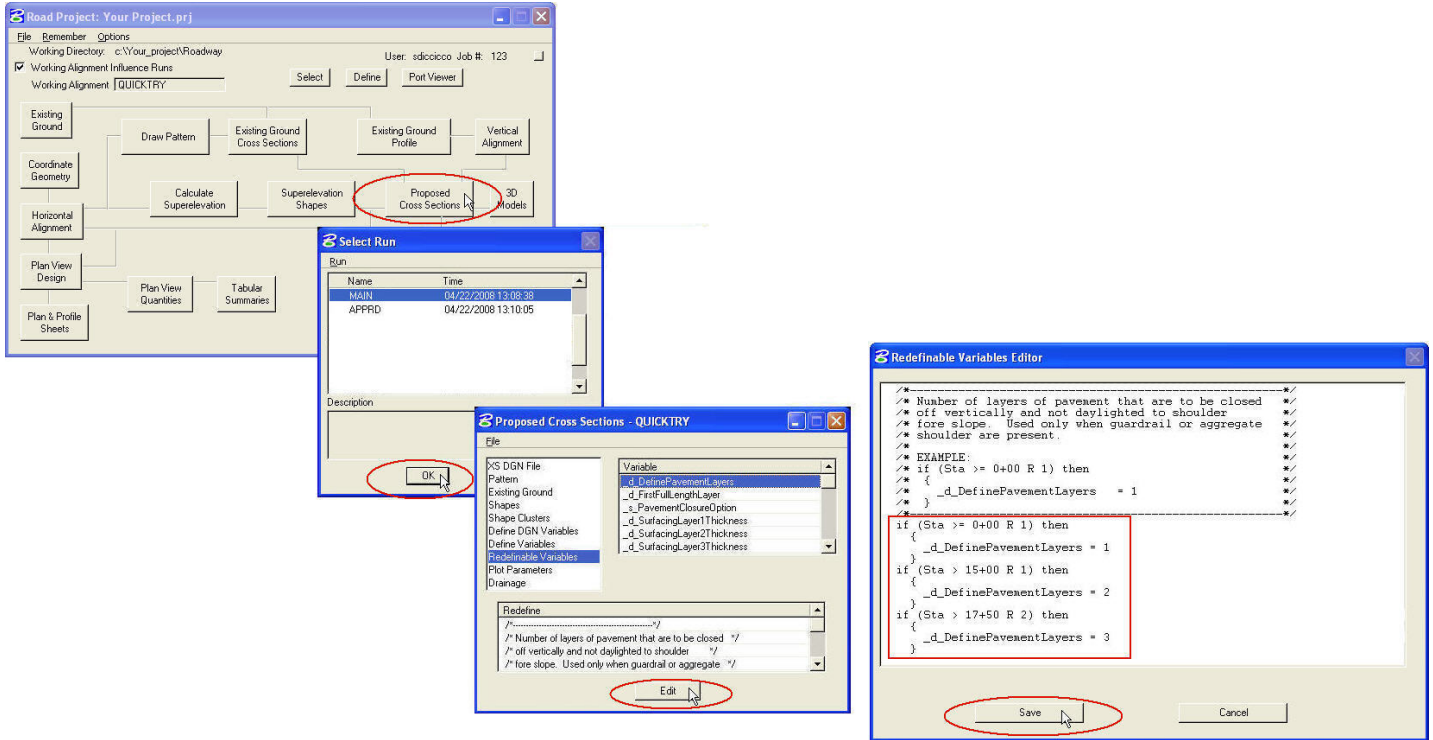


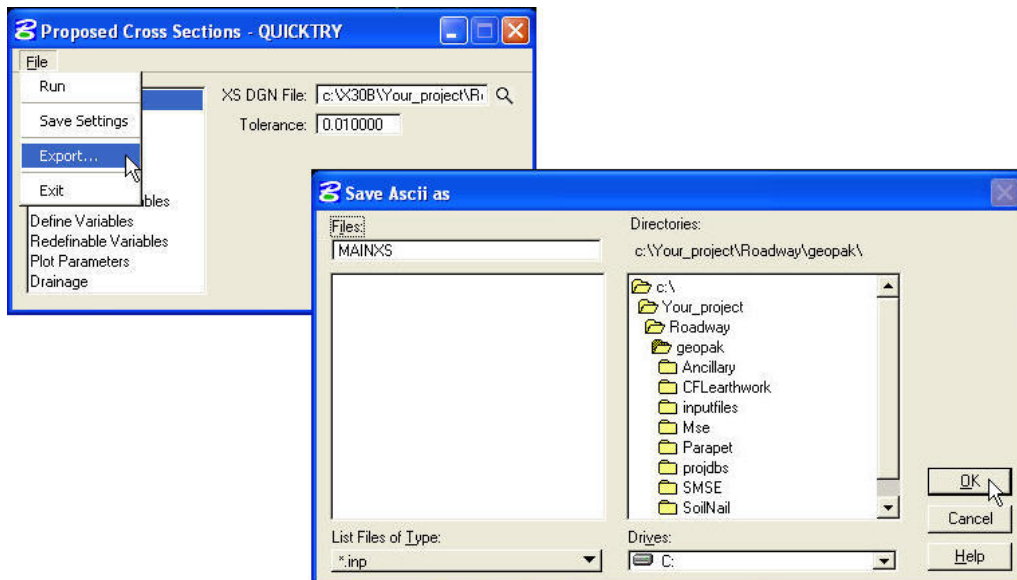
Redefinable Variables

Editing Redefinable Variables



Note: Leave the first station at 0+00 R 1

Save Backup of Proposed Cross Section Run as an ASCII Input File



Redefinable Variable Descriptions

Note: Plan View Override Elements overwrite all Redefinable Variable values

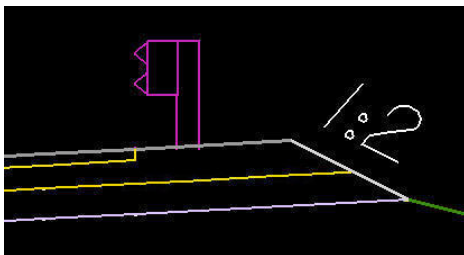
_d_DefinePavementLayers

This variable defines the number of proposed surfacing layers that are to be closed off vertically, and not “daylighted” to the shoulder foreslope in guardrail or aggregate shoulder locations. Use the `_d_DefinePavementLayers` variable where guardrail or aggregate shoulder is present.

