applies. Then these individual roadway volumes are summed to compute the design cross section volume.

ADDED QUANTITIES



This subprocess provides for adding, modifying, or reviewing Added Quantities data records. Each record defines the earthwork quantities to be added/subtracted from the quantities computed from cross sections. It also includes specification for applying the quantity and handling haul.

Use this feature to compensate for borrow or waste, for stockpiling materials from the roadway, and other such uses. Positive or negative cut values will be added algebraically to the mass ordinate. A compaction factor can be entered for application to added quantities. If multiple quantities are added at one station, the compaction factor on the last added quantity is used to adjust all of the quantities at this station.

A quantity in any amount may be added at a single station. It will be applied as illustrated in Figure 6-15. A quantity per station may also be added over a range of stations as illustrated in Figure 6-16. If the station range includes partial stations, the quantity will be prorated as illustrated. IGrds limits the number of added quantities to 150 entries per project.

When the subprocess is selected, all existing records for the specified roadway will be displayed in the scrolled area. Clicking on a record will highlight it for further action. Current data will be displayed in the edit fields below the scrolled area.

Roadway	The active roadway is displayed. It cannot be changed in this subprocess. To change, use the roadway selection option button on either the Design Data Manager or Set Active Roadway menu.

Record Actions

Add Click to add a new data record by entering data in the fields below the scrolled area. The new record will be placed in the list according to its Station.

Revise Click to revise the highlighted record by revising the field below the scrolled area.

Delete Click to delete the highlighted record.

Record Data

Begin Station Select Option

- Enter/Select
  Enter or select the station where added quantities will be applied, or the first station in a range of stations over which added quantities will be applied.

- Begin
  The beginning station of the roadway will be displayed.

End Station Select Option

- Enter/Select
  Enter or select the last station in a range of stations over which added quantities will be applied. Leave blank if added quantities apply to a single station only.

- End
  The ending station of the roadway will be displayed.

Select Station From Select Option

- Plan View (Default)
  Allows station selection from Plan View.

- Profile View
  Allows station selection from the profile view.

Added Cut	Enter this volume of added cut to be applied at the specified station, or over the station range on a per station basis.
Haul Dist	Enter the haul distance to be applied to the added cut when computing the dead haul.
Comp. Factor	Enter the compaction factor (shrink/ swell) to be applied to the added quantities.
Type of Added Qty	Select Option (A through Q) • A Excavation for overbreak and slides • B Excavation for benching • C Excavation for channel improvement • D Moisture density control zone • E Subexcavation, including removal of top soil under fills • F Excavation for road approaches • G Excavation for culvert inlets/outlets • H Miscellaneous added excavation • I Borrow excavation • J Excess excavation or material needed for other roads • K Cross haul material added or removed • L Waste material • M Material removed and used for other purposes • N Miscellaneous mass ordinate correction • O Replacement embankment

	• P Added embankment • Q Miscellaneous added embankment
Save	Click to save the changes made while the dialog has been open.
Reset	Click to reset all data to the status when the last save was made for this roadway and data type.
Close	Click to dismiss the dialog. If changes have been made an opportunity to save will be given.
Help	Click to display help for this subprocess.

Note:

The free haul is not used in determining dead haul for an added quantity. The dead haul is computed as follows:

° Single Station

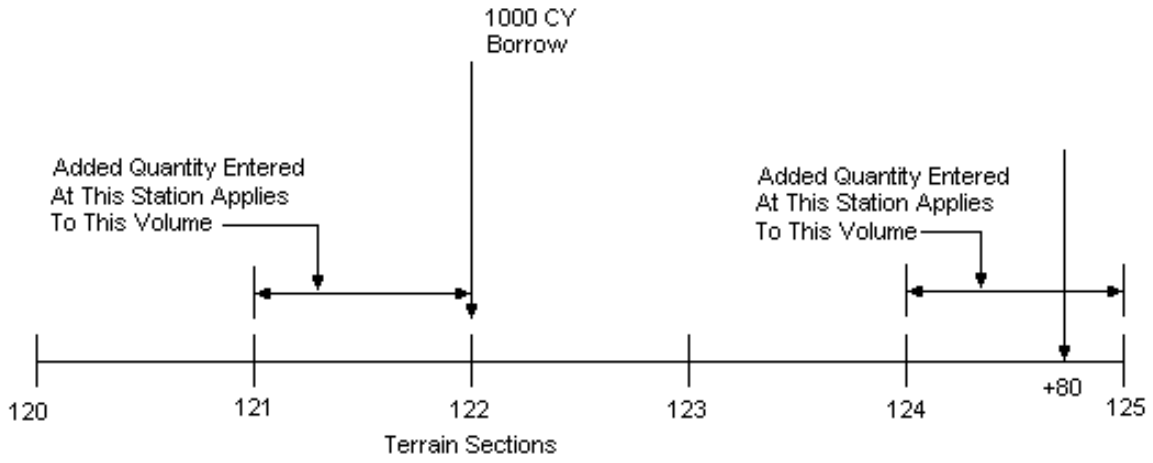
HAUL = Added Quantity Haul Distance* Shrink/Swell Factor*

° Range of Stations

HAUL = Added Quantity Haul Distances* Shrink/Swell Factor* Station Range*

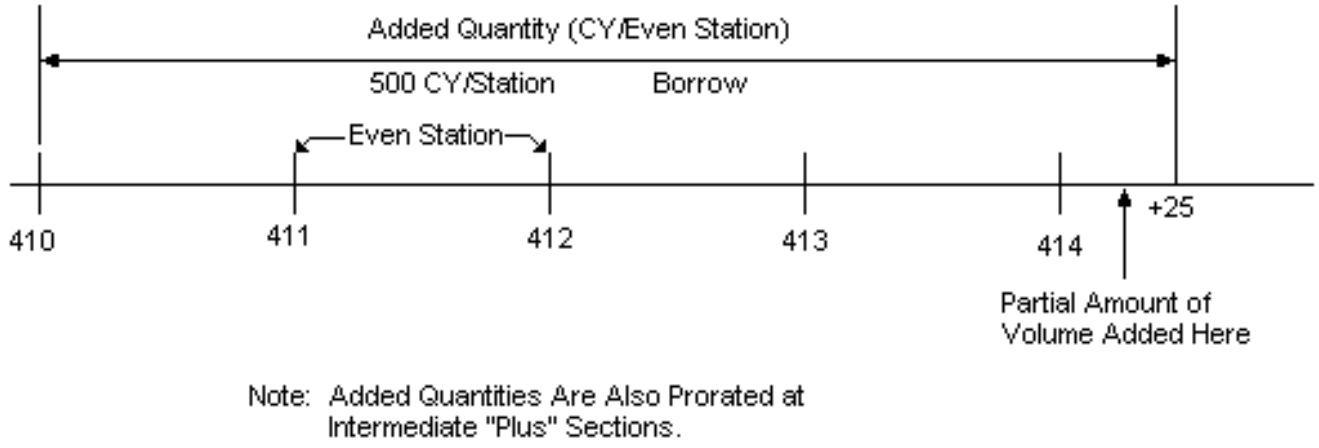
Station Range = To Station - From Station

The amount of dead haul for added quantities will be indicated on the haul plots and be included in haul quantities for each balance.



Note: Data Entered Before the First Station of a Volume Request
Or After the Last Station of a Volume Request Will Be Ignored.

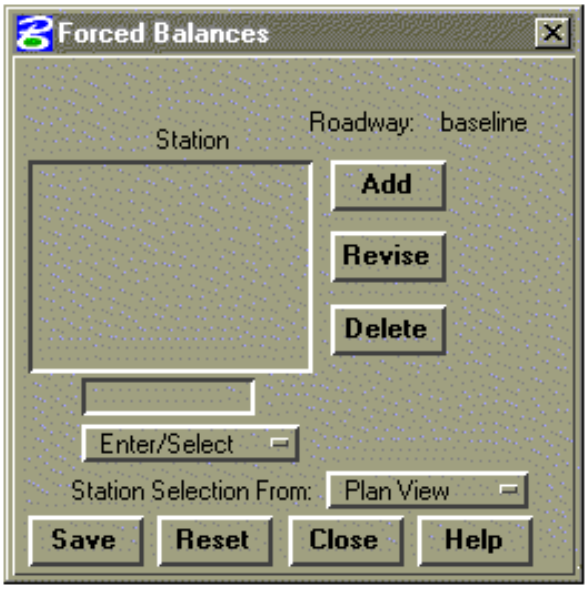
Figure 6-15
Added Quantity - Single Station



Note: Added Quantities Are Also Prorated at Intermediate "Plus" Sections.

