
Chapter 3

Design and Computation Manager

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3.1 Objectives

- Understand the use of the **D&C Manager** in creating construction plans
- Understand the format of the hierarchical database and how to use it
- Be able to use the **D&C Manager** in conjunction with Microstation to store roadway features and calculate their quantities

3.2 Definitions

The **Design and Computation Manager** (D&C Manager) is a tool that allows MoDOT to standardize graphic elements for drafting and pay item quantities.

3.3 Database

A hierarchical database is used with the **Design and Computation Manager**. For MoDOT the default database is either **MoDOT_English.ddb** or **MoDOT_Metric.ddb**. The database stores information concerning functional classification and display preferences for each feature and item used in a Microstation file.

Categories are used to group and classify the features and items used in creating construction drawings. The MoDOT databases are divided into four overall categories – **Design Standards/**, **Drafting Standards/**, **Pay Items/**, and **3PC Tools**. The first three categories each contain sub-categories. The sub-categories break down each classification into more specific sections. (See dialog box next page). **3PC Tools** has a list of the various tools available.

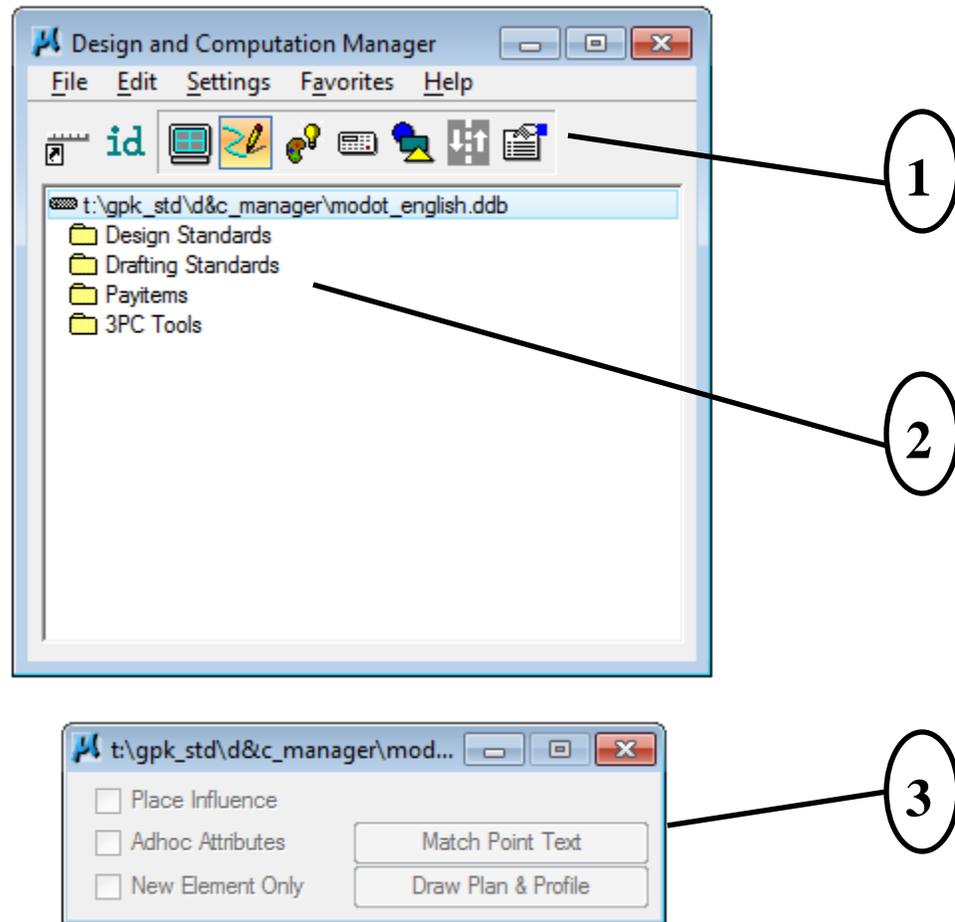
For example, **Pay Items/** is broken into several additional categories like **Pipes/** and **Lighting and Signals/**. **Pipes/** is broken into many different categories representing various types of pipes and pipe features that may be used in the design of your project like **Flared End Sections/**. Within the category **Flared End Sections/** the different pay items for flared end sections are listed.

CADD Support personnel maintain this database. You will find commands within the D&C menu that require a password before execution. This is a security measure to protect the integrity of the database file and ensure its consistent application on a statewide basis.

3.4 Accessing

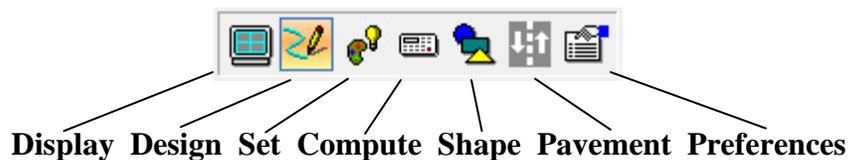
Design and Computation Manager can be accessed from **Project Manager >> Plan View Quantities** or from the **Design and Computation Manager** icon.

The following dialogs will appear.



The D&C Manager dialog box is composed of three distinct areas:

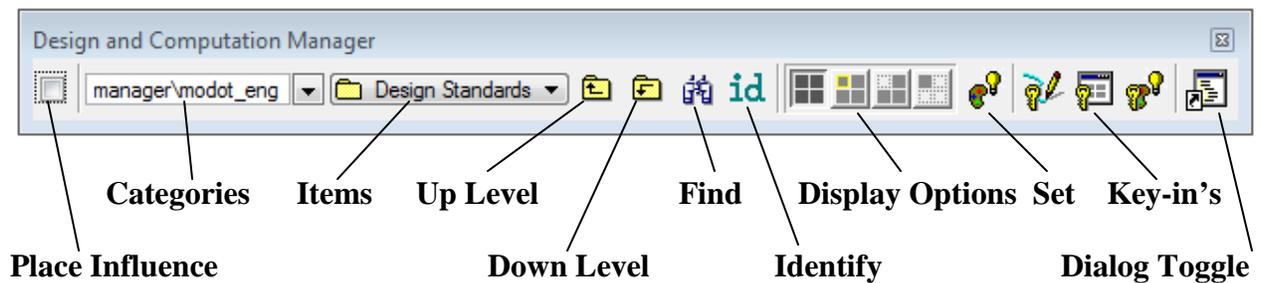
- 1) The D&C Manager may be configured to operate in seven different modes. A single click on an icon will change operational modes. They are: **Display Design Set Compute Shape Pavement Preferences**



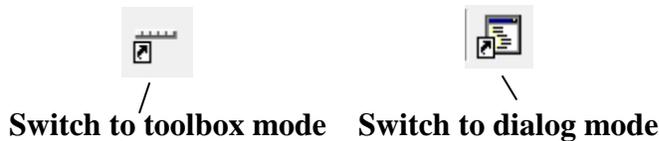
- 2) The **Content box** lists the sub-categories or items available at your current position within the database structure.
- 3) The **Operations box** will appear differently depending on the set mode of operation.

The D&C Manager dialog box can be used in two different modes. The dialog mode as shown on the previous page, allows the user to access items in from a “directory tree” structure. The icons at the top of the dialog allow the user to access the different operational modes of D&C Manager.

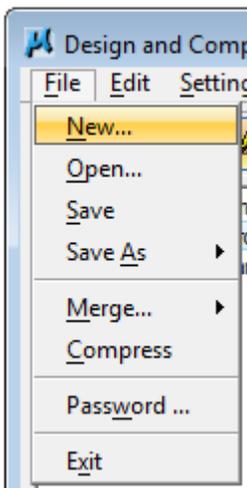
The toolbox mode as shown below, allows the D&C Manager dialog to be docked on the Microstation toolbars. With this format, the user accesses items from the pull-down menus, and can toggle the various tools from the tool bar.



The dialog box can be toggled using the appropriate icons.



3.4.1 File Commands



For a MoDOT Geopak user, the only file command options needed are **Open** and **Exit**.

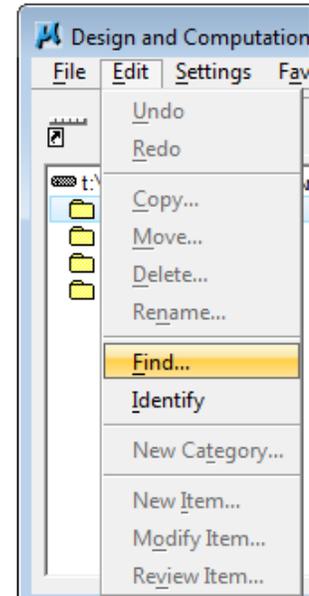
MoDOT_English.ddb or **MoDOT_Metric.ddb** will be used for all MoDOT projects. This file is password protected, so the users will not be able to make changes to it.

3.4.2 Edit Commands

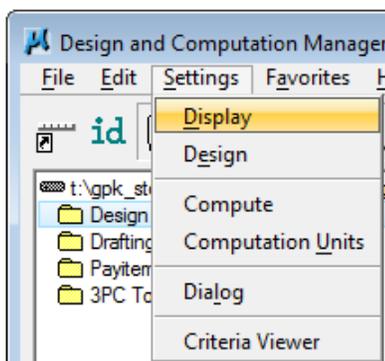
Find - will search the database (from your current location) for an item or category. The display in the D&C Manager dialog box will change to each item/category as it is found.



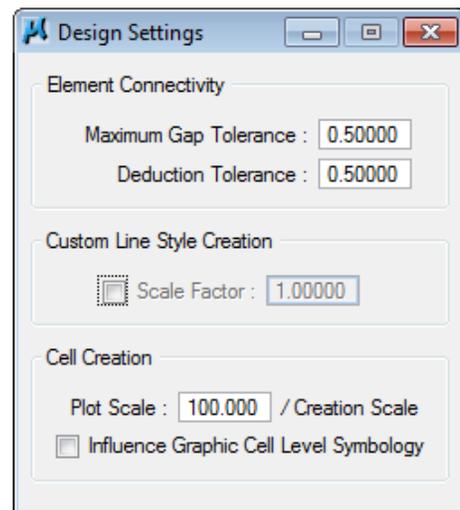
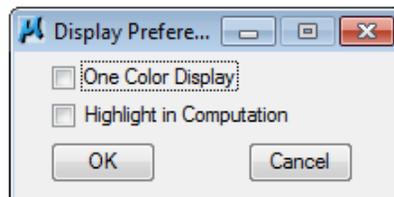
Identify - will show the item name and description attached to an element in the design file.



3.4.3 User Commands



Display Settings - temporarily changes the display of elements on the screen to one common color, then the user may specify additional elements to be viewed in their original colors. This tool enhances visualization when working on a complex project.