The default value = 1

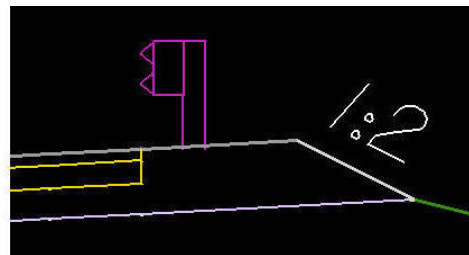
EXAMPLE:

```
if (Sta >= 0+00 R 1) then
  {
    _d_DefinePavementLayers = 1
  }
```



EXAMPLE:

```
if (Sta >= 0+00 R 1) then
  {
    _d_DefinePavementLayers = 2
  }
```



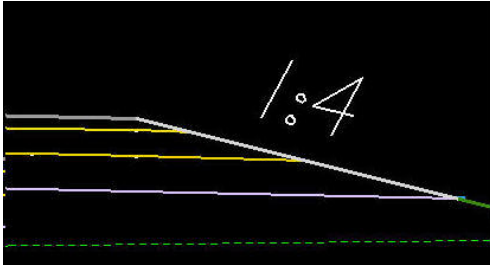
_d_FirstFullLengthLayer

This variable defines the number proposed surfacing layers to “daylight” to the shoulder foreslope. Use the `_d_FirstFullLengthLayer` variable where no guardrail or aggregate shoulders are present.

The default value = 1

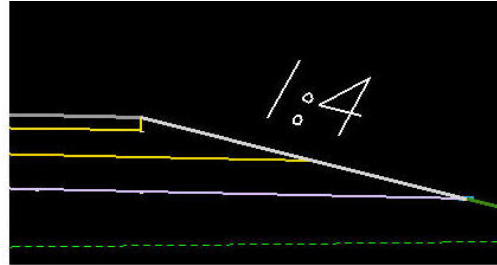
EXAMPLE:

```
if (Sta >= 0+00 R 1) then  
  {  
    _d_FirstFullLengthLayer = 1  
  }
```



EXAMPLE:

```
if (Sta >= 0+00 R 1) then  
  {  
    _d_FirstFullLengthLayer = 2  
  }
```



_s_PavementClosureOption

This variable sets how the edge of pavement is to be closed if not “daylighted” to the shoulder foreslope (i.e. `_d_FirstFullLengthLayers = 2` or more). The option was created for the different needs of the three FHWA divisions. Use a 1:1 pavement edge for typical Central Federal Lands (CFL) projects and a vertical edge for Easter Federal Lands (EFL) projects. Use `^V^` for a vertical closure or `^S^` for a one to one slope closure. The selected closure option also applies when guardrail is present.

The default value = `^V^`

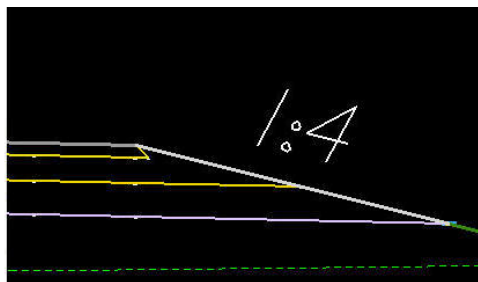
EXAMPLE:

```
if (Sta >= 0+00 R 1) then  
  {  
    _s_PavementClosureOption = ^V^  
  }
```



EXAMPLE:

```
if (Sta >= 0+00 R 1) then  
  {  
    _s_PavementClosureOption = ^S^  
  }
```



_d_SurfacingLayer1Thickness

This defines the thickness of the first layer in the proposed pavement structure. Use this variable for all projects with a proposed driving surface. The first surfacing layer thickness must be greater than zero and expressed in master units.

The default values = 4/12 or .100

EXAMPLE:

```
if (Sta >= 0+00 R 1) then
  {
    _d_SurfacingLayer1Thickness = 3/12
  }
```

_d_SurfacingLayer2Thickness to _d_SurfacingLayer5Thickness

These variables define the thickness of additional layers in the proposed pavement structure. Use these variables when more than one proposed pavement structure layers are desired. The surfacing layer thicknesses 2 through 5 may be set to zero.

Note: Cross Sections with guardrail will not be drawn correctly, without at least two layers of surfacing. The fill slope will begin at the top of the foreslope, instead of the bottom. One work around for this is to use two layers of surfacing, and then delete out the 'dummy' layer. For consistency in Staking Reports, use a 'dummy' layer through out the entire project.

_d_WedgeDepth

This variable defines the depth of the wedge adjacent to the non-daylighted surfacing layer(s) and is expressed in master units. Use this variable for projects that require a different shoulder material other than a surfacing lever. When used, the wedge will be drawn with different symbology (shoulder backfill) so that earthwork values can be separated. If the wedge depth is set to a value greater than the depth of the surfacing layers which are not "daylighted", the wedge will be drawn to the same depth as the surfacing layers which are not "daylighted". If no wedge is desired, set the value to zero.