Figure 6-16
Added Quantity - Station Range

FORCED BALANCE



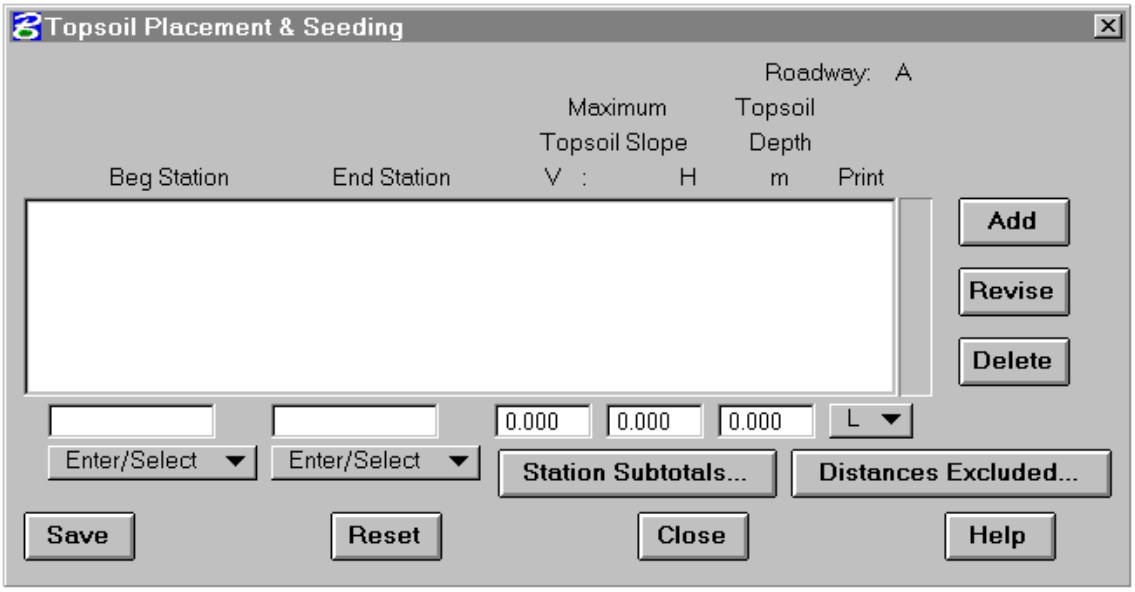
This subprocess provides for adding, modifying, or reviewing Forced Balance data records. Each record defines a station where the mass ordinate (haul) is to be forced to zero. This allows the designer to force balances on individual roadways at such places as bridges, overpasses, or borrow sources. If excavated material cannot be hauled across a river because the bridge is not built, a forced balance point entered at the beginning station of the bridge would give the correct haul quantities. *Compaction factors are not changed when a forced balance station is entered.*

When the subprocess is selected, all existing records for the specified roadway will be displayed in the scrolled area. Clicking on a record will highlight it for further action. Current data will be displayed in the edit fields below the scrolled area.

Roadway	The active roadway is displayed. It cannot be changed in this subprocess. To change, use the roadway selection option button on either the Design Data Manager or Set Active Roadway menu.
Record Actions	
Add	Click to add a new data record by entering data in the fields below the scrolled area. The new record will be placed in the list according to its Station.
Revise	Click to revise the highlighted record by revising the field below the scrolled area.
Delete	Click to delete the highlighted record.

Record Data	
Station	Select Option • Enter/Select Enter or select the station at which an earthwork balance is to be forced. • Begin The beginning station of the roadway will be displayed. • End The ending station of the roadway will be displayed.
Select Station From	Select Option • Plan View (Default) Allows station selection from Plan View. • Profile View Allows station selection from the profile view.
Save	Click to save the changes made while the dialog has been open.
Reset	Click to reset all data to the status when the last save was made for this roadway and data type.
Close	Click to dismiss the dialog. If changes have been made an opportunity to save will be given.
Help	Click to display help for this subprocess.

TOPSOIL PLACEMENT



This subprocess provides for adding, modifying, or reviewing Topsoil Placement and seeding data records. Each record defines a specification for top soil placement. The topsoil placement volumes computed are the amounts needed to cover the areas disturbed by construction from slope stake to slope stake minus the excluded areas and slopes greater than the maximum slope ratio. The topsoil depth and maximum slope ratio for which topsoil is used are required input. The seeding areas are for all slopes from catch point to catch point minus the excluded areas.

When the subprocess is selected, all existing records for the specified roadway will be displayed in the scrolled area. Clicking on a record will highlight it for further action. Current data will be displayed in the edit fields below the scrolled area.

Roadway	The active roadway is displayed. It cannot be changed in this subprocess. To change, use the roadway selection option button on either the Design Data Manager or Set Active Roadway menu.

Record Actions

Add Click to add a new data record by entering data in the fields below the scrolled area. The new record will be placed in the list according to its Station.

Revise Click to revise the highlighted record by revising the field below the scrolled area.

Delete Click to delete the highlighted record.

Record Data

Begin Station Select Option

- Enter/Select
  Enter or select the station at which topsoil placement and seeding computations are to begin.

- Begin
  The beginning station of the roadway will be displayed.

End Station Select Option

- Enter/Select
  Enter or select the station at which topsoil placement and seeding computations are to end.

- End
  The ending station of the roadway will be displayed.

Maximum Topsoil Slope

V - Enter the vertical distance of the slope ratio.

H - Enter the horizontal distance of the slope ratio. Slopes greater than the maximum slope ratio are excluded from topsoil placement.

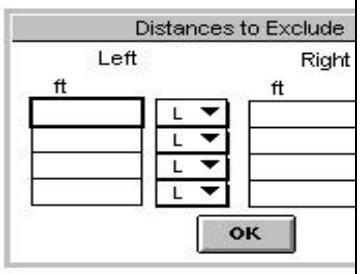
Topsoil Depth Enter the depth of topsoil to be applied.

Print Select Option

- L Print topsoil and seeding quantities on the left side of the roadway centerline only.
- R Print topsoil and seeding quantities on the right side of the roadway centerline only.
- B Print topsoil and seeding quantities on both sides of the roadway centerline.

Station Subtotals... See Page 6-83.

Distances Excluded Click on this button to bring up the menu which is used to define the distances left or right of the roadway centerline to be excluded from computation. A maximum of four exclusions is permitted.



Distances to Exclude

Left Limit Enter the distance from the roadway centerline to the left limit of the excluded distance.

Side Option Select Option

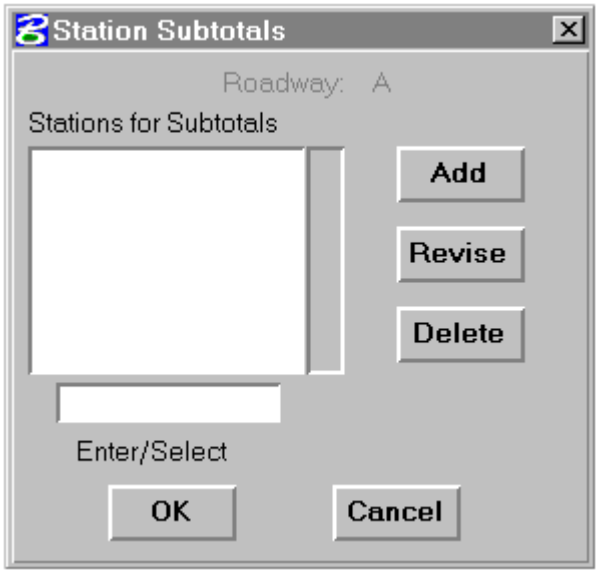
- L Select this option if the Left limit is left of the roadway centerline.
- R Select this option if the Left limit is right of the roadway centerline.

Right Limit Enter the distance from the roadway centerline to the right limit of the excluded distance.

Side Option Select Option

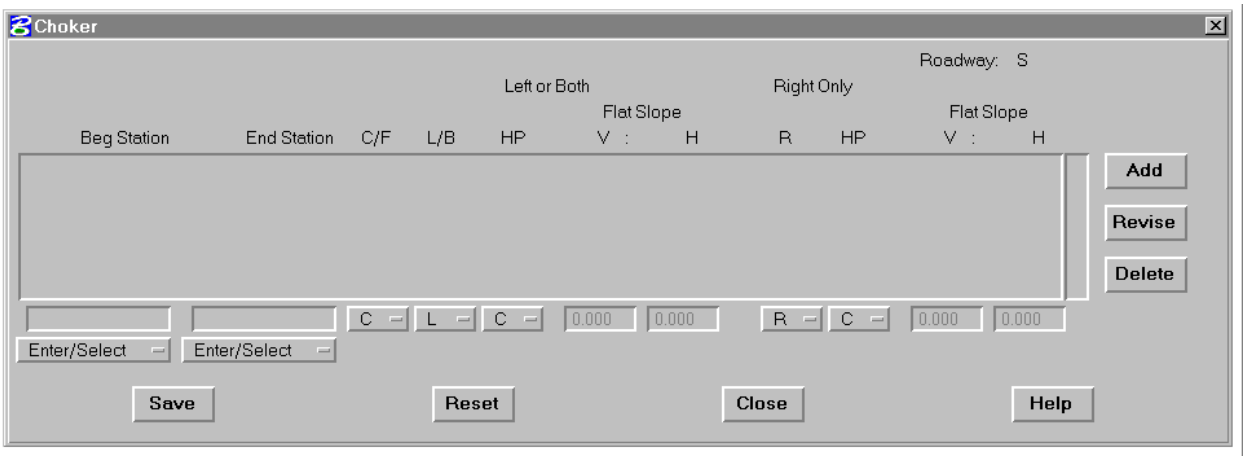
- L Select this option if the Right limit is left of the roadway centerline.
- R Select this option if the Right limit is right of the roadway centerline.