Design Settings - sets the *maximum gap* tolerance and *deduction tolerance* used in computations and the drawing scale for placing cells. **Do not use the Custom Line Style Creation option.** The **Project** in the Microstation Manager handles the line style scaling in the MoDOT Microstation configuration. This dialog also sets the cell scale to adjust the cell size appropriate to the drawing scale.

3.4.4 Recall Commands



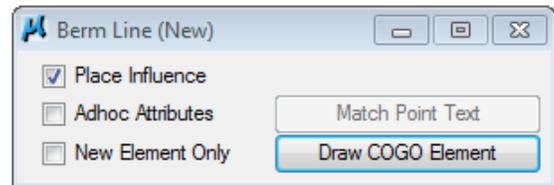
Add to Favorites - saves current D&C Manager path for easy recall in the future.

Organize Favorites - allows the user to edit and save the Favorites list.

3.5 Operational Modes

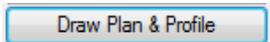
3.5.1 Design

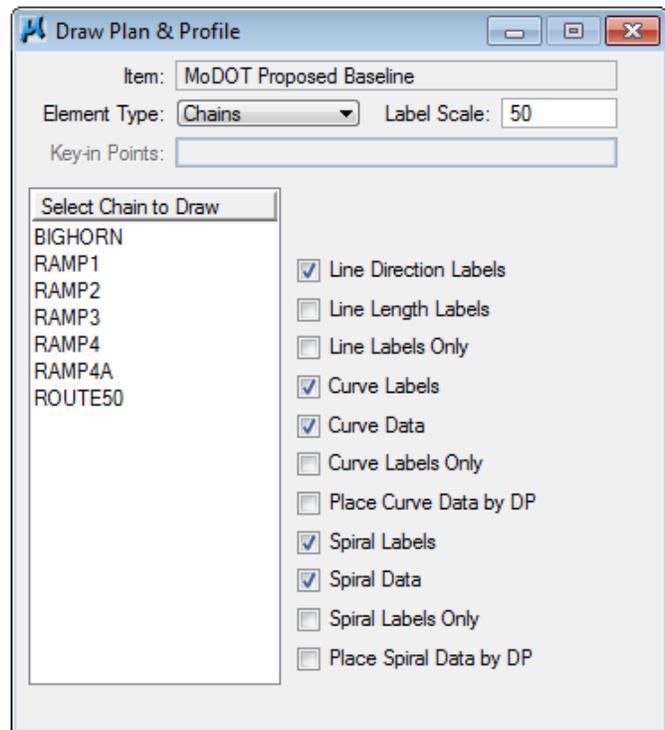
The Design mode allows the user to tag each roadway element as it is placed in the design file based on item parameters and/or write COGO elements to the file.



Place Influence will set the level, symbology and attribute tags of elements drawn or copied using Microstation commands. When **Place Influence** is **On**, elements are drawn using the level, symbology and attributes as defined in the Geopak database file. When **Place Influence** is **Off**, elements are drawn using the active level, symbology and attributes of Microstation.

The **Draw Cogo Element** button is for drawing Cogo elements to a design file. A single click to this button prompts the user for a job number then opens a dialog box that allows the user to choose a COGO item to draw.

 If a drafting item is chosen, the **Draw Cogo Element** button changes to **Draw Plan and Profile**. A single click to this button prompts the user for a job number, and then opens the **Geopak Plan and Profile Draw** box shown to the right.



There are nine possible COGO elements that may be recalled from the .gpk file: points, lines, curves, spirals, chains, stationing, parcels, profiles, and parallel chain. Each of these options changes the dialog box to offer relevant draw and label features used when placing an element in a graphics file. When using **Plan and Profile Draw**, be sure to turn off **Place Influence**.

The points and lines dialog boxes have a key-in field that allows the user to specify the names of the COGO elements to be drawn. To use the line operation, the user must use point numbers to specify the ends of the line. The points/lines are drawn immediately after you enter their respective names and press the enter key. To draw more than one point or line, place a dash in-between the point numbers. To draw a line without using consecutive point numbers, use a forward slash.

The dialog boxes for curves, spirals, chains, stationing, parcels, and profiles have a list box that displays the names of all stored curves and chains. Highlighting one of the available elements causes it to be drawn into the file. Each type of item has a list of options that can be plotted.

**Note that Geopak can draw elements to levels not turned on. After elements are drawn, it may be necessary to turn on appropriate levels and fit screen.

Remember that **Place Influence is for drawing Microstation elements. **Draw Plan & Profile** is for drawing **Cogo** elements. **Do Not** have **Place Influence** on when using **Draw Plan & Profile**.

3.5.2 Display

Display mode is  used to enhance on screen visualization.

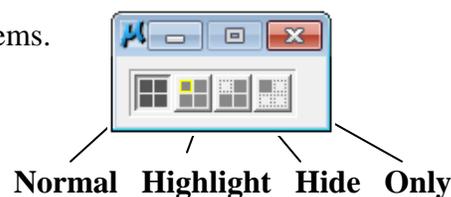
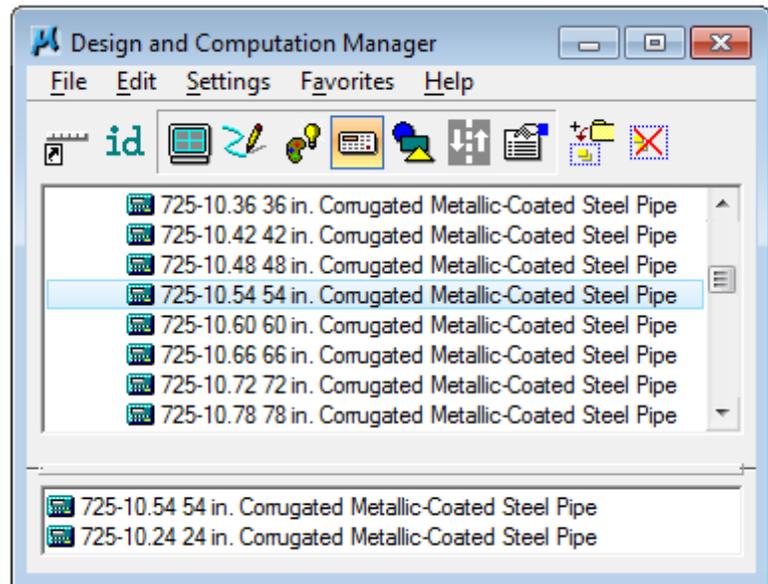
The pay item to be visualized is added to the **Collection** box. Four display options are available for the display of the items in the **Collection** box.

Normal – will show everything in the file, like normal

Highlight - will change those items stored in the collection area to the Microstation highlight color.

Hide - simply turns off the display of the collection items leaving everything else on.

Only - will turn off everything but the collection items.



3.5.3 Set

The **Set** mode allows you to assign attributes from the D&C Manager database to existing graphical elements in the file. With the Use **Complex Chain** option turned off, the **Set** mode is the same as MicroStation *Element Selection*.

The user may tag several elements by depressing the Ctrl key while data pointing each element or by using the MicroStation *Element Selection* tool. This allows you to affect multiple elements with one Set command.

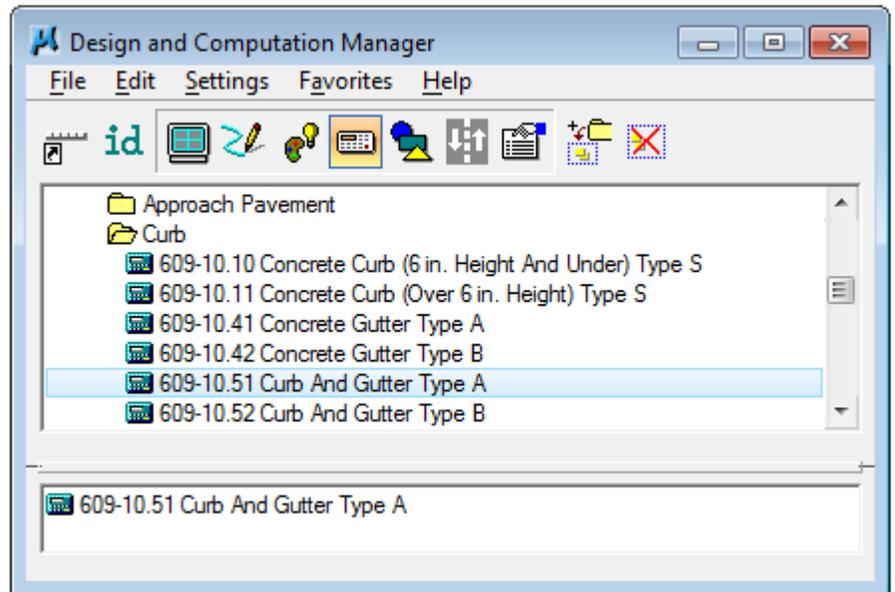


The **Use Complex Chain** option automatically creates a chain from graphic elements and applies the attributes of the highlighted item in the content box.



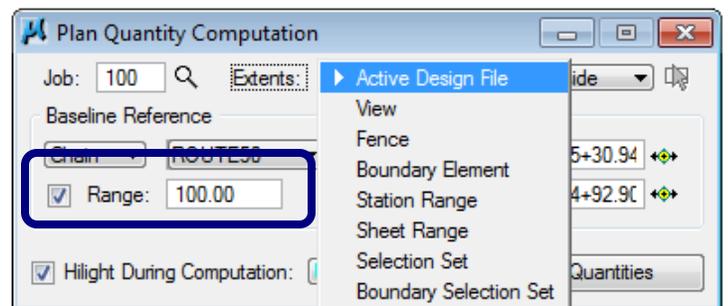
3.5.4 Compute

The **Compute** mode provides quantity calculations from graphic elements placed using the **D&C Manager**. Desired items for inclusion in the computation are added to the collection box at the bottom of the main D&C dialog as shown to the right.

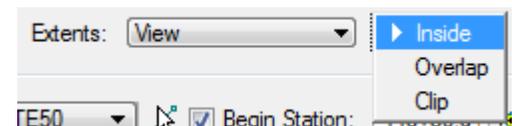


When the compute mode is invoked the Plan Quantity Computation dialog appears. The user can type in the job number in the field or select the icon. 

The items to be computed can be chosen by various options provided in the **Extents** pulldown, which include **Active Design File**, **View**, **Fence**, **Boundary Element**, **Station Range**, **Sheet Range**, **Selection Set** and **Boundary Selection Set**.

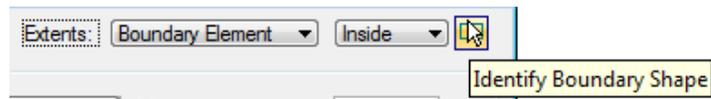


The **Active Design File** option will allow all elements found in the active design file and within the specified **Range** to be considered for computation, while the **View** option will allow only those elements in the current view to be used for computing quantities. If the view includes elements outside range, the range will override.