The default value = 0 (no wedge)

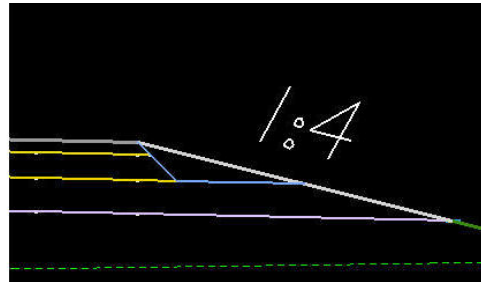
EXAMPLE: In this example, the first layer thickness is 3/12, the second layer is 6/12 and the third layer thickness is 8/12.

```
if (Sta >= 0+00 R 1) then
{
  _d_WedgeDepth = 10/12
}
```



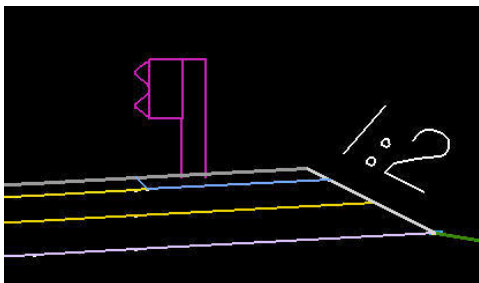
with: `_d_FirstFullLengthLayer = 2`

```
if (Sta >= 0+00 R 1) then
{
  _d_WedgeDepth = 10/12
}
```



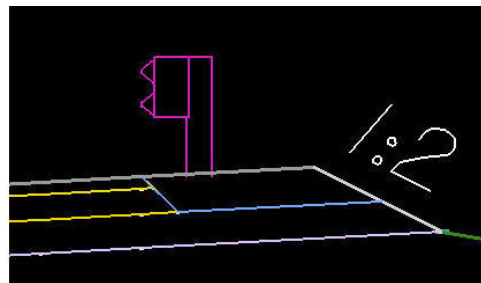
with: `_d_FirstFullLengthLayer = 3`

```
if (Sta >= 0+00 R 1) then
{
  _d_WedgeDepth = 10/12
}
```



with: `_d_FirstFullLengthLayer = 2`

```
if (Sta >= 0+00 R 1) then
{
  _d_WedgeDepth = 10/12
}
```



with: `_d_FirstFullLengthLayer = 3`

`_d_ShoulderForeSlope`

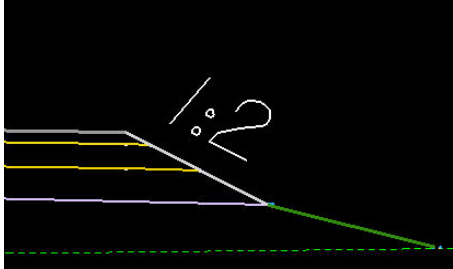
This variable defines the shoulder foreslope and is expressed in a rise:run format. All proposed cross section use this variable. The slope will always be assumed to be negative in value.

The default value = 1:4

Note: The shoulder foreslope variable can be overridden with plan view overrides.

EXAMPLE:

```
if (Sta >= 0+00 R 1) then  
  {  
    _d_ShoulderForeSlope = 1:2  
  }
```



_s_RecoverableShoulderForeSlope

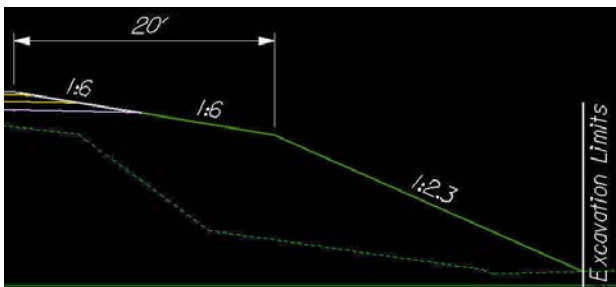
This variable is used to override the 'normal' shoulder foreslope when a recoverable slope is used. Only use this variable when the recoverable slope is preferred over the shoulder foreslope. Set this variable to ^Yes^ to override the shoulder foreslope variable with a recoverable slope. If set to ^No^, the shoulder foreslope will equal the shoulder foreslope variable.

This variable must be used in conjunction with the redefinable variable _d_RtRecoverableSlopeDist (or Lt). If these variables are set to zero, no override will occur. The slope of the recoverable distance is set with the Redefinable variable _d_RtRecoverableSlope (or Lt). The use of the variable _d_RtSecondarySlope is optional, if the value is set to 0:0 then the secondary fill slope will be selected from the fill slope criteria table.

The default value = Yes

EXAMPLE:

```
if (Sta >= 0+00 R 1) then  
  {  
    _s_RecoverableShoulderForeSlope = ^Yes^  
  }
```



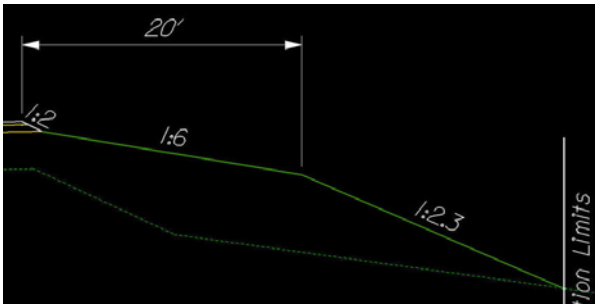
with:

```
_d_ShoulderForeSlope = 1:2  
_s_RecoverableShoulderForeSlope = ^Yes^  
_d_RtRecoverableSlopeDist = 20  
_d_RtRecoverableSlope = -1:6  
_d_RtSecondarySlope = -1:2.3
```

```

if (Sta >= 0+00 R 1) then
{
  _s_RecoverableShoulderForeSlope = ^No^
}

```



with:

```

_d_ShoulderForeSlope = 1:2
_s_RecoverableShoulderForeSlope = ^No^
_d_RtRecoverableSlopeDist = 20
_d_RtRecoverableSlope = -1:6
_d_RtSecondarySlope = -1:2.3

```

_d_SubExDepth and **_d_SubExType**

These variables set the location, depth and type of subexcavation to be drawn in the proposed cross sections. Use these variables whenever it is necessary to show subexcavation in cross section views or to accurately measure the earthwork volumes associated with subexcavation.