OK	Click on this button to close the distance exclusion menu and apply the data to the current record.
Save	Click to save the changes made while the dialog has been open.
Reset	Click to reset all data to the status when the last save was made for this roadway and data type.
Close	Click to dismiss the dialog. If changes have been made an opportunity to save will be given.
Help	Click to display help for this subprocess.



This dialog box is activated by clicking the Station Subtotals button on the Topsoil Placement and Seeding dialog box. Enter or select stations where subtotals are to be calculated, then add to the list box by clicking the Add button. The Revise and delete buttons act on the highlighted selection in the List Box. Click on the OK button to save the stations where subtotals are to occur.

CHOKER



Choker data provides the means to control interaction of the edges of the subgrade surface with the finished grade under various conditions. For a more detailed description of choker capabilities, see Appendix E of the IGrds Concepts Manual.

Roadway	The active roadway is displayed. It cannot be changed in this subprocess. To change, use the roadway selection option button on either the Design Data Manager or Set Active Roadway menu.
Record Actions	
Add	Click to add a new data record by entering data in the fields below the scrolled area. The new record will be placed in the list according to its Station.
Revise	Click to revise the highlighted record by revising the field below the scrolled area.
Delete	Click to delete the highlighted record.

Record Data

Begin Station Select Option

- Enter/Select
  Enter or select the beginning station for the choker data being entered.

- Begin
  The beginning station of the roadway will be displayed.

End Station Select Option

- Enter/Select
  Enter or select the ending choker data being entered.

- End
  The ending station of the roadway will be displayed.

C/F Select Option

- C Select C for cut.
- F Select F for fill.
- B Both Cut and fill.

L/B/blank Select Option

- L - Left Select L when next four data fields apply to left side only.

- B - Both Select B when next three data fields apply to both left and right sides.

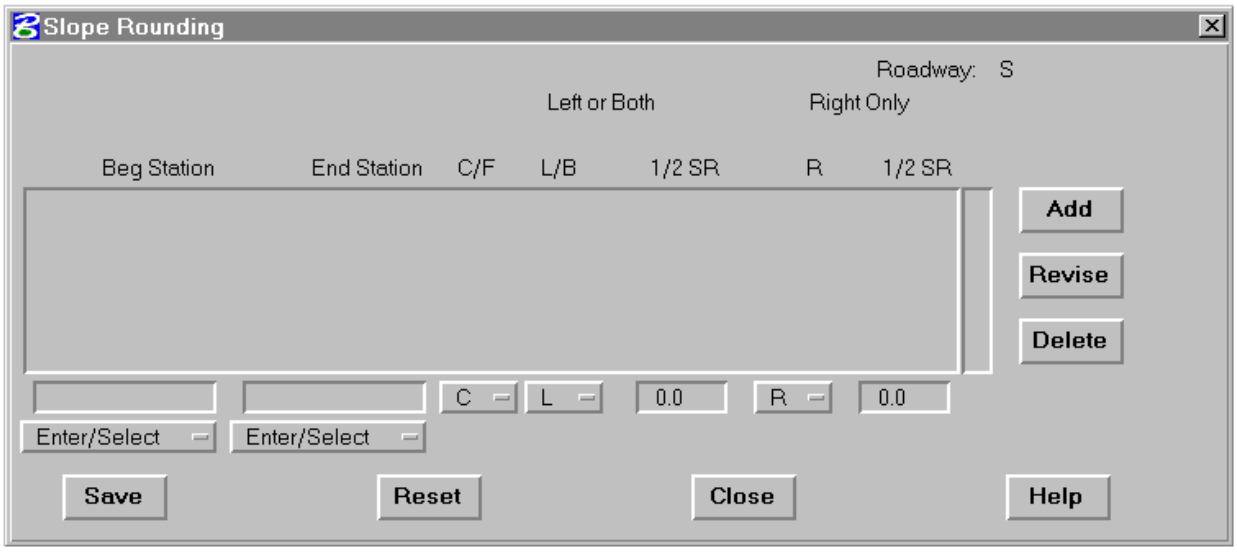
- blank - None Select blank if data will not be entered in these fields.

HP Select Hinge Point Type Option

- C Hinge point type C
- D Hinge point type D
- F Hinge point type F
- blank None

Flat Slope	Enter the flat slope ratio, V:H. (Applies only to fill option.) • V Enter the vertical value of the ratio if different from the default value of 1.0 which is displayed. • H Enter the horizontal value of the slope ratio.
R/blank	Select Option • R - Right Select R when next four data fields apply to the right side only. • blank - None Select blank if there is no right side data, or it was covered by the B option of the previous fields.
HP, and Flat Slope	Definition for the final three data fields is the same as previously defined for the left side option.
Save	Click to save the changes made while the dialog has been open.
Reset	Click to reset all data to the status when the last save was made for this roadway and data type.
Close	Click to dismiss the dialog. If changes have been made an opportunity to save will be given.
Help	Click to display help for this subprocess.

SLOPE ROUNDING



Slope Rounding provides the means for specifying a parabolic rounding of the back slope at the catch point in cut and fill conditions. For a more detailed description of slope rounding capabilities, see Appendix J of the IGrds Concepts Manual.

Roadway	The active roadway is displayed. It cannot be changed in this subprocess. To change, use the roadway selection option button on either the Design Data Manager or Set Active Roadway menu.
Record Actions	
Add	Click to add a new data record by entering data in the fields below the scrolled area. The new record will be placed in the list according to its Station.
Revise	Click to revise the highlighted record by revising the field below the scrolled area.
Delete	Click to delete the highlighted record.

Record Data

Begin Station Select Option

- Enter/Select
  Enter or select the beginning station for the slope rounding data being entered.

- Begin
  The beginning station of the roadway will be displayed.

End Station Select Option

- Enter/Select
  Enter or select the ending slope rounding data being entered.

- End
  The ending station of the roadway will be displayed.

C/F Select Option

- C Select C for cut.
- F Select F for fill.
- B Both cut and fill.

L/B/blank Select Option

- L - Left Select L when next four data fields apply to left side only.

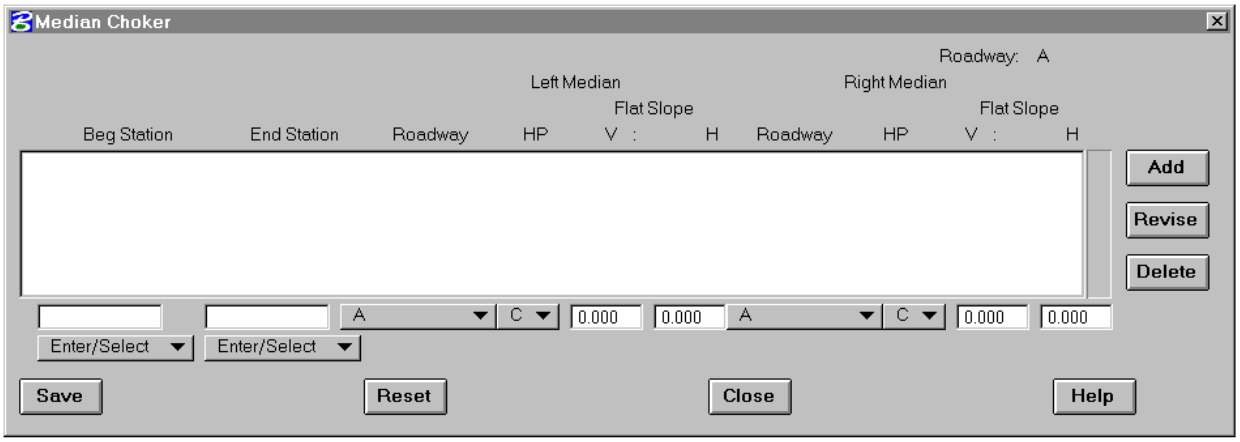
- B - Both Select B when next four data fields apply to both left and right sides.

- blank - None Select blank if data will not be entered in these fields.

1/2 SR Enter 1/2 the slope rounding width to be applied on the specified side(s).

R/blank	Select Option • R - Right Select R when the next data field applies to the right side only. • blank - None Select blank if there is no right side data, or it was covered by the B option of the previous fields.
1/2 SR	Definition for the final data field is the same as previously defined for the left side option.
Save	Click to save the changes made while the dialog has been open.
Reset	Click to reset all data to the status when the last save was made for this roadway and data type.
Close	Click to dismiss the dialog. If changes have been made an opportunity to save will be given.
Help	Click to display help for this subprocess.

MEDIAN - CHOKER



This subprocess provides for adding, modifying, or reviewing Median - Choker data records. Each record defines specifications for a Median Choker over a range of stations.

When the subprocess is selected, all existing records for the specified roadway will be displayed in the scrolled area. Clicking on a record will highlight it for further action. Current data will be displayed in the edit fields below the scrolled area.