The **Fence** option determines which elements to be used for computation based on the Fence options chosen as well as the range. The fence modes include **Inside**, **Overlap**, and **Clip**. However, the **Clip** mode applies only to non-shape elements.

The **Boundary Element** option allows the user to select a previously placed closed element to represent the boundary for computation. This option is sensitive to the *MicroStation* **Inside**, **Overlap** and **Clip** modes. Similarly, the Boundary Element Set allows the user to use an element to specify the boundary for element selection to be included in the computation; however, the **Boundary Element Set** mode requires the user to create the selection set of the boundary prior to computing.

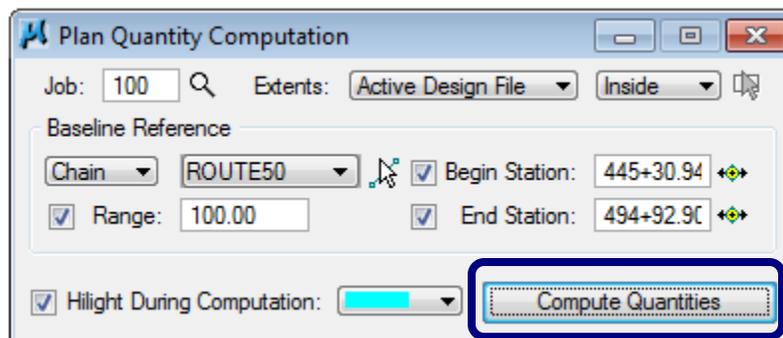


The **Station Range** option allows the user to compute quantities based on a station range for a particular cogo chain or *Microstation* baseline. The **Station Range** can be typed in the Begin/End Station fields or it can also be selected by data pointing.



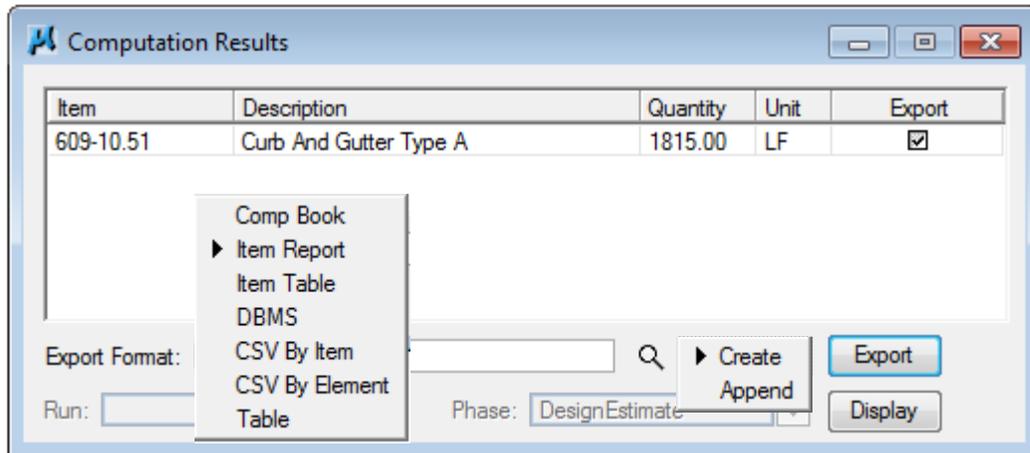
The **Sheet Range** option allows the user to compute quantities within GEOPAK generated plan/profile sheets by specifying a sheet range.

The **Selection Set** option allows the user to create a selection set of the elements to be included in the computation prior to computing quantities.



The **Highlight in Computation** toggle will highlight all *MicroStation* elements utilized in the computations if activated.

Once the computation options are set, the user can start the computation by selecting the **Compute Quantities** button and the **Computation Results** dialog appears.



Each item computed is listed in the **Computation Results** dialog. For each item the dialog lists the *Pay Item Name*, a *Description*, the computed *Quantity*, the *Unit* used for computation, and a toggle for *Exporting* to a report. At this point, the user can create a file containing the calculations by specifying the format of such report. Once a file has been created, the user can append other computed quantities. Once the type of format has been selected, select the **Export** button to create the output file. There are six types of reports that can be exported.

Comp Book – This is a report that lists pay item name, description, quantity summaries and their respective station/offsets for each occurrence of the pay item. This file is in an ASCII format.

Item Report – This reports lists a total quantity for each pay item, giving the description, and unit used for calculation. This file is in an ASCII format.

Item Table – contains the same information as an Item Report. It produces an ASCII formatted quantity table to be included in a drawing file or imported into the estimate program.

DBMS – provides very detailed information including calculated and rounded quantities, geometric properties, pay item numbers, descriptions, station / offset values, etc. The format is the selected database (i.e., Microsoft Access, Oracle, SQL Server, and dbase).

CSV By Item – is similar to Item Report, except that the file is in a CSV (comma separated value) format.

CSV By Element – produces a more detailed report that lists not only quantity summaries, but also geometric properties such as plan view coordinates and station/offsets for located elements. File output is in CSV format.

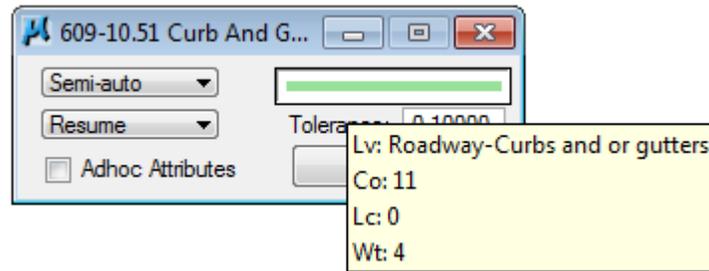
The **Run** and **Phase** fields are used only for the DBMS format for subsequent use in the Quantities Manager Tool. MoDOT currently uses the Estimate 2000 software for estimating quantities.

3.5.5 Shape



Shape mode provides tools for creating shapes to be used for area calculations such as pavement.

Three options are available for choosing the elements to create the shape.



Semi-auto – allows the user to trace around the elements to create the shape. The user picks an element, and then GEOPAK finds an intersection on that element. The user clicks the data point button to accept the intersection, or reset to choose another intersection. GEOPAK will then find the next intersection, which the user can accept or choose another. This is repeated until the beginning of the shape is reached.

During the Semi-auto mode of shaping, the user can select various *Ball Options* to adjust the size of the circle showing the points determining the boundary of the shape. The Ball Options include **Resume**, **Time Out**, **Ball Enlarge**, **Ball Reduce**, and **Ball Restore**. The default is set to Resume.

Resume – This option deletes the drawing circles automatically upon completion of drawing the shape.

Time Out – This option suspends the shaping process to allow the user to use any MicroStation window commands, such as Zoom In, Zoom Out, etc.

Ball Enlarge – This option allows the user to enlarge the size of the drawing circle. This can be selected an unlimited number of times while drawing the shape.

Ball Reduce – Opposite of the Ball Enlarge.

Ball Restore – Resizes the circle to the radius size when the Draw button was last selected.

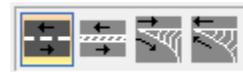
Automatic – creates the smallest shape possible. The user selects a data point inside the shape they are trying to create. GEOPAK then moves up until it intersects an element, then traces around intersecting elements to create the shape.

Exclusive – works the same as the **Automatic** mode, but allows the user to select elements that will create a hole in the shape.

3.5.6 Pavement



The **Pavement** mode allows the user to place pavement marking including striping and symbols.



Striping – allows the user to place single or double, solid or skip pavement stripes.



Separation – allows the user to place traffic separation pavement marking.



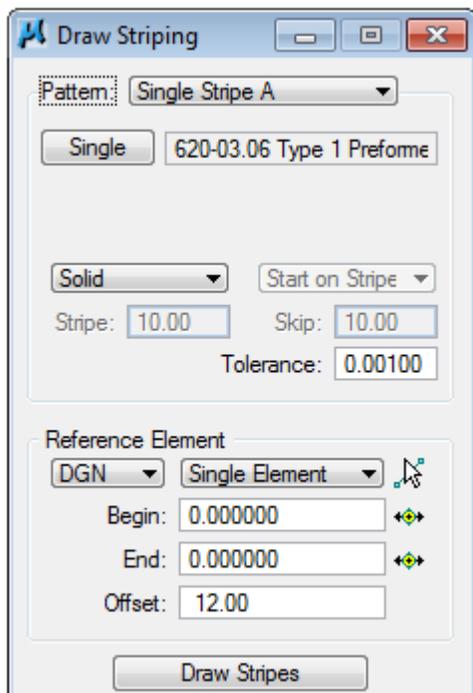
Chevron Diverge – allows the user to place pavement chevrons in areas of diverging traffic.



Chevron Merge – allows the user to place pavement chevrons in areas of merging traffic.

These are discussed further in the following pages.

3.5.6.1 SINGLE STRIPING



This box offers predefined configurations for single stripe and double stripe options so the user can easily control the type of striping being placed.

The pay item box will reflect the currently selected pay item in the **D&C Manager** dialog box; the user may change this at any time during the process.

Next, define the start option by selecting **Solid** or **Skip** (or a combination thereof). If **Skip** is active, the user must define the stripe and skip lengths. If an ending stripe is shorter than the Tolerance value, it will not be drawn.

The lower portion of the dialog box allows the user to set up the **Reference Element**. The reference element can be selected from an existing cogo **Chain** or from MicroStation elements in the **DGN**. If **DGN** is the method selected to set the **Reference Element**, the user then has three choices to make the selection. The three choices are *Single Element*, *Complex Chain*, or *Selection Set*. In addition, the user needs to set up beginning and ending points for the

limits of striping. Once the reference element has been chosen, the Begin/End fields will automatically populate with the total distance measured for the element. The user can adjust this distance by using the  icons to the right of the Begin/End fields. If a cogo chain is chosen,

the Begin/End stationing of the chain are automatically populated. The user can then adjust the station range by utilizing the  icons.