The variable `_d_SubExDepth` defines the depth of subexcavation. Use the variable in all locations of subexcavation regardless of the type of subexcavation defined (Type 1 or 2) which also must be defined. The variable needs to be expressed in master units and no negative sign is required. The depth is measured differently, depending upon the type of subexcavation selected; see the description of `_d_SubExType` for an explanation.

The default value = 0

EXAMPLE:

```

if (Sta >= 0+00 R 1) then
{
  _d_SubExDepth = 24/12
}

```

The variable `_d_SubExType` defines the type of subexcavation. Use in conjunction with `_d_SubExDepth` for all subexcavation locations. Type 1 subexcavation, which is defined as below proposed subgrade, is invoked by setting the variable equal to 1. Type 2 subexcavation, which is defined as below existing ground, is invoked by setting the variable equal to 2.

The default value = ^2^

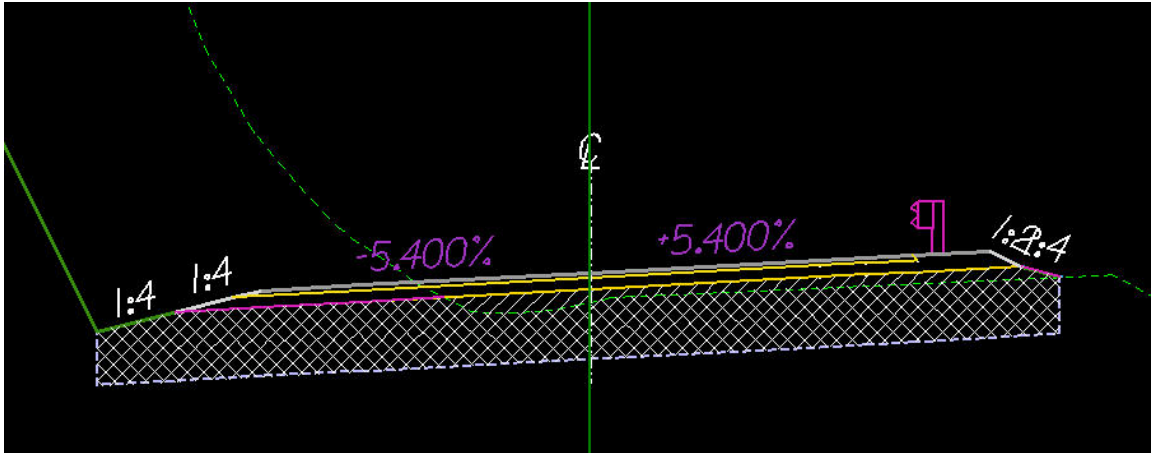
Note: *The subexcavation type and depth variables can be overridden with plan view overrides.*

EXAMPLE 1: *Note:* The bottom of the Type 1 subexcavated area is parallel to the proposed subgrade and it automatically ends when it intersects the fill slope or the bottom of the ditch. No plan view elements are required.

```

if (Sta >= 0+00 R 1) then
{
  _d_SubExType = ^1^
}

```



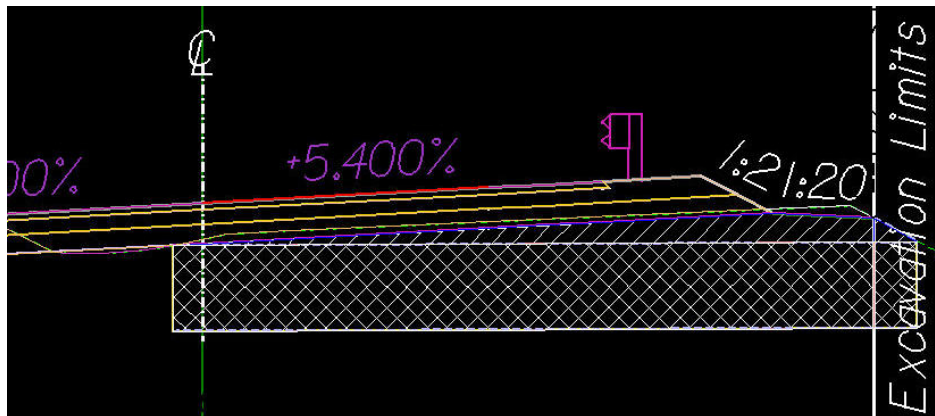
Subexcavation quantity = Crosshatched area
 Subexcavation Backfill quantity = Crosshatched area + Hatched area

EXAMPLE 2: *Note:* Type 2 Subexcavation requires two plan view lines (LV= P_RDW_Edge_of_Subexcavation) to define the offset distances from centerline. The bottom of the subexcavated area is horizontal and the depth is measured from the existing ground on the left hand side.

```

if (Sta >= 0+00 R 1) then
{
  _d_SubExType = ^2^
}

```



Subexcavation quantity = Hatched area + Crosshatched area
 Subexcavation Backfill quantity = Crosshatched area

[_d_MaxWidenSearchDistance](#)

This variable defines the distance in master units to search for a pavement widening line in plan view. The distance is measured from centerline. This variable is used when cross sections may cross other edges of pavement widening from other roads or in switchbacks. Extraneous lines will cause errors when proposed cross sections are drawn.