Roadway	The active roadway is displayed and must be the left roadway of the median. It cannot be changed in this subprocess. To change, use the roadway selection option button on either the Design Data Manager or Set Active Roadway menu.
Record Actions	
Add	Click to add a new data record by entering data in the fields below the scrolled area. The new record will be placed in the list according to its Station.
Revise	Click to revise the highlighted record by revising the field below the scrolled area.
Delete	Click to delete the highlighted record.

Record Data

Begin Station Select Option

- Enter/Select
  Enter or select the beginning station for the median choker data being entered.

- Begin
  The beginning station of the roadway will be displayed.

End Station Select Option

- Enter/Select
  Enter or select the ending station for the median choker data being entered.

- End
  The ending station of the roadway will be displayed.

Roadway Select the roadway name associated with the left side of the median.

HP Select Hinge Point Type Option for the left median.

- C Hinge point type C
- D Hinge point type D
- F Hinge point type F
- blank None

Flat Slope Enter the flat slope ratio, V:H, for the left median. (Applies only for HP types C or D.)

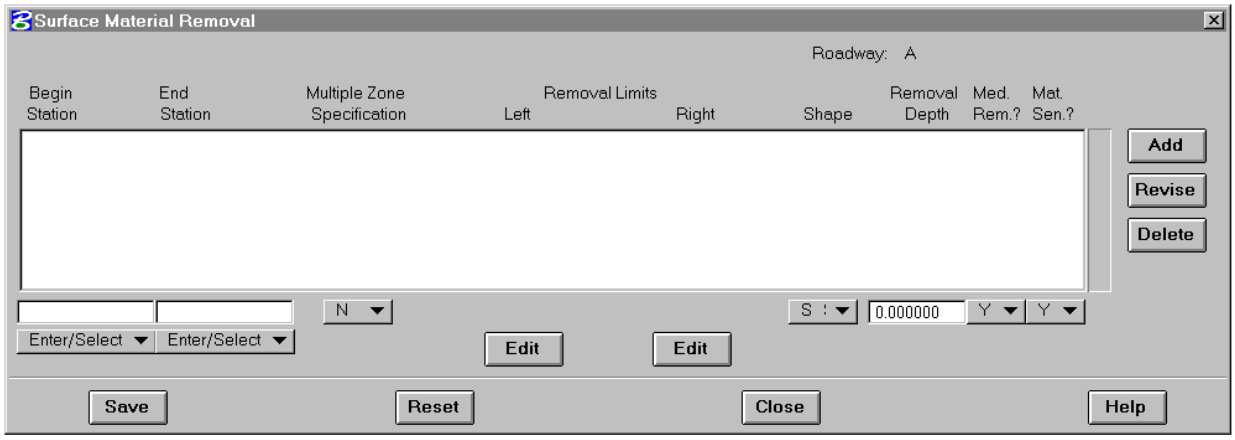
- V Enter the vertical value of the ratio if different from the default value of 1.0 which is displayed.

- H Enter the horizontal value of the slope ratio.

Roadway, HP, and Flat Slope	Definition for the final four data fields, applicable to the right side median, is the same as the preceding fields applying to the left side median. After entering the HP and flat slope for the left median, these same settings will be automatically set for the right side. If this is not desired, the default setting in the .ini file: "default right median choker data to left data" can be changed from "yes" to "no".
Save	Click to save the changes made while the dialog has been open.
Reset	Click to reset all data to the status when the last save was made for this roadway and data type.
Close	Click to dismiss the dialog. If changes have been made an opportunity to save will be given.
Help	Click to display help for this subprocess.

Note: Since the median choker data must be stored under the left roadway, do not store this median choker data again under the right roadway.

SURFACE MATERIAL REMOVAL



This subprocess enables a user to specify by roadway, the limits and configurations for surface material removal. The process is useful for topsoil removal and stockpiling. It is also useful for unsuitable material removal and wastage. Since the process can be sensitive to material classification, unsuitable materials can be removed and wasted, while suitable materials can be removed and stored for later use.

When the subprocess is selected, all existing records for the specified roadway will be displayed in the scrolled area. Clicking on a record will highlight it for further action. Current data will be displayed in the edit fields below the scrolled area.

Roadway	The active roadway is displayed. For Surface Material Removal, the roadway must be a design roadway. It cannot be changed in this subprocess. To change, use the roadway selection option button on either the Design Data Manager or Set Active Roadway menu.
Record Actions	
Add	Click to add a new data record by entering data in the fields below the scrolled area. The new record will be placed in the list according to its Station.
Revise	Click to revise the highlighted record by revising the field below the scrolled area.
Delete	Click to delete the highlighted record.

Record Data

Begin Station Select Option

- Enter/Select
  Enter or select the beginning station where the entered removal data is to apply.

- Begin
  The beginning station of the current roadway will be displayed.

- End
  The ending station of the current roadway will be displayed.

End Station Select Option

- Enter/Select
  Enter or select the ending station where the entered removal data ceases to apply.

- Begin
  The beginning station of the current roadway will be displayed.

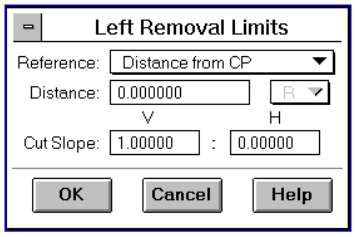
- End
  The ending station of the current roadway will be displayed.

Multiple Zone Specification Select Option

- N - No Multiple Specification
  One record will be used to describe surface material removal for this range of stations.

- M - Multiple Specification
  This is the first of multiple specification records to describe surface material removal for this range of stations.

	• C - Continue Multiple Specification This is a continuing record of multiple specification records to describe surface material removal for this range of stations.
Removal Limits	Left Side Edit Button • Select to reveal Left Removal Limits menu. Right Side Edit Button • Select to reveal Right Removal Limits menu.
Left Removal Limits Menu	Select Reference Option • Distance from left CP Distance entered is measured from the left catch point. • Distance from left SP Distance entered is measured from the left shoulder point. • Slope from left SP The removal limit is to be based on a user defined slope from the left shoulder point to an intersection with the terrain. • Distance from CL Distance entered is measured from the roadway centerline. • Distance from right CP Distance entered is measured from the right catch point. • Slope from right SP The removal limit is to be based on a user defined slope from the right shoulder point to an intersection with the terrain. • Distance from right SP Distance entered is measured from the right shoulder point.



- Geometry Element
  Enter or select the geometry element that defines the removal limit.

Distance
(Applies only to the above options where distances are required).

Enter the distance to the removal limit based on the selected reference point.

Slope
(Applies only to the slope options above.)
Enter the slope ratio (V:H) values, V and H, used to set the removal limit.

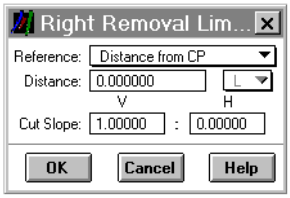
Cut Slope
Enter the ratio (V:H) values, V and H, that define the cut slope to be applied from the Left Side Removal limit.

Limit Menu Action Options

- OK
  Select OK to transfer the data from this menu to the data record of the Surface Material Removal left limit edit box, and close off the menu.

- Cancel
  Select Cancel to close the menu without saving any data.

- Help
  Select Help to display the menu help screen.



Right Removal Limits Menu — Refer to the Left Removal Limits menu definitions given above, and apply them to the right side limits to be defined.

Shape — Select Option

- S Straight Line
  The bottom of the cut area to be removed will follow a straight line from the left side removal limit to the right side limit.

- F Follow Terrain
  The bottom of the cut area to be removed will follow the terrain surface at the specified depth, between the left and right side removal limits.

Removal Depth — Enter the depth of surface material to be removed as measured vertically at the removal limit points.

Median Removal? — Select Option

- Y Yes
  Select this option to indicate that surface material is to be removed in median areas.

- N No
  Select this option to indicate that surface material is not to be removed in median areas.

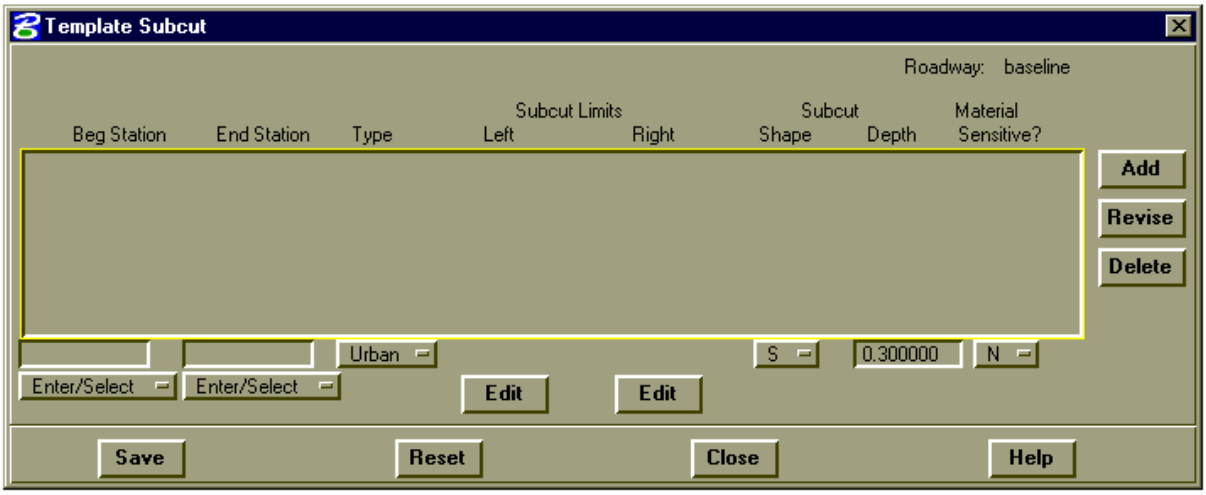
Material Sensitive? — Select Option

- Y Yes
  Select this option to indicate that the process is to check if the material type is a removable material.