After selecting the **Draw Stripes** button, the user must enter a data point on either side of the reference element to begin striping. Striping is placed at the indicated **offset** value; the data point controls whether striping is offset left or right. *Striping is placed as a graphic group.*

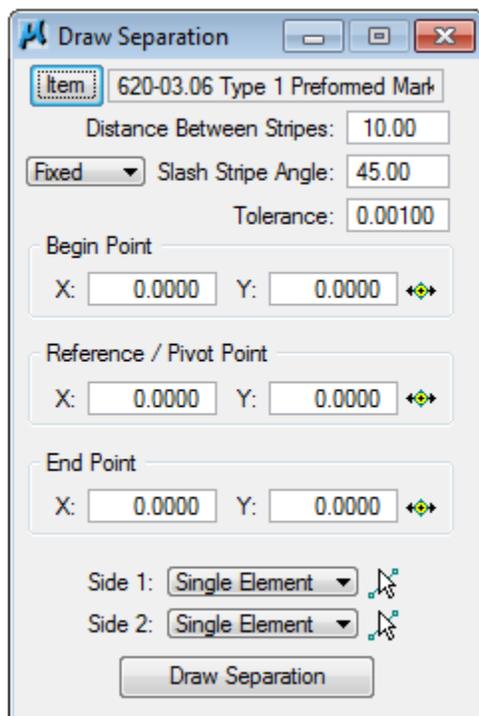
3.5.6.2 DOUBLE STRIPING

The process for Double Striping is the same as Single, except for having two pay item placement options, Inside and Outside. The user must select either the Inside or Outside button for the highlighted (D&C Manager) pay item to be displayed in the dialog box. Separate quantities are calculated for each stripe.

The remaining process is the same as described above.

3.5.6.3 SEPARATION

This option draws pavement markings between two sets of selected elements. Elements may be either GEOPAK or Microstation generated.

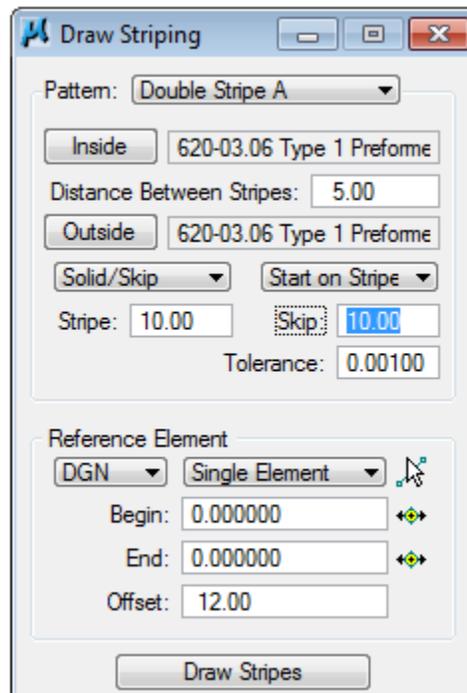


Once a pay item has been selected, the user may set the **Distance Between Stripes** and the **Slash Stripe Angle**. Tolerance functions the same as for striping.

A **Begin Point** and **End Point** should be issued before the **Reference DP** is identified. The Reference Point must fall between the **Begin Point** and **End Point**. It marks the location of the first pavement marking and determines the direction of the slashed stripe. All other markings will be based on the first stripe.

Tools for defining the limits of the pavement markings are located at the bottom of the Separation dialog box. **Side 1** and **Side 2** are the two edges to determine the separation marking. **Side 2** is used when turning the

Slash Stripe Angle. GEOPAK begins on **Side 2**, and draws the marking at the specified angle until it intersects the **Side 1** element, where the marking stops. It is desirable to have the total length of the **Side 2** elements longer than those of **Side 1**.



The three methods available to select elements are the MicroStation *Single Element, Selection Set, and Complex Chain*.

After the **Draw Separation** button is selected, the user must issue a data point in the graphics file for the pavement markings to be displayed.

3.5.6.4 CHEVRON DIVERGE

Once the pay item and its relative parameters have been defined, there are three points needed to define the chevron: **Gore Point, Breaking Line** and **Diverge Point**.

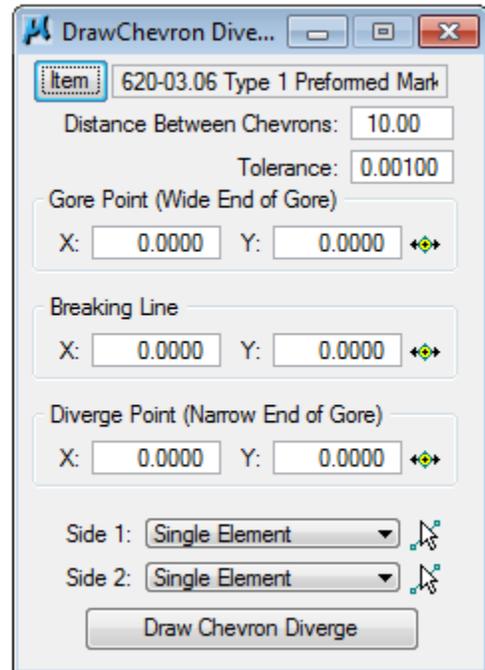
The **Gore** point defines the wide end of the gore.

The **Breaking Line** point must fall between the two sides of the gore and sets the location of the point at which the chevron diverts in a different direction.

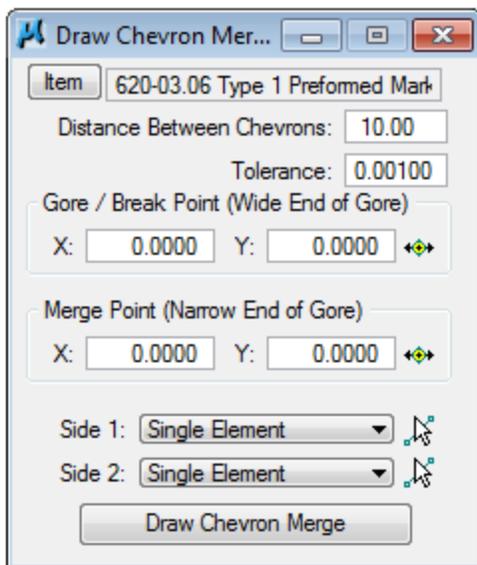
The **Diverge Point** represents the narrow end of the gore where chevrons are to stop.

Use the two **Side 1** and **Side 2** buttons similarly to the Draw Separation tool to identify the sides of the gore.

Once the **Draw Chevron Diverge** button is selected, the chevrons are displayed.



3.5.6.5 CHEVRON MERGE



This process works similar to Chevron Diverge except the two points, Gore Point and Breaking Line, have been combined into one **Gore/Break Point** that serves both functions.

The **Gore/Break Point** should be located near the wide end of the chevron. It simultaneously sets the beginning of the pavement markings and the point at which the chevron will break.

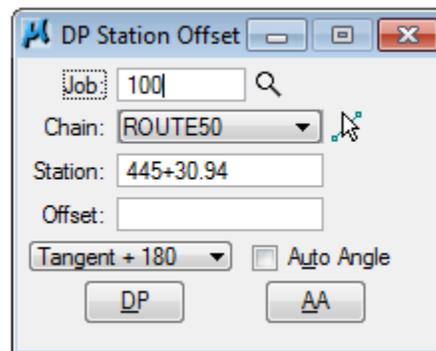
The **Merge Point** set up works similar to the Diverge Point.

The remainder of the process is as described above.

3.6 DP Station/Offset



The **DP Station/Offset** command works in conjunction with Microstation commands and the D&C Manager. It can be used as the *data point* for any Microstation command. **DP Station/Offset** provides precision placement of elements based on a station and offset of a stored chain. Uses for this command include precision placement of elements and window functions.

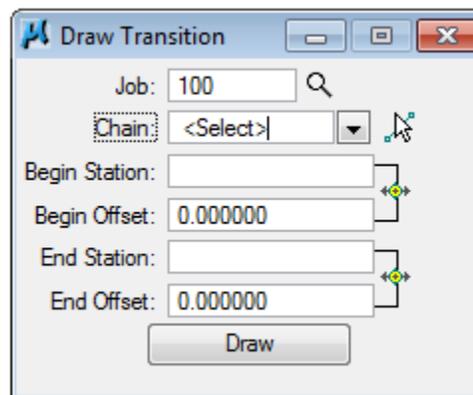


3.7 Draw Transition



Draw Transition will draw a line/curve based on a beginning station/offset and an ending station/offset relative to a selected chain. Use of this command includes turn lanes, mail box widening and lane transitions.

Note: Elements placed with **Draw Transition** will have Microstation element type **curve** when the beginning and ending offsets are different and will have Microstation element type **line** and/or **arc** when the beginning and ending offsets are the same.



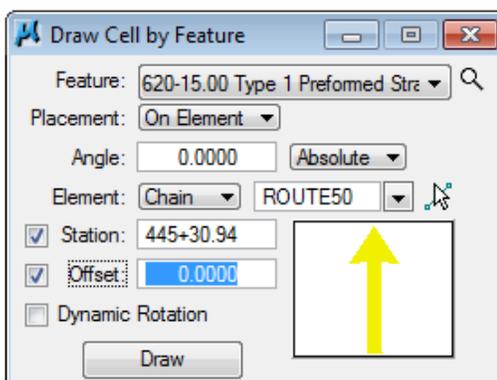
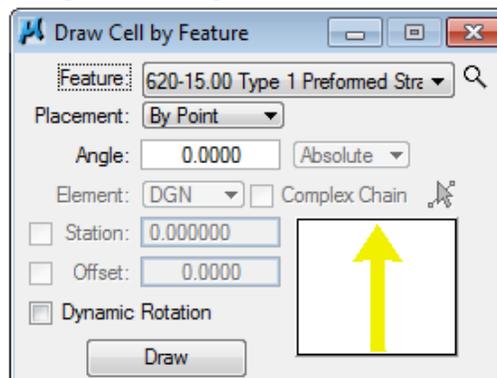
3.8 Draw Cell By Feature



Draw Cell By Feature will place cells stored in the D&C Manager pay items with the precision of a Station/Offset input.

The user selects the Feature from the D&C Manager. The tool offers two settings for placement: **On Element** or **By Point**. If **By Point** is chosen, the user has only the options of setting the active **Angle** and **Dynamic Rotation** available. However, if **On Element** is selected, the user has additional options. The Angle can be set up **Relative** to the chain/element or **Absolute**. With the Element method of **Chain** selected, the user can select a chain stored in the active GPK file and check the **Station** and **Offset** toggles to place the cell.

If a GPK is not available, the user can set the **Element** method to **DGN** and select a complex chain or an element from the DGN file. If the Dynamic



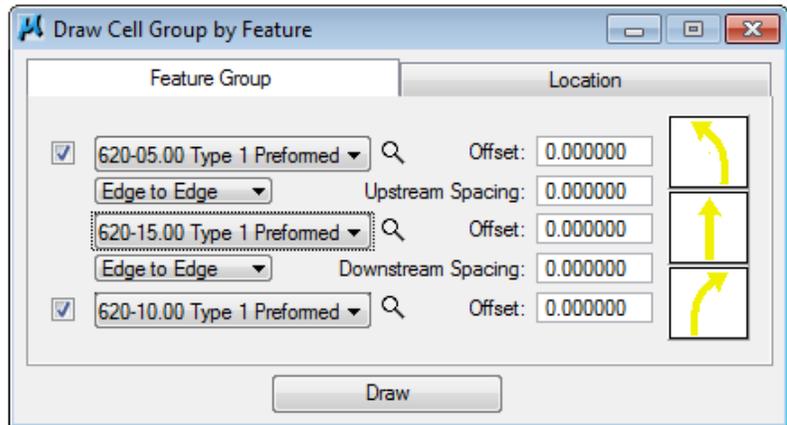
Rotation is checked on, it will override the active angle. Once all the settings are set, select the **Draw** button to place the cell.