The default values = 12 (ft) or 3.6 (m)

EXAMPLE:

```
if (Sta >= 0+00 R 1) then
  {
    _d_MaxWidenSearchDistance = 40
  }
```

[_d_BackofCurbSearchDistance](#)

This variable defines the distance in master units to search for the back of Type 1 or Type 2 curb in plan view. The distance is measured from the edge of traveled way. Type 1 and Type 2 curb lines in plan view act as a trigger and exact horizontal position is not important. Use this variable to work with the plan view offset values drawn.

The default values = 3 (ft) or 1 (m)

EXAMPLE:

```
if (Sta >= 0+00 R 1) then
  {
    _d_BackofCurbSearchDistance = 40
  }
```

[_d_Type3CurbSearchDistance](#)

This variable defines the distance in master units to search for Type 3 curb in plan view. The distance is measured from centerline. Type 3 curb lines in plan view act as a trigger and exact horizontal position is not important. Use this variable to work with the plan view offset values drawn.

The default value = 20

EXAMPLE:

```
if (Sta >= 0+00 R 1) then
  {
    _d_Type3CurbSearchDistance = 20
  }
```

_d_ClrZoneRecovCutDist and _d_ClearZoneCutSlope

These redefinable variables are used to define cut situation clear zone distances and allowable slopes. Additionally, these variables are used to label or check proposed cut slopes that do not meet the defined distance or exceed the allowable cut slopes within a clear zone. Any cut slope that exceeds the allowable slope within the defined clear zone will be labeled. The criteria will also label a case where the clear zone distance is not met.

Note: Use of these variables does not draw a “barn roof” clear zone section. These variables are used where “barn roof” sections are not proposed.

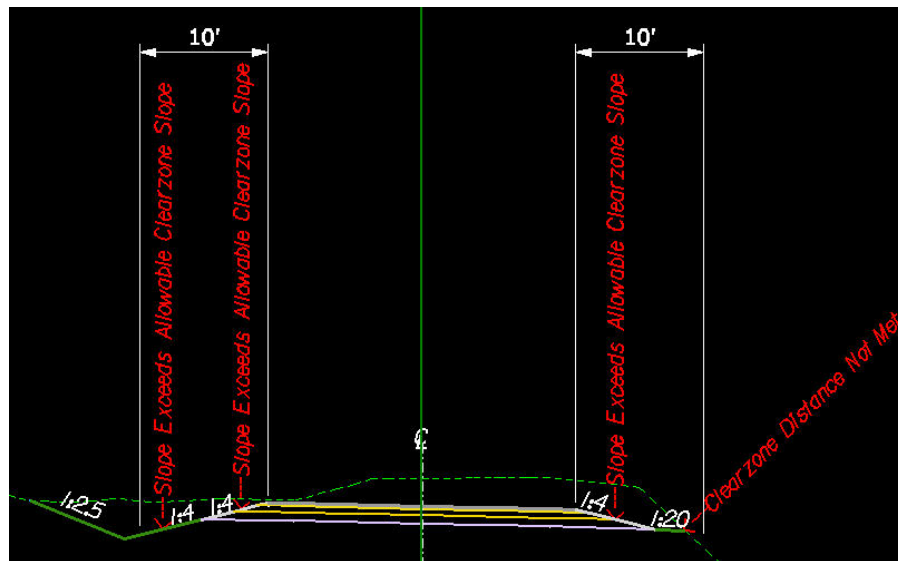
The variable _d_ClrZoneRecovCutDist defines the distance to perform the check from the top of the shoulder foreslope to the outer edge of the clear zone in a cut situation.

The variable _d_ClearZoneCutSlope sets the allowable clear zone slope in a cut situation.

If no check of the slopes is required, leave the _d_ClrZoneRecovCutDist variable set to 0 (default).

EXAMPLE:

```
if (Sta >= 0+00 R 1) then
{
    _d_ClrZoneRecovCutDist = 10
}
```



with: _d_ClearZoneCutSlope = 1:6

_d_ClrZoneRecovFillDist and _d_ClearZoneFillSlope

These redefinable variables are used to define fill situation clear zone distances and allowable slopes. Additionally, these variables are used to label or check proposed fill slopes that do not meet the defined distance or exceed the allowable fill slopes within a clear zone. Any fill slope that exceeds the allowable slope within the defined clear zone will be labeled. The criteria will also label a case where the clear zone distance is not met.

Note: Use of these variables does not draw a “barn roof” clear zone section. These variables are used where “barn roof” sections are not proposed.