- N No
  Select this option to bypass the material sensitivity check.

Save	Click to save the changes made while the dialog has been open.
Reset	Click to reset all data to the status when the last save was made for this roadway and data type.
Close	Click to dismiss the dialog. If changes have been made an opportunity to save will be given.
Help	Click to display help for this subprocess.

TEMPLATE SUBCUT PROCESS



Template Subcut is the removal of material below subgrade in excavation sections. The process enables the user to specify by design roadway the location (station to station), template subcut limits, type of subcut section, and configuration. The Template Subcut process is sensitive to material classification, if so desired. The process is useful for moisture and density control. Material is removed, then replaced and compacted to provide better transition from cut to fill sections.

The process is also useful for removal and wastage of unsuitable materials below subgrade. Since the process can be sensitive to material classification, suitable materials can be ignored, or cut, replaced, and recompacted.

When the subprocess is selected, all existing records for the specified roadway will be displayed in the scrolled area. Clicking on a record will highlight it for further action. Current data will be displayed in the edit fields below the scrolled area.

Roadway	The active roadway is displayed. It cannot be changed in this subprocess. To change, use the roadway selection option button on either the Design Data Manager or Set Active Roadway menu.

Record Actions

Add Click to add a new data record by entering data in the fields below the scrolled area. The new record will be placed in the list according to its Station.

Revise Click to revise the highlighted record by revising the field below the scrolled area.

Delete Click to delete the highlighted record.

Record Data

Begin Station Select Option

- Enter/Select
  Enter or select the beginning where the entered subcut data is to apply.

- Begin
  The beginning station of the current roadway will be displayed.

- End
  The ending station of the current roadway will be displayed.

End Station Select Option

- Enter/Select
  Enter or select the ending station where the entered subcut data ceases to apply.

- Begin
  The beginning station of the current roadway will be displayed.

- End
  The ending station of the current roadway will be displayed.

Subcut Type Select Option

- Rural

  (Use in conjunction with Distance and Cut Slope from the Subcut Limits menu.)

  For rural subcut types, the distance from the subcut limits menus is used to determine the maximum intercept distance for the subcut section of the specified cut slope. The maximum intercept distance must be at or outside the shoulder points. It is normally set at the ditch point.

  If the Cut Slope field is left blank, then the lowered segment adjacent to the shoulder point is extended until this segment intersects the front slope of the ditch forming the beginning (left side) or ending (right side) point of the rural subcut section. If a value is entered for Cut Slope, then a line is constructed using this slope ratio from the lowered shoulder point until this line intersects the front slope of the ditch. Positive slope ratios are up and away from the shoulder point, negative slope ratios are down and away from the shoulder point.

- Urban

  (Use in conjunction with Distance and Cut Slope from the Subcut Limits menu.)

  For Urban Subcut types, the distance from the Subcut Limits menu is used to determine where the beginning point or ending point for the right side of the subcut section is located. The beginning and ending points must be at or inside the shoulder points.

If the Cut Slope field is left blank, then a vertical slope is built from the beginning point to the specified depth. If a value is entered for the Cut Slope, then a line is constructed using this slope ratio from the beginning point to the specified depth. Positive slope ratios are down and toward the centerline; negative slope ratios are down and away from the centerline.

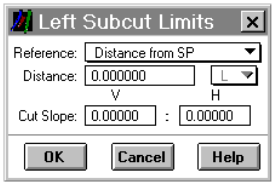
Subcut Limits

Left Side Edit Button

- Select to reveal Left Subcut Limits menu.

Right Side Edit Button

- Select to reveal Right Subcut Limits menu.



Left Subcut Limits Menu

Select Reference Option

- Distance from CL
  Distance entered is measured from the roadway centerline.

- Distance from SP
  Distance entered is measured from the shoulder point.

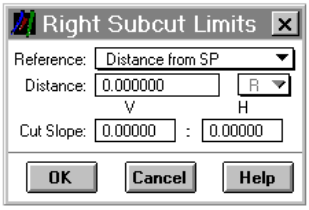
Distance

Enter the distance to the subcut limit based on the selected reference point (rural subcut type) or to the beginning point based on the select reference point (urban subcut type).

Select Distance Option (applicable only for CL distance measurements).

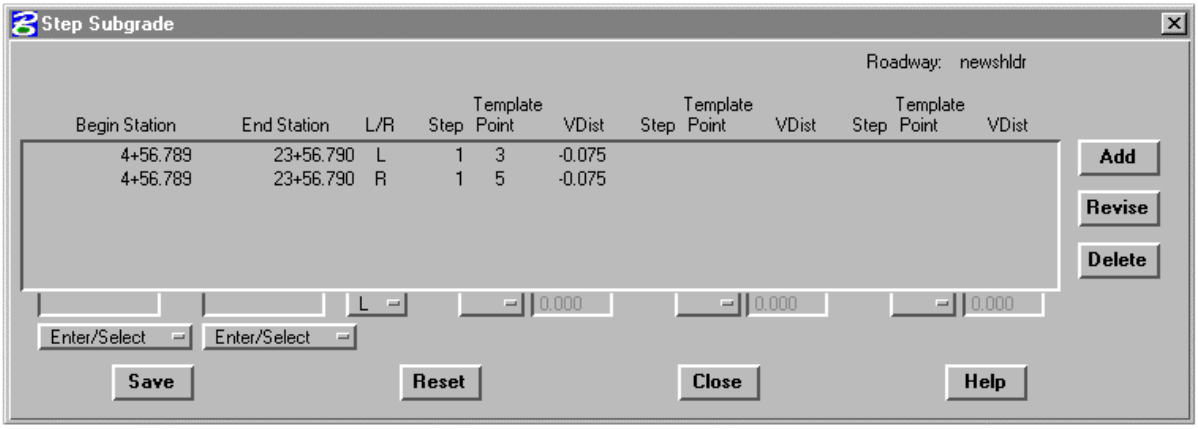
- L
  Distance is left of CL

	• R Distance is right of CL
	Cut Slope (Varies are only to Subcut Type. See explanation in Subcut Type description.) Enter the ratio (V:H) values, V and H, that define the cut slope to be applied from the Left Side Subcut limit. Select Help to display the menu help screen.
	Limit Menu Action Options • OK Select OK to transfer the data from this menu to the data record of the Template Subcut left limit edit box, and close off the menu. • Cancel Select Cancel to close the menu without saving any data. • Help Click to display help for this subprocess.
Right Subcut Limits Menu	Refer to the Left Subcut Limits menu definitions given above, and apply them to the right side limits to be defined.
Subcut Depth	Enter the depth of subcut measured vertically form the subgrade template.
Material Sensitive?	Select Option • Y Yes Select this option to indicate that the process is to check if the material type is to be subcut. • N No Select this option to bypass the material sensitivity check.



Save	Click to save the changes made while the dialog has been open.
Reset	Click to reset all data to the status when the last save was made for this roadway and data type.
Close	Click to dismiss the dialog. If changes have been made an opportunity to save will be given.
Help	Click to display help for this subprocess.

STEP SUBGRADE



This subprocess provides for adding, modifying, or reviewing Step Subgrade data records. Each record defines the station range over which a Step Subgrade applies. Each record may contain from one to ninety-nine steps for either the left or right side of a roadway template centerline. In order for the Step Subgrade to work, there must be choker data in the template data for the roadway.

When the subprocess is selected, all existing records for the specified roadway will be displayed in the scrolled area. Clicking on a record will highlight it for further action. Current data will be displayed in the edit fields below the scrolled area.

Roadway	The active roadway is displayed. It cannot be changed in this subprocess. To change, use the roadway selection option button on either the Design Data Manager or Set Active Roadway menu.
Record Actions	
Add	Click to add a new data record by entering data in the fields below the scrolled area. The new record will be placed in the list according to its station.
Revise	Click to revise the highlighted record by revising the field below the scrolled area.
Delete	Click to delete the highlighted record.

Record Data

Beg Station Select Option

- Enter/Select
  Enter station for step subgrade or select a graphic point to indicate station.

- Beginning
  The beginning station of the roadway will be displayed.