3.9 Draw Cell Group By Feature

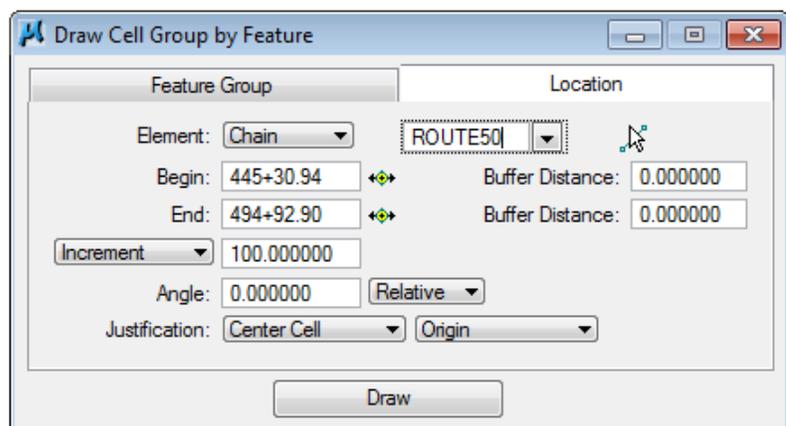


Similarly, the Draw Cell Group By Feature combines the precision of a Station/Offset input with the features stored in the D&C Manager. This dialog consists of two tabs: **Feature Group** and **Location**.

The **Feature Group** tab defines the features and the offsets to be used for placing the cells based on a reference chain or element set in the **Location** tab. The tool allows for placement of cell groups in up to three different rows simultaneously. If placing groups of cells in more than one row, the user must check the appropriate toggles. Offsets are measured from the graphic element or chain defined on the **Location Tab**. The upstream and downstream spacing can be measured from origin to origin or from edge to edge of the cell. All cells are placed in a graphic group for easier manipulation.



The **Location** tab defines the reference chain element as well as the spacing of each cell within the group being placed. Both **Chain** and **Element** methods have the option for defining the begin/end placement. When using the **Chain** method, the user can enter the begin/end stations, but when using the **Element** method, the user must data point to define the begin/end stations.



The **Buffer Distance** is used for cases where the beginning station is known, but the user must maintain a certain distance inside that stationing. The tool offers several methods for spacing in between each cell within the group. The most commonly used are **Even** and **Increment**. The **Angle** can be set up relative to the chain or absolute. The tool also offers justification settings.

Once all the parameters are set in both the Feature Group and the Location tabs, select the Draw button to place cells.

3.10 Example 3-1

This example uses the GEOPAK Design and Computation Manager to draw the plan view items needed for the alignment of Big Horn Drive from the BIGHORN chain stored in the GPK file.

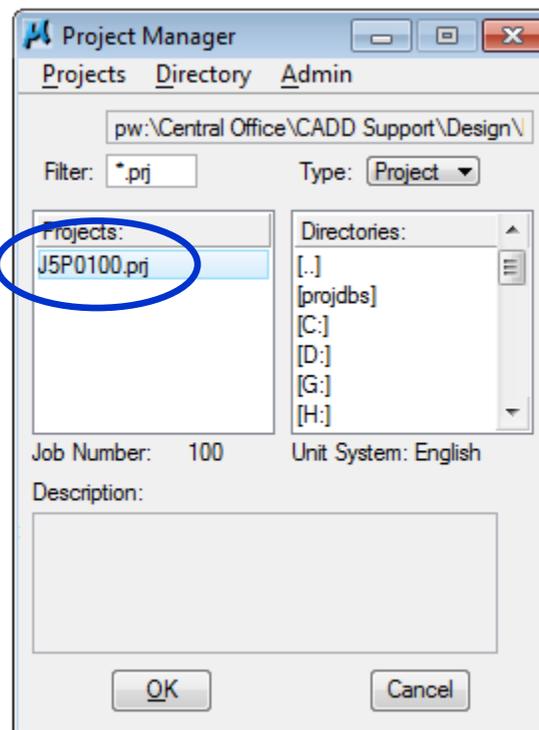
1. In ProjectWise, open the following MicroStation file:

pwname: \\MoDOT\Documents\District CADD\Design\Miller##\J5P0100\data\plan_j5p0100.dgn

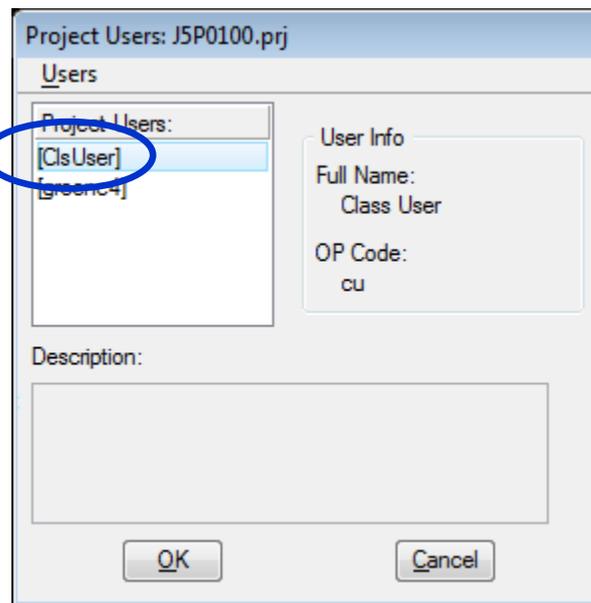
Save the file as **BH_plan_j5p0100.dgn**.

2. Click on the **Project Manager** icon and open the following GEOPAK project:

pwname: \\MoDOT\Documents\District CADD\Design\Miller##\J5P0100\project\j5p0100.prj



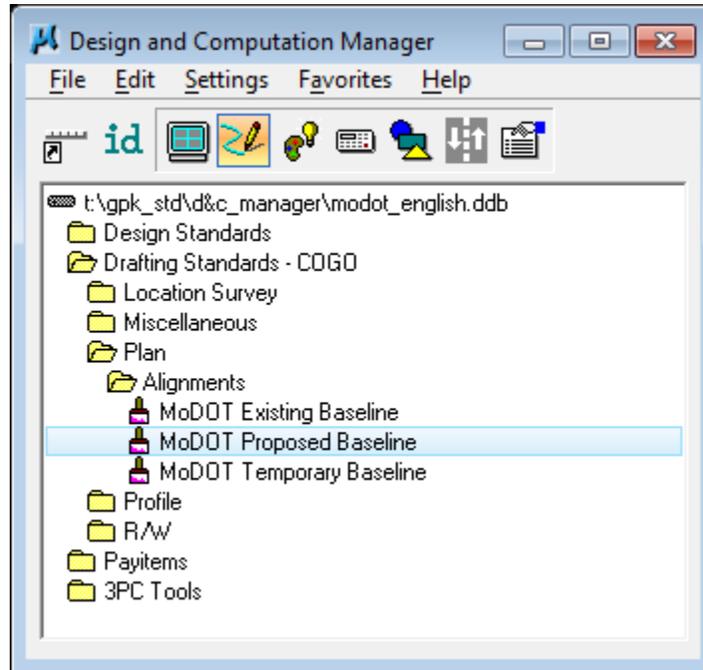
3. Enter the project as **ClisUser** for this exercise.



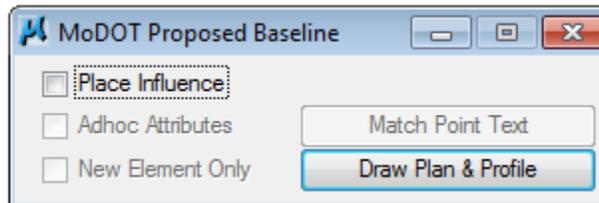
4. The first step is to draw the alignment. Open the **Design and Computation Manager** dialog.



5. Select the item **Drafting Standards-COGO/Plan/Alignments/MoDOT Proposed Baseline**



6. Select the **Draw Plan & Profile** button. Make sure "*place influence*" is unchecked.



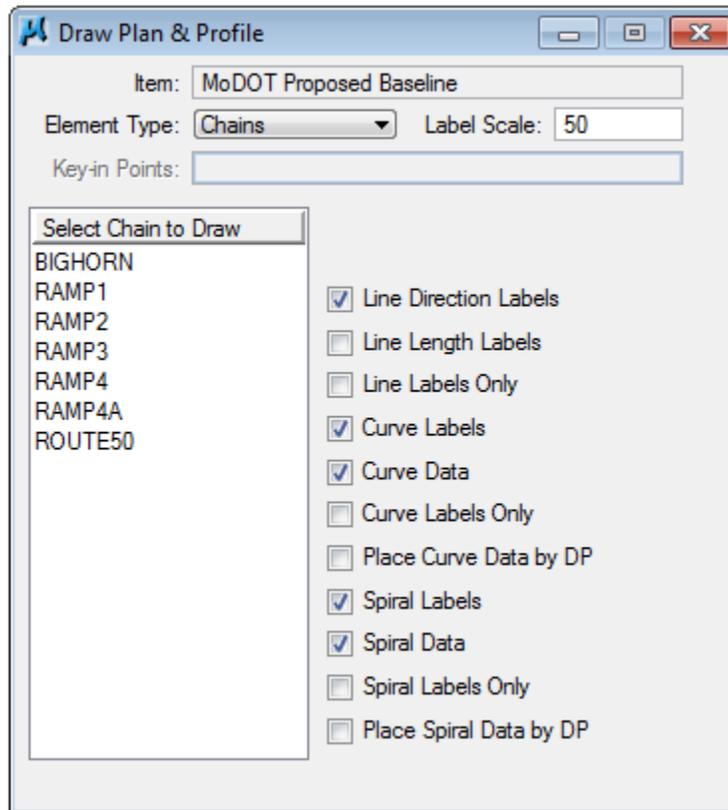
7. Select the **Chains** operation.

Set the **Label Scale** to **50**

Turn on the following options:

- Line Direction Labels**
- Curve Labels**
- Curve Data**
- Spiral Labels**
- Spiral Data**

Select the chain **BIGHORN** one time only.



8. Select the **Stationing** operation.

Be sure the **Labeling Scale** is set to **50**.