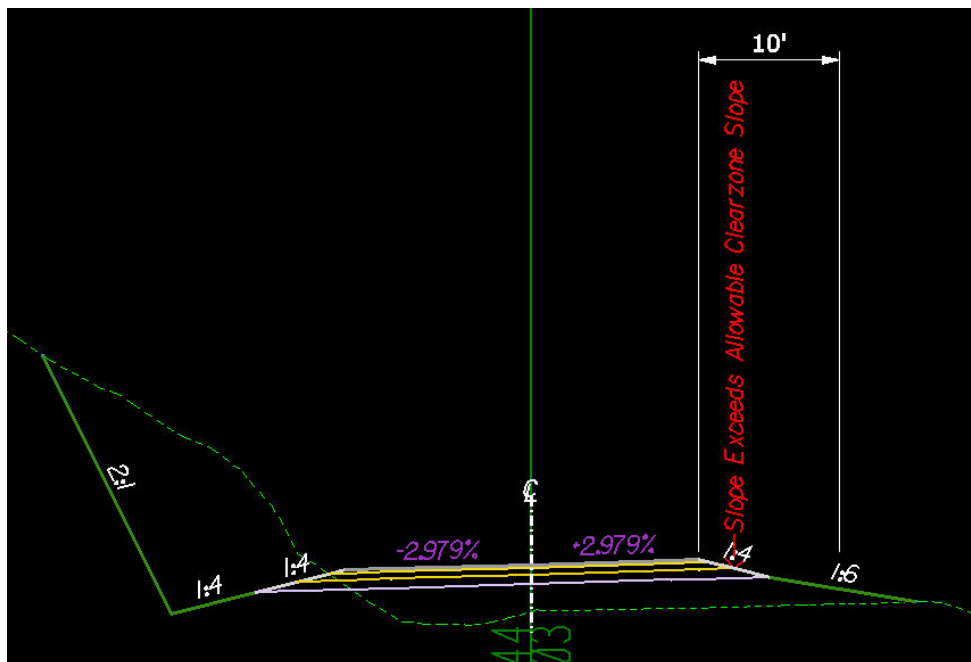
The variable _d_ClrZoneRecovFillDist defines the distance to perform the check from the top of the shoulder foreslope to the outer edge of the clear zone in a fill situation.

The variable _d_ClearZoneFillSlope sets the allowable clear zone slope in a fill situation.

If no check of the slopes is required, leave the _d_ClrZoneRecovFillDist variable set to 0 (default).

EXAMPLE:

```
if (Sta >= 0+00 R 1) then
{
  _d_ClrZoneRecovFillDist = 10
}
```



with: _d_ClearZoneFillSlope = 1:6

[_d_LtRecoverableSlopeDist](#) and [_d_LtRecoverableSlope](#) and [_d_LtSecondarySlope](#)

These redefinable variables are used to create a safe recovery area or “barn roof” section in cut and fill situations on the left side of the roadway. Use these variables to build safety into the proposed roadway or when the defined clear zone requirements are not met.

The variable `_d_LtRecoverableSlopeDist` defines the horizontal distance for the recoverable slope and is measured from the top of the shoulder foreslope or edge of pavement if no shoulder is proposed.

The variable `_d_LtRecoverableSlope` defines the slope for the recoverable slope and is expressed as negative rise:run values.

The variable `_d_LtSecondarySlope` defines a secondary slope and is used to set fill slopes when recoverable slopes are used. Use this variable if it is necessary to have a constant fill slope or if the standard fill slopes are not desired. Any value, expressed in a rise:run format, other than 0 (default) will override the fill slope table. If the secondary slope is flatter than the recoverable slope, the recoverable slope will be used instead. It is not necessary to set this variable when using recoverable slopes.

If no recoverable slope is desired, set `_d_LtRecoverableSlopeDist` = 0 (default).

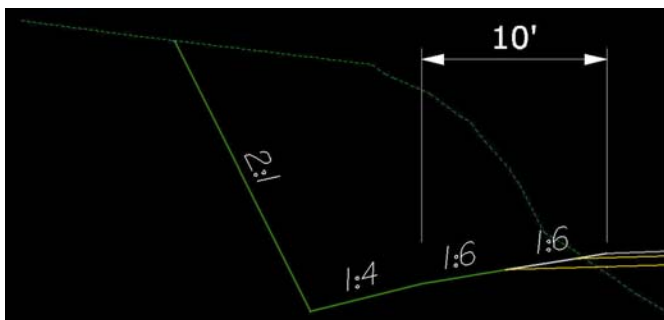
EXAMPLE:

if (Sta >= 0+00 R 1) then

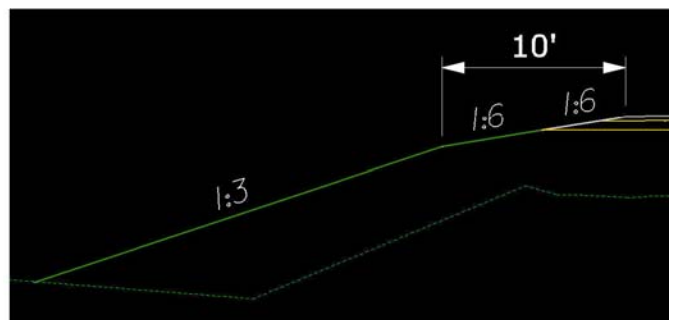
```
{  
  _d_LtRecoverableSlopeDist = 10  
}
```

with: `_d_LtRecoverableSlope` = -1:6
`_d_LtSecondarySlope` = -1:3
`_d_RecoverableShoulderForeSlope` = ^Yes^

Note: If `_d_RecoverableShoulderForeSlope` is set to ^No^, then the shoulder foreslope is controlled by the `_d_ShoulderForeSlope` variable.



Cut Situation



Fill Situation

Note: In the cut situation, the secondary slope does not override the ditch slope, which is controlled by the redefinable variable `_d_DitchForeslopeLt`

_d_RtRecoverableSlopeDist and _d_RtRecoverableSlope and _d_RtSecondarySlope

These redefinable variables are used to create a safe recovery area or “barn roof” section in cut and fill situations on the right side of the roadway. Use these variables to build safety into the proposed roadway or when the defined clear zone requirements are not met. See the description above for the Left side variables.

_d_FillSlope1 and _d_FillSlope1Height (and Fill Slopes 2 through 9)

These redefinable variables define the fill slope selection criteria, based on the height of the fill slope. The slope is expressed in a rise:run format. The slope will be assumed to be negative. The fill height is a maximum height for the corresponding slope and is expressed in master units.