End Station Select Option

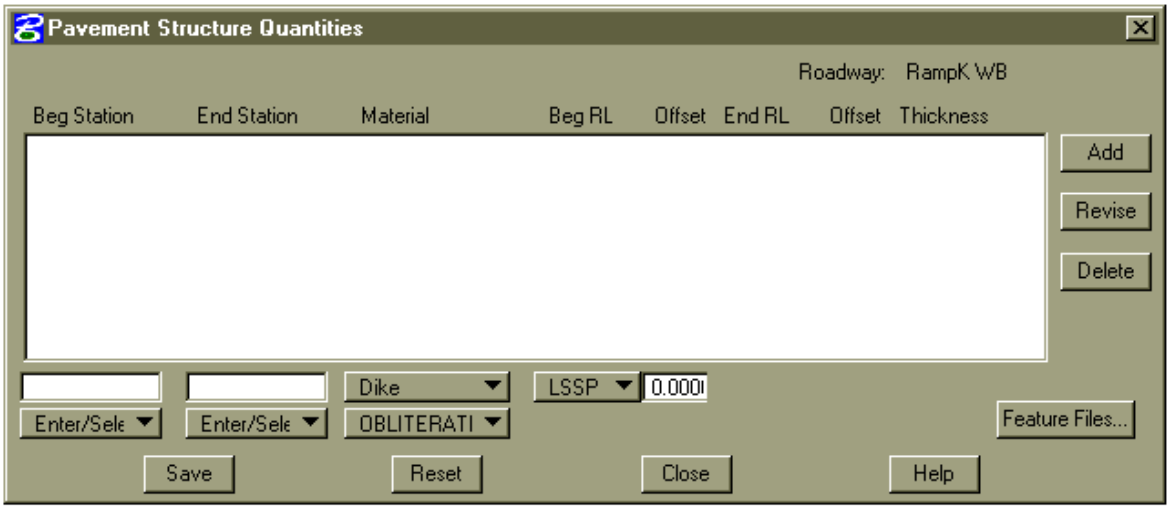
- Enter/Select
  Enter station for step subgrade or select a graphic point to indicate station.

- Ending
  The ending station of the roadway will be displayed.

L/R Select L if the step subgrade is left of the roadway centerline or R if it is right of the roadway centerline.

Step 1	
Template Point	The ridge point (1-99) of the template where the subgrade depth is changed. Select template point 1-16 or select enter and enter the template point number. The steps are numbered from the roadway centerline outward. The last template point that can be specified is the one next to the choker. If the "F" segment option is used on the corresponding template record, then the stepped segments will have the same slope as subgrade. If not, then the stepped segments will have the same slope as the finish grade. When using an "on template" be sure to drop the "dummy segment" before determining the template point number.
VDist	The vertical distance of the step subgrade. Minus for vertical segment down and blank or plus for vertical segment up.
Steps 2 thru 99	Follow instructions for first step.
Save	Click to save the changes made while the dialog has been open.
Reset	Click to reset all data to the status when the last save was made for this roadway and data type.
Close	Click to dismiss the dialog. If changes have been made an opportunity to save will be given.
Help	Click to display help for this subprocess.

PAVEMENT STRUCTURE QUANTITIES



This subprocess enables a user to specify by roadway, the limits and configurations for pavement structures whose quantities need to be summarized. The process is useful for computing quantities of pavement structure materials for inclusion in construction plans and/or to be exported to engineering estimate systems such as PES subsystem within BAMS.

When the subprocess is selected, all existing records for the specified roadway will be displayed in the scrolled area. Clicking on a record will highlight it for further action. Current data will be displayed in the edit fields below the scrolled area.

Roadway	The active roadway is displayed. For Pavement Structure Quantities, the roadway must be a design roadway. It cannot be changed in this subprocess. To change, use the roadway selection option button on either the Design Data Manager or Set Active Roadway menu.
Record Actions	
Add	Click to add a new data record by entering data in the fields below the scrolled area. The new record will be placed in the list according to its material and then station.
Revise	Click to revise the highlighted record by revising the field below the scrolled area.
Delete	Click to delete the highlighted record.

Record Data

Begin Station Select Option

- Enter/Select
  Enter or select the beginning station where the entered pavement structure data is to apply.

- Begin
  The beginning station of the current roadway will be displayed.

End Station Select Option

- Enter/Select
  Enter or select the ending station where the entered pavement structure data ceases to apply.

- End
  The ending station of the current roadway will be displayed.

Material Select Option (Material Groupings)

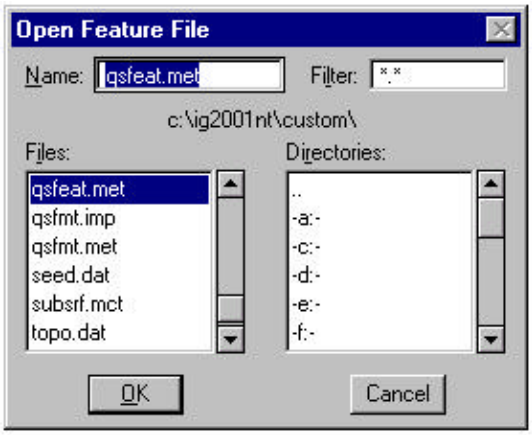
- Select the desired group name which contains the pavement structure material for which data is to be entered. The groups displayed in the option button are those that have been flagged in the Quantity Summary feature table as being pavement structure material groups.

Select Option (Specific Material within Group Selected Above)

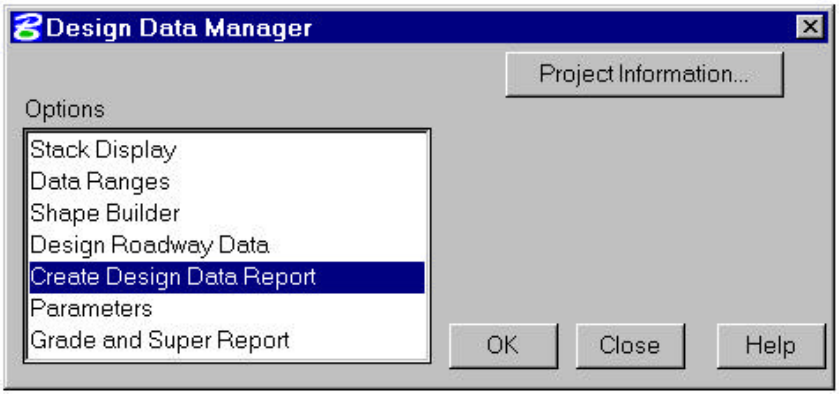
	• Select the specific pavement structure material for which data is to be entered. The materials displayed in this option button change as different groups are selected from the option button above. The specific materials displayed are those in the Quantity Summary feature table that are associated with the pavement structure materials group selected in the option button above. Note: In the Appendices, the "Detailed Descriptions of Quantity Summary External Files" section defines how pavement structure materials should be flagged.
Beg RL	Select Option (Beginning Ridge Line) This option button is displayed and applies to all pavement structure materials (linear, area, and volume). For linear, it specifies the ridge line along which a specific material should be summarized. For area or volume, it specifies the ridge line that defines the leftmost limit of the specific material that is to be summarized. • LSSP - Left subgrade shoulder point. • RSSP - Right subgrade shoulder point. • 1 thru 99 - The finish grade template ridge line points beginning with 1 for the leftmost template point and proceeding left to right on the template to the rightmost template point (maximum 99 points). Select Ridgeline point 1-16 or select Enter to enter the ridge line point number
Offset	Enter the offset distance from the beginning ridge line that defines the location (or leftmost limit) of the pavement structure material (-/+ offset defines left/right offset distance).

End RL	Select Option (Ending Ridge Line) This option button is displayed and applies only to area or volume type pavement structure materials. (linear, area, and volume). It specifies ridge line that defines the rightmost limit of the specific material that is to be summarized. • LSSP - Left subgrade shoulder point. • RSSP - Right subgrade shoulder point. • 1 thru 99 - The finish grade template ridge line points beginning with 1 for the leftmost template point and proceeding left to right on the template to the rightmost template point (maximum 99 points).
Offset	Enter the offset distance from the ending ridge line that defines the location (or leftmost limit) of the pavement structure material (-/+ offset defines left/right offset distance). (Only displayed when End RL is displayed.)
Thickness	Enter the thickness of the pavement structure. This input box applies to and is only displayed for volume-type pavement structure materials. The thickness should be constant and measured vertically at the left/right limit points. If this is not the case, a reasonable summary of pavement structures that vary in thickness can be obtained by entering the average thickness.

Feature Files	Click to select a new feature file. Please note that any existing pavement structure data will be deleted when a new feature file is selected. The Open Feature File dialog is displayed to make the selection.
Save	Click to save the changes made while the dialog has been open.
Reset	Click to reset all data to the status when the last save was made for this roadway and data type.
Close	Click to dismiss the dialog. If changes have been made an opportunity to save will be given.
Help	Click to display help for this subprocess.



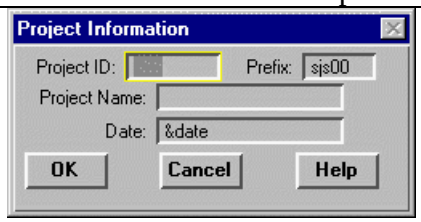
CREATE DESIGN DATA REPORT



This process creates a Design Data report file for all design data that is stored.