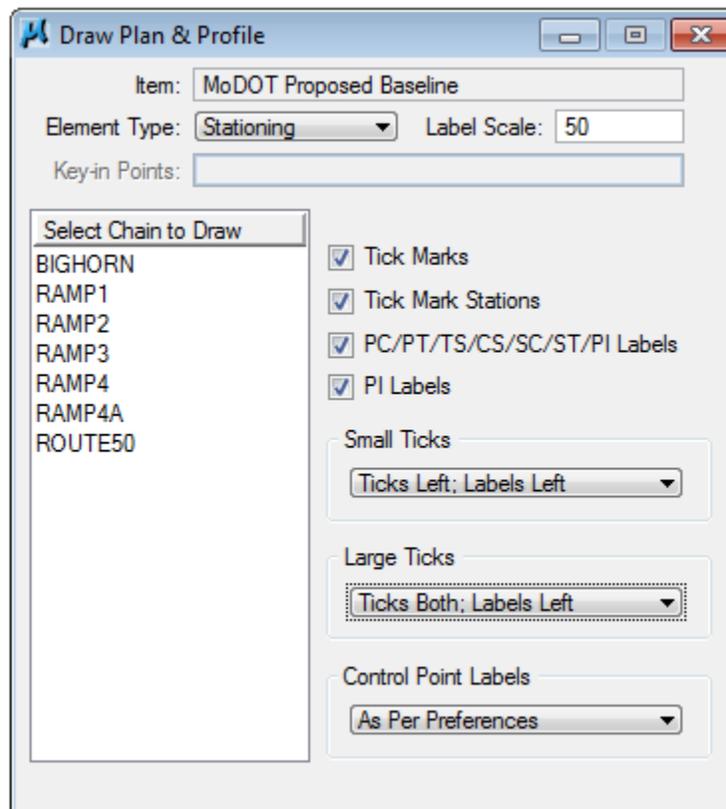
Turn on the following options:

Tick Marks
Tick Mark Stations
PC & PT & CS ... Labels
PI Labels

Set the following options:

Small Ticks: **Ticks LT, Labels LT**
Large Ticks: **Ticks Both, Labels LT**
Control Point Labels: **As Per Preferences**

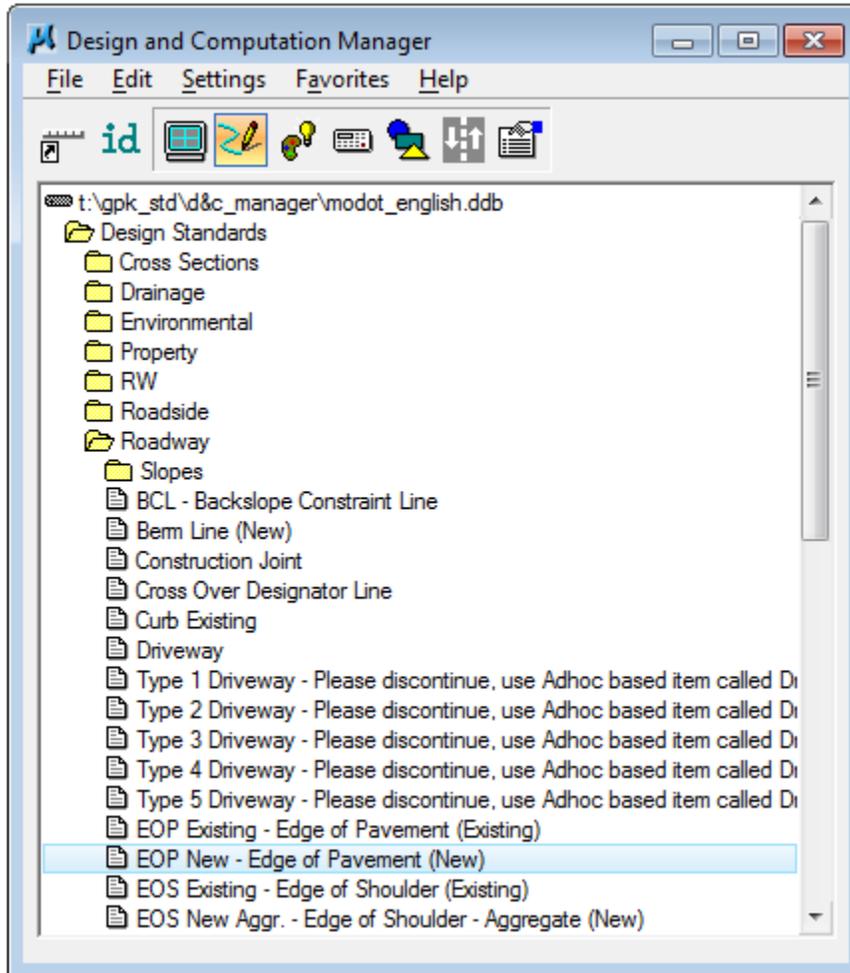
Select the chain **BIGHORN** one time only.



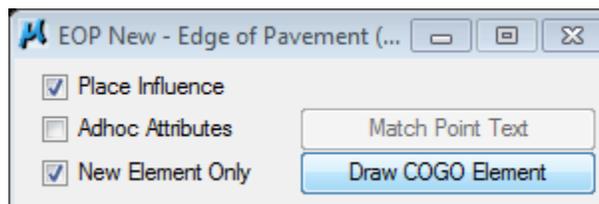
9. Now we will create the edges of pavement for **BigHorn** with the following parameters.

Use the **Design and Computation Manager** item:

Design Standards\Roadway\EOP New – Edge of Pavement (New).

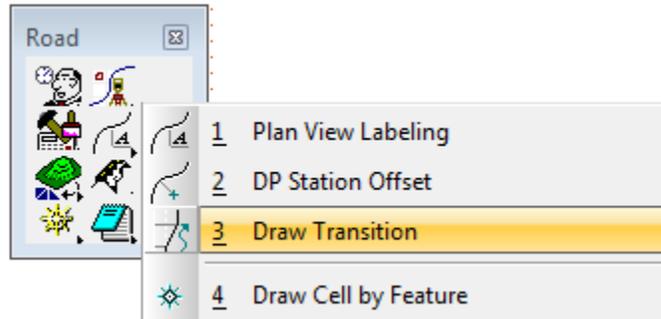


Be sure that **Place Influence** and **New Element Only** options are turned on.



Now activate the **Draw Transition** tool and create the pavement edges using the following settings:

Tip: A negative offset will go to the left side of the selected chain and positive offset will go to the right side of the selected chain.

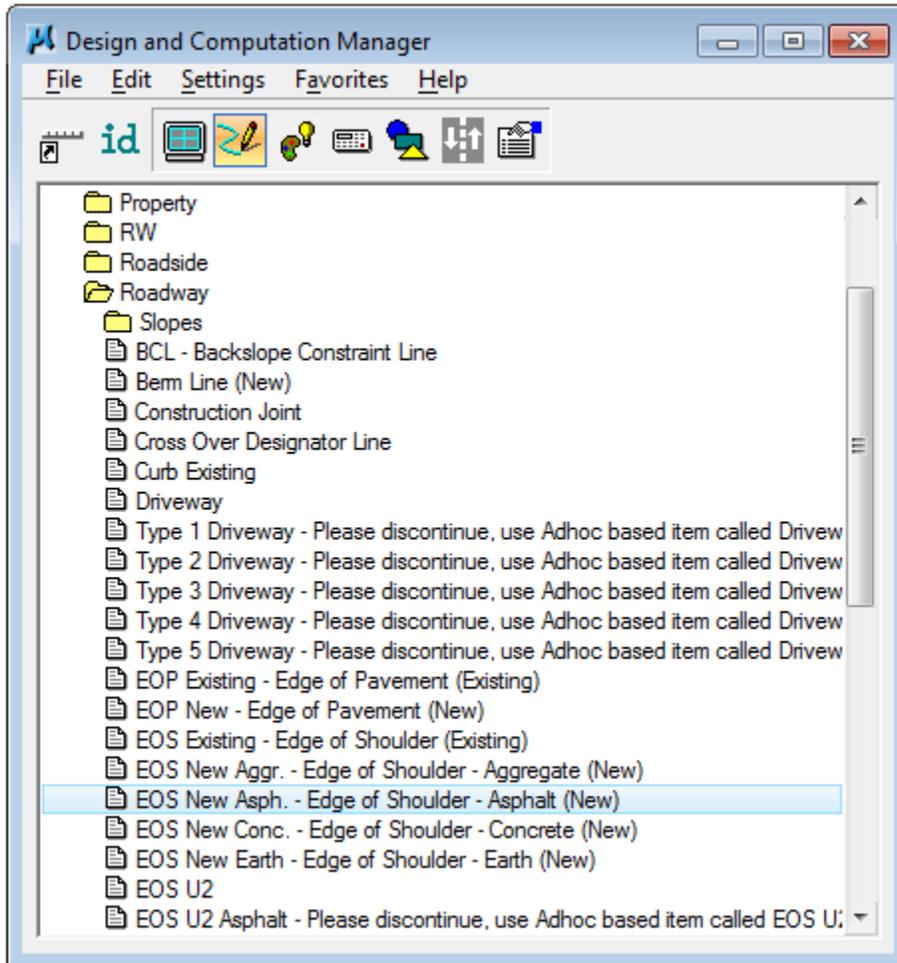


<u>Beginning Station</u>	<u>Beginning Offset</u>	<u>Ending Station</u>	<u>Ending Offset</u>
Start of Chain	-16	17+31.61	-16
Start of Chain	16	17+31.61	16
17+31.61	-16	19+31.61	-12
17+31.61	16	19+31.61	12
19+31.61	-12	End of Chain	-12
19+31.61	12	End of Chain	12

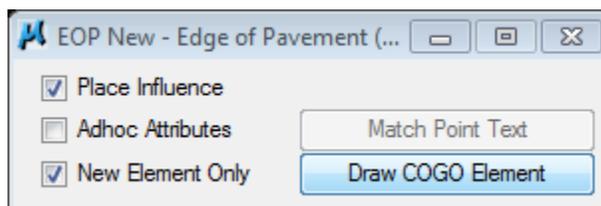
10. Use the **Draw Transition** tool to create the edges of shoulder for **BigHorn** with the following parameters.

Use the **Design and Computation Manager** item:

Design Standards\Roadway\EOS New Asph. – Edge of Shoulder - Asphalt (New).



Be sure that **Place Influence** and **New Element Only** options are turned on.