Note: All fill slope variables can be overridden with plan view overrides.

EXAMPLE:

```
if (Sta >= 0+00 R 1) then
{
  _d_FillSlope1 = 1:6
}
```

EXAMPLE:

```
if (Sta >= 0+00 R 1) then
{
  _d_FillSlope1Height = 2.0
}
```

In the example, all fill slopes with a height of two feet or less will be drawn at a -1:6 slope.

_d_CutSlope1 and _d_CutSlope1Height (and Cut Slopes 2 through 9)

These redefinable variables define the cut slope selection criteria, based on the height of the cut slope. The slope is expressed in a rise:run format. The slope will be assumed to be positive. The cut height is the maximum height for the corresponding slope and is expressed in master units.

Note: All cut slope variables can be overridden with plan view overrides.

EXAMPLE:

```
if (Sta >= 0+00 R 1) then
{
  _d_CutSlope1 = 1:6
}
```

EXAMPLE:

```
if (Sta >= 0+00 R 1) then
{
  _d_CutSlope1Height = 2.0
}
```

In the example, all cut slopes with a height of two feet or less will be drawn at a 1:6 slope.

_d_DitchForeslopeLt and _d_DitchForeslopeHeightLt and _d_FlatBottomDitchWidthLt

These redefinable variables set the design parameters of the left roadside ditches. Use them to vary the heights, slopes and shapes of ditches throughout a proposed project.

This variable _d_DitchForeslopeLt variable defines the slope of the left ditch from the subgrade hinge point in a rise:run format. The slope will always be assumed to be negative.

The default value = 1:4

EXAMPLE:

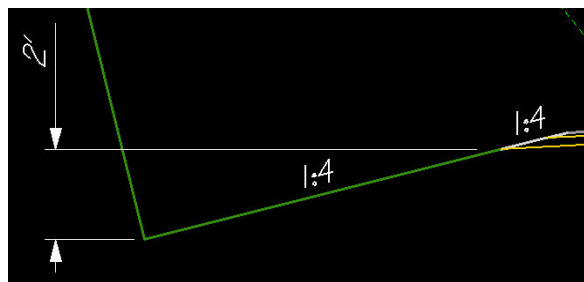
```
if (Sta >= 0+00 R 1) then
{
  _d_DitchForeslopeLt = 1:4
}
```

This variable _d_DitchForeslopeHeightLt defines the vertical height of the left ditch from the subgrade hinge point in master units.

The default values = 1.5 (ft) and 0.5 (m)

EXAMPLE 1:

```
if (Sta >= 0+00 R 1) then
{
  _d_DitchForeslopeHeightLt = 2.0
}
```



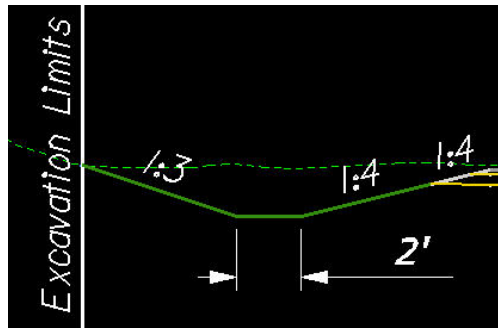
Note: The ditch foreslope and the ditch foreslope height variables can be overridden with plan view overrides. Also note that if an unwanted ditch is being placed behind a curb section (all curb Types), set the variable _d_DitchForeslopeHeight to zero to remove the ditch.

The variable _d_FlatBottomDitchWidthLt defines the width of the left flat bottom ditch and is measured in master units. This variable is used when a flat bottom ditch is preferred over a "V" ditch. If a "V" ditch is desired, leave this variable set to zero (default).

Note: The flat bottom ditch width variable can be overridden with plan view overrides.

EXAMPLE 2:

```
if (Sta >= 0+00 R 1) then
{
  _d_FlatBottomDitchWidthLt = 2
}
```



_d_DitchForeslopeRt and _d_DitchForeslopeHeightRt and _d_FlatBottomDitchWidthRt

These redefinable variables define the dimensions of the ditch on the right side. See the descriptions above for the left side ditch variables.

Note: The all these variables can be overridden with plan view overrides.

_d_GroundDropOffSearchDistance and _d_GroundDropOffSampleDistance

These variables are used to define how and when a ditch is created in a fill situation. If the shoulder subgrade point is above ground and the bottom of the ditch foreslope is below ground, the criteria will check to see if the ground slopes to a point below the defined ditch bottom. If this is the case, a fill slope will be drawn intersecting existing ground and a ditch will not be drawn.

Note: The bottom if the ditch foreslope is set by the variable for ditch foreslope height.

The variable _d_GroundDropOffSearchDistance defines the distance in master units used to determine how far to search to see "if" the ground falls below the ditch bottom in a fill situation. This distance is defined in master units and is measured horizontally from the shoulder subgrade point.

The default values = 50 (ft) and 15 (m)

EXAMPLE:

```
if (Sta >= 0+00 R 1) then
{
  _d_GroundDropOffSearchDistance = 50
}
```

The variable `_d_GroundDropOffSampleDistance` sets the distance in master units used to determine the increment to move along the ground to determine if the ground falls off below the bottom of ditch in a fill situation.

The default values = 1 (ft) and 0.3 (m)

EXAMPLE:

```
if (Sta >= 0+00 R 1) then
{
  _d_GroundDropOffSampleDistance = 1
}
```

`_d_DaylightSlope` and `_d_DaylightWidth` and `_d_DaylightOption`

These variables are used to define the slope width and type of “daylighted” slope that is drawn. “Daylighted” slopes are used in cut situations when there is a possibility to grade out a slope instead of having a roadside ditch.