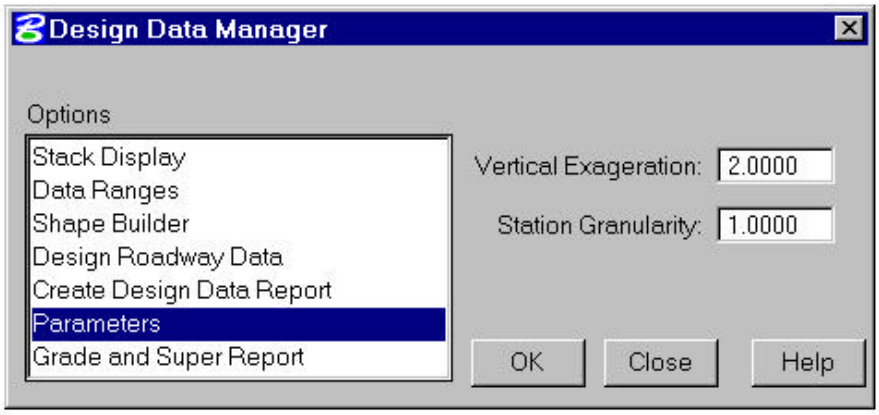
The resulting file can be displayed using the Display Report function under the **File** menu. See Chapter 2.

Design Roadway	The active roadway is displayed. To change, use the roadway selection option button.
OK	Click to produce report file.
Close	Click to cancel the process.



Project Information	Click to review/change Project Information.
Project ID	Project Identification (up to 3 characters).
Prefix	Earthwork output file prefix.
Project Name	Project Name.
Date	Date to be shown on reports. "&date" is the current date.
OK	Click to save and use displayed data.
Cancel	Click to cancel dialog box.
Help	Click to display help for this dialog box.

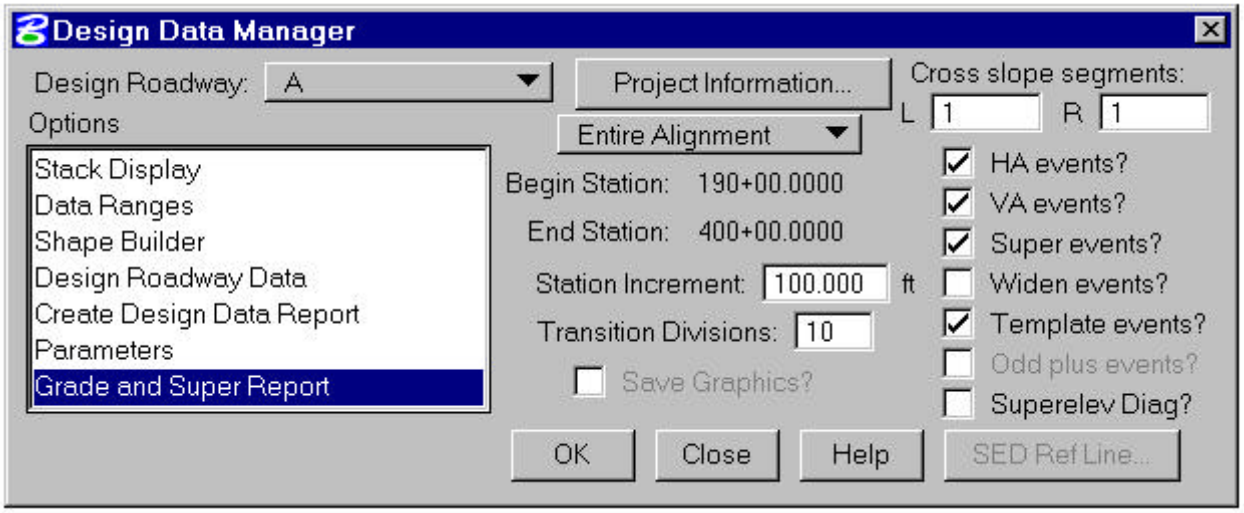
PARAMETERS



This command allows user control of the display ratio (Y:X) for temporary graphics displays used by Design Data Manager. It also allows control of the station factor used when graphic picking of stations is used.

Design Roadway	The active roadway is displayed. Not relevant for this process as these are global settings.
Y:X Ratio	Enter the Y:X ratio used for DDM temporary graphics displays. Default is 2:1 (i.e., vertical scale is twice the horizontal).
Station Factor:	Enter the station factor to be used for commands that allow graphic picking of stations. The station factor is the nearest plus value that stations will be rounded to when they are graphically picked.
OK	Click to produce report file.
Close	Click to dismiss the process.

GRADE AND SUPERELEVATION REPORT

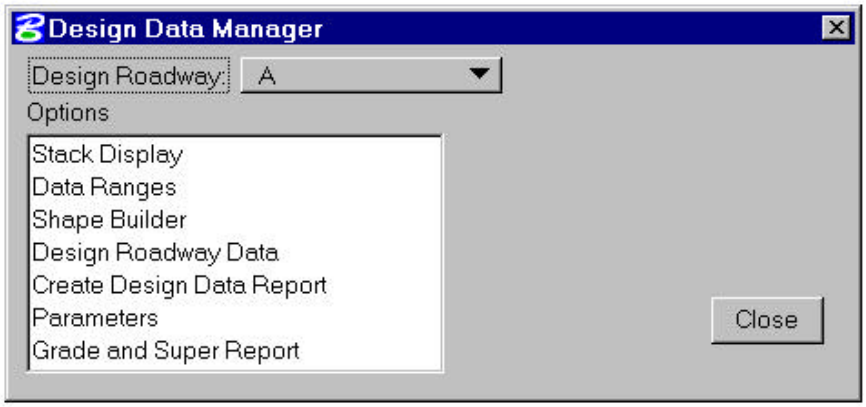


The Grade and Superelevation Report displays Grade and Superelevation information at regular intervals and important stations along a given design alignment. The body of the tabular report contains: Finished Grade Elevation, Profile Grade Elevation, Profile Grade (% Grade), Algebraic Difference, k-value, Vertical Sight Distance (6", 4.25') or metric equivalents, Vertical Curve Length, VPI Elevation, Pavement Buildup (IGrds Elevation Correction), Template Cross Slopes (Left and Right of the Centerline), and Curve Widening (Left and Right of the Centerline). In addition, a superelevation diagram showing cross slopes of selected template segments is optionally displayed on the graphics screen.

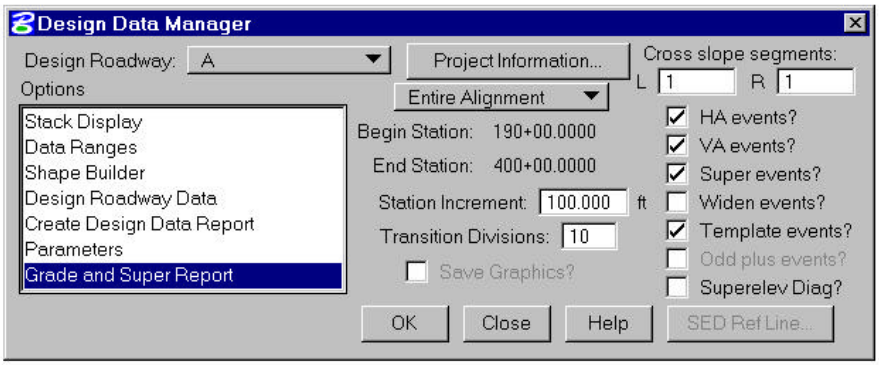
The data is reported at Even Station Increments defined by the user as well as at these important stations: All Cross Sections (if the roadway is a baseline with original cross sections). Equalities, Horizontal Alignment changes (PC, PT, TS, ST, SC, CS, PCC, PRC, POT/P-Line), Vertical Alignment changes (VPT, VPC, Sag and Peak Points), and user-defined divisions of spirals, superelevation and curve widenings.

The Grade and Superelevation Report is an option of the Design Data Manager (DDM).

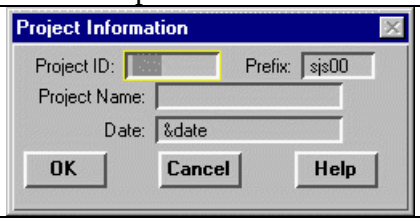
The DDM dialog box is displayed as shown below.



Select Grade and Superelevation Report and the dialog box is modified as shown below.



Design Roadway	Select the desired design roadway.
Stations	Enter Station Range or Select Entire Alignment.
Station Increment	Enter the Station Increment for the regular station interval to be reported. If this differs from the cross section increment on a baseline, the cross section stations will be reported as odd plus stations. Enter a very large number to omit regular station increments.
Transition Divisions	Enter the number of even divisions you wish to divide spiral, superelevation, and curve widening transition areas.
Cross Slope Segments	Enter the left and right segment numbers. Segments are numbered from the center line outward starting with one. Dummy segments defined by the off template method are not included here. Enter "none" or blank in these fields if cross slope data is not necessary.