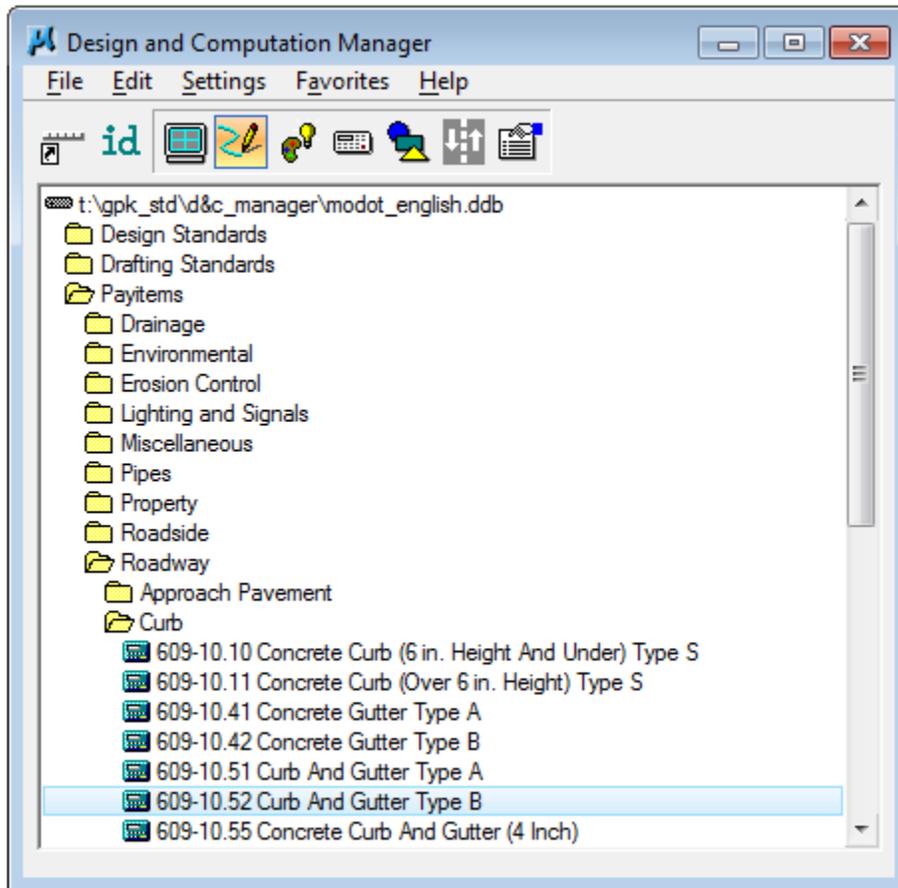
10. Cont. Use the following settings in the **Draw Transition** Tool:

<u>Beginning Station</u>	<u>Beginning Offset</u>	<u>Ending Station</u>	<u>Ending Offset</u>
17+31.61	-24	19+31.61	-20
17+31.61	24	19+31.61	20
19+31.61	-20	End of Chain	-20
19+31.61	20	End of Chain	20

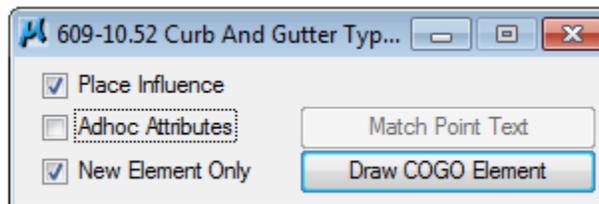
11. Again use the **Draw Transition** tool to draw the curb for **BigHorn** with the following parameters.

Use the **Design and Computation Manager** item:

Payitems\Roadway\Curb\609-10.52 Curb And Gutter Type B



Be sure that **Place Influence** and **New Element Only** options are turned on.

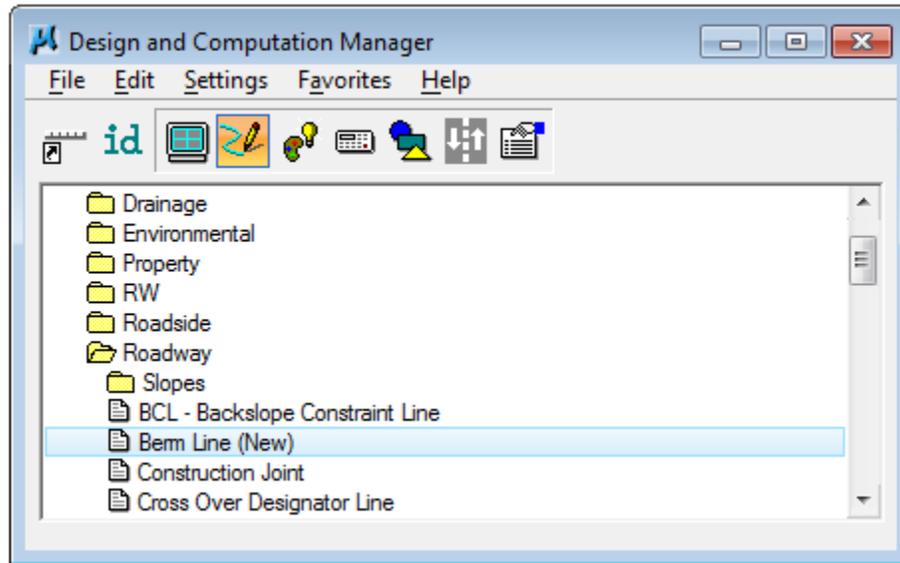


Use the following settings in the **Draw Transition** Tool:

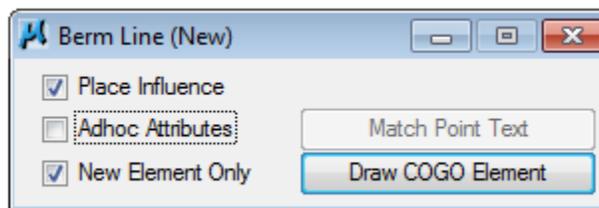
<u>Beginning Station</u>	<u>Beginning Offset</u>	<u>Ending Station</u>	<u>Ending Offset</u>
Start of Chain	-19	17+31.61	-19
Start of Chain	19	17+31.61	19

12. Use the **Draw Transition** tool to draw the edge of berm line behind the curb for **BigHorn** with the following parameters:

Use the **Design and Computation Manager** item: **Design Standards\Roadway\Berm Line (New)**



Be sure that **Place Influence** and **New Element Only** options are turned on.

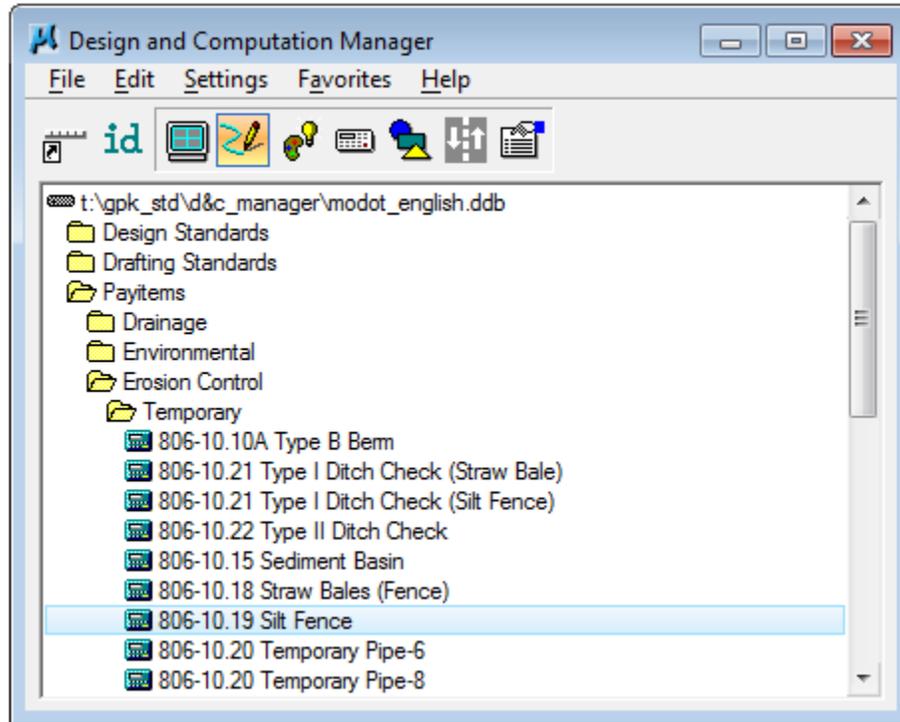


Use the following settings in the **Draw Transition** Tool:

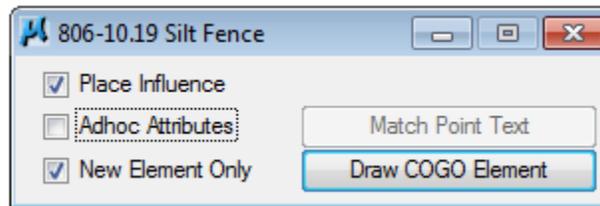
<u>Beginning Station</u>	<u>Beginning Offset</u>	<u>Ending Station</u>	<u>Ending Offset</u>
Start of Chain	-24	17+31.61	-24
Start of Chain	24	17+31.61	24

13. Use the **Draw Transition and D&C Manager** tools to draw a silt fence for **BigHorn** with the following parameters.

Use the **Design and Computation Manager** item:
Payitems\Erosion Control\Temporary\806-10.19 Silt Fence



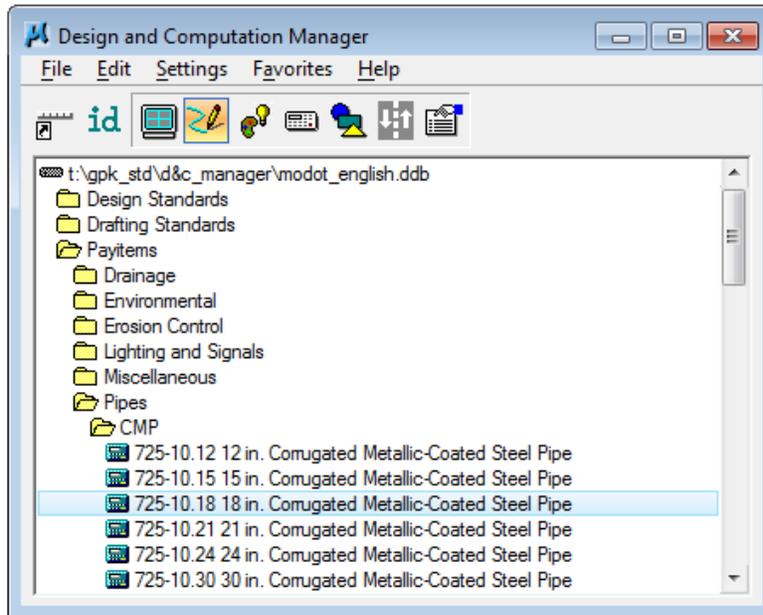
Be sure that **Place Influence** and **New Element Only** options are turned on.