`_d_DaylightSlope` defines the slope in rise:run format to draw the daylight slope.

The default value = -1:20

EXAMPLE:

```
if (Sta >= 0+00 R 1) then
{
  _d_DaylightSlope = -1:20
}
```

`_d_DaylightWidth` is a redefinable variable that defines the maximum width of the “daylighted” slope measured horizontally from the bottom of the ditch foreslope in master units. Use the variable in cut situations where there is a choice to either create a ditch or grade out to an existing slope.

The default values = 30 (ft) and 10 (m)

EXAMPLE:

```
if (Sta >= 0+00 R 1) then  
  {  
    _d_DaylightWidth = 10  
  }
```

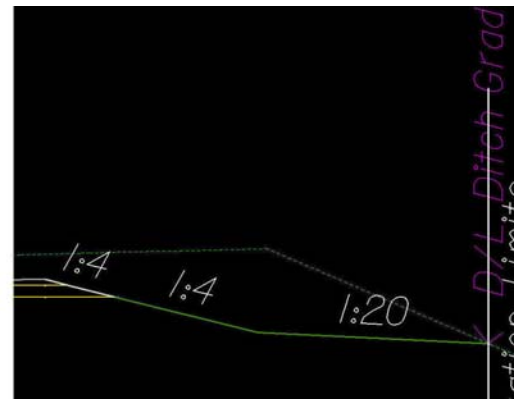
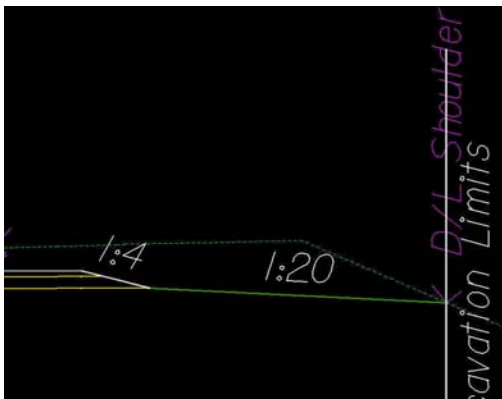
_d_DaylightOption defines the method of daylighting a slope. Use ^S^ to daylight from the shoulder subgrade; use ^D^ to daylight from a ditch foreslope and use ^N^ if no daylight slope is desired.

The default value = ^D^

EXAMPLE:

```
if (Sta >= 0+00 R 1) then  
  {  
    _d_DaylightOption = ^S^  
  }
```

```
if (Sta >= 0+00 R 1) then  
  {  
    _d_DaylightOption = ^D^  
  }
```



_d_RockSlopeLT and _d_RockSlopeRT

These redefinable variables are used to define the slope of the lower portion of a broken back cut slope. The slope of the upper portion of the broken back cut slope is defined by the slope selection criteria or by plan view overrides. The elevation where the change in slope occurs is triggered by a line drawn on the cross section with the D&C Manager.

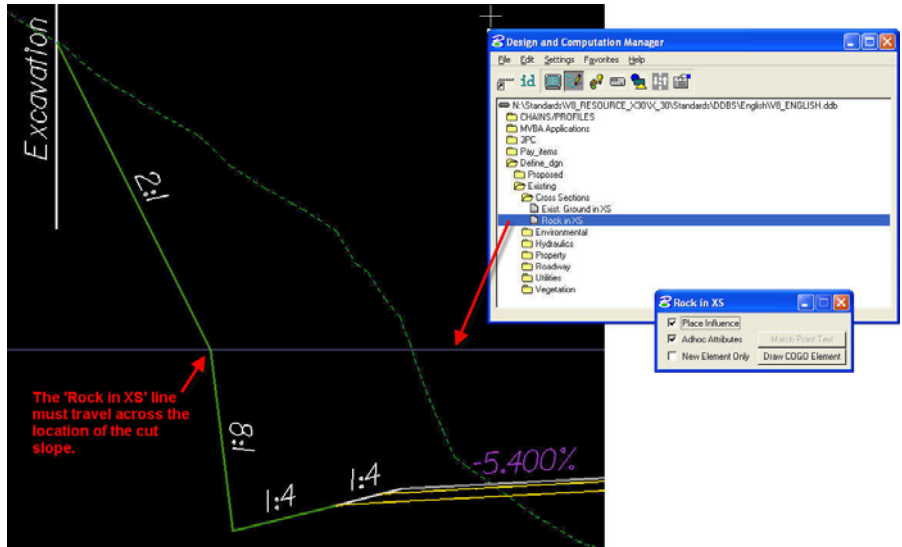
The default value = 4:1

EXAMPLE:

```

if (Sta >= 0+00 R 1) then
{
  _d_RockSlopeLt = 8:1
}

```



_s_ExcavationLimit and _s_ExcavationLimitOffset

These redefinable variables are used to label the limits of excavation. If no labels are desired, set the variable `_s_ExcavationLimit` to `^N^`. The offset of the label can be positive (outside of tie) or negative (inside of tie).

EXAMPLE:

```

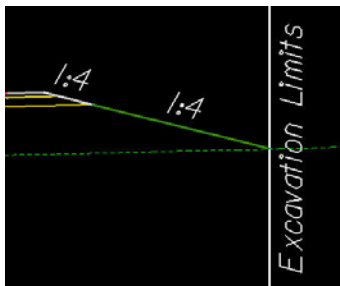
if (Sta >= 0+00 R 1) then
{
  _s_ExcavationLimit = ^Y^
}

```

```

if (Sta >= 0+00 R 1) then
{
  _s_ExcavationLimitOffset = 0
}

```



Note: Earthwork processes require the use of Excavation Limit labels.