Station Events	Select the events you wish to include on your report.
Superelevation Diagram	Check this box if superelevation diagrams are desired.
Save SED Graphics	Check this box if the previous diagrams are to remain displayed. Otherwise, the old diagrams corresponding to the selected segments are erased before the new diagrams are displayed.
SED Reference Line	Push this button to display the Superelevation Diagram Reference Line dialog box.
OK	Push this button to execute the process. The report is sent to the temporary list file (.tmp file).
Close	Push this button to close DDM.
Help	Push this button to display help for this topic.
	
Project Information	Click to review/change Project Information.
Project ID	Project Identification (up to 3 characters).
Prefix	Earthwork output file prefix.
Project Name	Project Name.
Date	Date to be shown on reports. “&date” is the current date.
OK	Click to save and use displayed data.
Cancel	Click to cancel dialog box.
Help	Click to display help for this dialog box.

Sample Grade and Superelevation Report

GRADE AND SUPERELEVATION REPORT Page 1
ROADWAY base

Station (m)	Event	Fin.Grade Elevation (m)	Grade (%)	Elevation Correction (m)	Cross Slopes Left1 (%)	Cross Slopes Right1 (%)	Widening Left1 (m)	Widening Right1 (m)
10+00.000	BEGN							
10+00.000	TEMPLT							
10+19.269	VPI	753.820	0.5103	0.000	-0.0200	0.0183	0.000	0.000
10+20.000	EVEN	753.824	0.5103	0.000	-0.0200	0.0183	0.000	0.000
10+40.000	EVEN	753.926	0.5103	0.000	-0.0200	0.0244	0.000	0.000
10+60.000	EVEN	754.028	0.5103	0.000	-0.0200	0.0183	0.000	0.000
10+80.000	EVEN	754.130	0.5103	0.000	-0.0200	0.0183	0.000	0.000
11+00.000	EVEN	754.232	0.5103	0.000	-0.0200	0.0244	0.000	0.000
11+20.000	EVEN	754.334	0.5103	0.000	-0.0200	0.0183	0.000	0.000
11+40.000	EVEN	754.436	0.5103	0.000	-0.0200	0.0183	0.000	0.000
11+60.000	EVEN	754.538	0.5103	0.000	-0.0200	0.0244	0.000	0.000
11+80.000	EVEN	754.640	0.5103	0.000	-0.0200	0.0183	0.000	0.000
12+00.000	EVEN	754.742	0.5103	0.000	-0.0200	0.0183	0.000	0.000
12+20.000	EVEN	754.844	0.5103	0.000	-0.0200	0.0244	0.000	0.000
12+40.000	EVEN	754.947	0.5103	0.000	-0.0200	0.0183	0.000	0.000
12+60.000	EVEN	755.049	0.5103	0.000	-0.0200	0.0183	0.000	0.000
12+80.000	EVEN	755.151	0.5103	0.000	-0.0200	0.0244	0.000	0.000
13+00.000	EVEN	755.253	0.5103	0.000	-0.0200	0.0183	0.000	0.000
13+20.000	EVEN	755.355	0.5103	0.000	-0.0200	0.0183	0.000	0.000
13+40.000	EVEN	755.457	0.5103	0.000	-0.0200	0.0244	0.000	0.000
13+60.000	EVEN	755.559	0.5103	0.000	-0.0200	0.0183	0.000	0.000
13+80.000	EVEN	755.661	0.5103	0.000	-0.0200	0.0183	0.000	0.000
14+00.000	EVEN	755.763	0.5103	0.000	-0.0200	0.0244	0.000	0.000
14+20.000	EVEN	755.865	0.5103	0.000	-0.0200	0.0183	0.000	0.000
14+40.000	EVEN	755.967	0.5103	0.000	-0.0200	0.0183	0.000	0.000
14+60.000	EVEN	756.069	0.5103	0.000	-0.0200	0.0244	0.000	0.000
14+80.000	EVEN	756.171	0.5103	0.000	-0.0200	0.0183	0.000	0.000
15+00.000	EVEN	756.273	0.5103	0.000	-0.0200	0.0183	0.000	0.000

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GRADE AND SUPERELEVATION REPORT Page 7
ROADWAY base

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CHANGE OF GRADE (crest curve):
Station = 19+98.000   VPI Elevation = 758.91 m    Algebraic difference = -1.4442 %
    Curve Length = 800.0000 m    K Value = 553.94
    Stopping sight distance (.15 m object) = 473 m
    Crossover decision sight distance (1.3 m object) = 724 m


CHANGE OF GRADE (sag curve):
Station = 31+44.272   VPI Elevation = 748.21 m    Algebraic difference = 5.5202 %
    Curve Length = 600.0000 m    K Value = 108.69

CHANGE OF GRADE (crest curve):
Station = 44+22.000   VPI Elevation = 806.81 m    Algebraic difference = -5.8671 %
    Curve Length = 1500.0000 m    K Value = 255.66
    Stopping sight distance (.15 m object) = 321 m
    Crossover decision sight distance (1.3 m object) = 492 m
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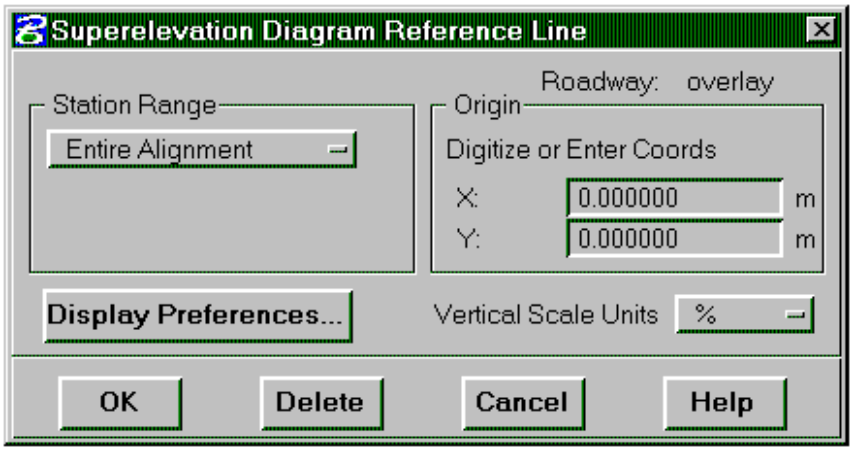
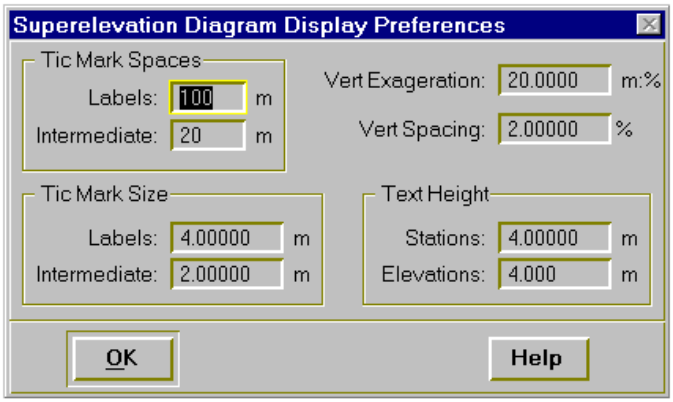
SUPERELEVATION DIAGRAM REFERENCE LINE



This dialog box is used to draw a reference line for display of superelevation diagrams for a roadway.

Roadway	The selected roadway is displayed here. This field cannot be modified.
Station Range	Select the station range option.
Entire Alignment	The reference line will include the entire alignment.
Station/Station	Digitize or enter the begin and ending station to include in the reference line.
Origin	Digitize or enter the coordinates of the origin of the reference line.
Display Preferences	Push this button to display the superelevation Diagram Display Preferences dialog box.
Vertical Scale Units	
%	The vertical scale will display cross slopes in percent values.
m/m or ft/ft	The vertical scale will display cross slopes as a fraction.
OK	Push this button to draw the reference line.
Delete	Deletes the existing reference line.
Cancel	Close the dialog box.
Help	Display help for this topic.

SUPERELEVATION DIAGRAM DISPLAY PREFERENCE



This dialog box is used to specify the parameters required to draw a Superelevation Diagram Reference Line.

Tic Mark Spaces	
Labels	Enter the spacing of major tic marks labeled with station data. The default for this field is specified by the parameter PVARLI (parameter file).
Intermediate	Enter the spacing of intermediate tics. The default for this field is specified by the parameter PARTI (parameter file).
Tic Mark Sizes	
Labels	Enter the size of the major tics. The default for this field is specified by the parameter PVAMAT (parameter field).
Intermediate	Enter the size of the intermediate tics. The default for this field is specified by the parameter PVAMI (parameter file).
Vertical Exaggeration	Enter the vertical scale factor in units of ft:% or m:%.
Vertical Spacing	Enter the spacing of tics on the vertical scale.
Text Height	
Stations	Enter the text height for station labels. The default is specified by the parameter PVASTA (parameter file).
Elevations	Enter the text height for vertical scale labels. The default for this field is specified by the parameter PVAELV (parameter file).
OK	Push this button to display preference.
Help	Push this button to display help for this topic.

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