Use the following parameters in the **Draw Transition** tool:

<u>Beginning Station</u>	<u>Beginning Offset</u>	<u>Ending Station</u>	<u>Ending Offset</u>
4+00	120	15+00	150
10+00	-150	5+00	-125

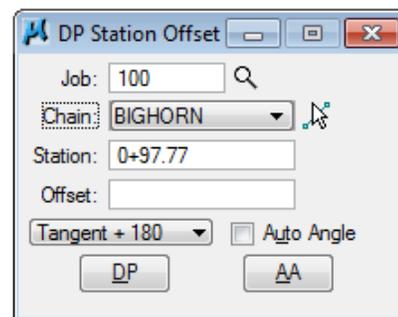
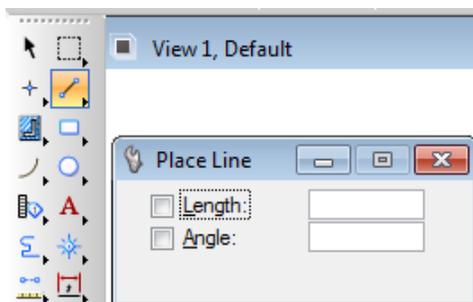
14. Use the **Design and Computation Manager** item:
Payitems\\Pipes\\CMP\\725-10.18 18 in. Corrugated Metallic-Coated Steel Pipe



Be sure that **Place Influence** and **New Element Only** options are turned on.

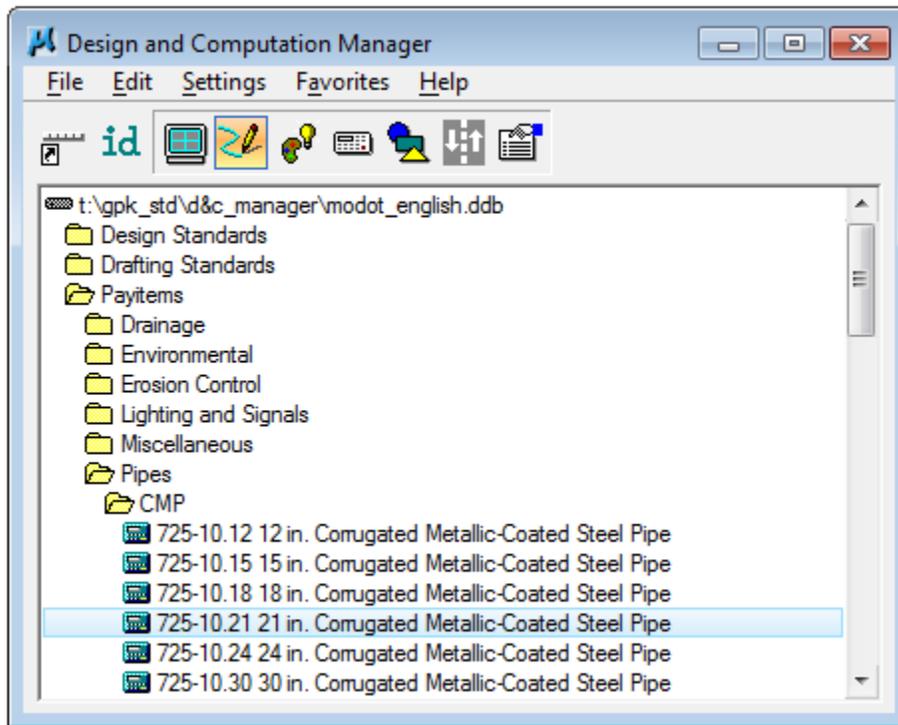


Activate the MicroStation **Place Line** or **Smartline** tool.
 Then use the following settings in the **DP Station/Offset Tool** to draw the pipe:



<u>From Station</u>	<u>Offset</u>	<u>To Station</u>	<u>Offset</u>
4+50	-50	6+75	50
10+00	-40	10+00	40

15. Use the same procedure to draw the 21 inch pipes.



<u>From Station</u>	<u>Offset</u>	<u>To Station</u>	<u>Offset</u>
14+00	-65	15+00	65

Save the changes to the DGN file.

3.11 Example 3-2

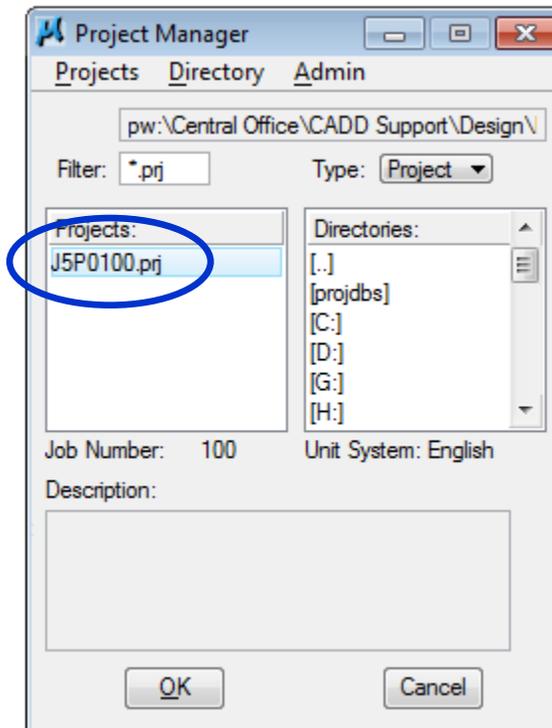
1. In ProjectWise, open the following MicroStation file:

pwname: \\MoDOT\Documents\District CADD\Design\Miller##\J5P0100\data\Plan_j5p0100.dgn

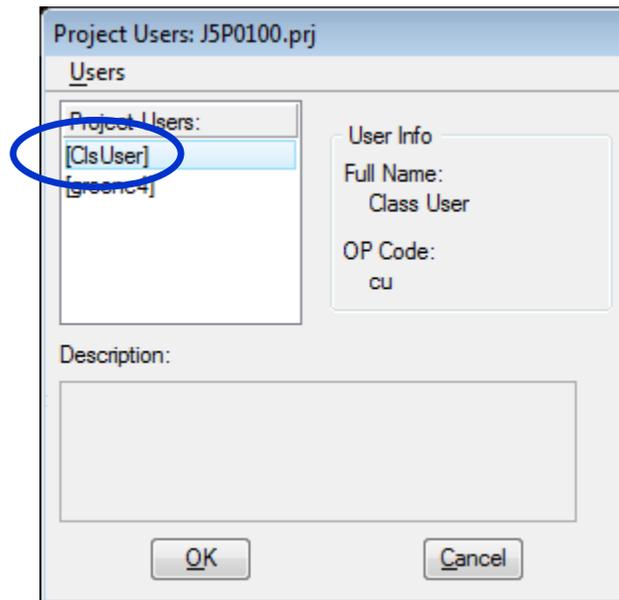
Save the file as **BH_plan_j5p0100.dgn**.

2. Click on the **Project Manager** icon and open the following GEOPAK project:

pwname: \\MoDOT\Documents\District CADD\Design\Miller##\J5P0100\project\j5p0100.prj



3. Enter the project as **ClsUser** for this exercise.

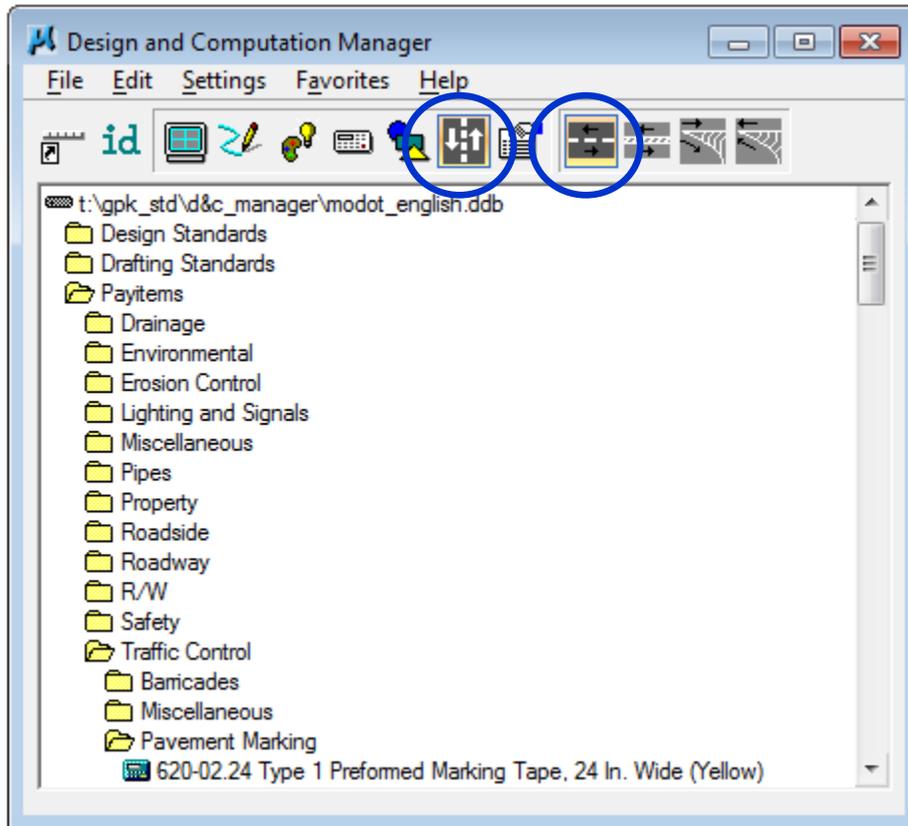


4. In the **Level Manager**, turn off all the levels except the two as shown below in the active file.

Roadway-Edge of Shoulder
Roadway-Curbs and or gutters

Then open the **Design and Computation Manager** to begin drawing the striping.

5. Select the **Pavement Marking** option in the D&C Manager.
Choose the **Draw Striping** option that is contained in the pavement marking tools.

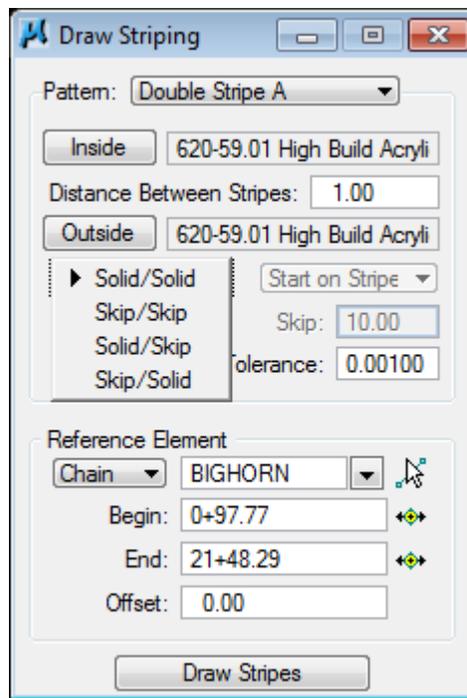
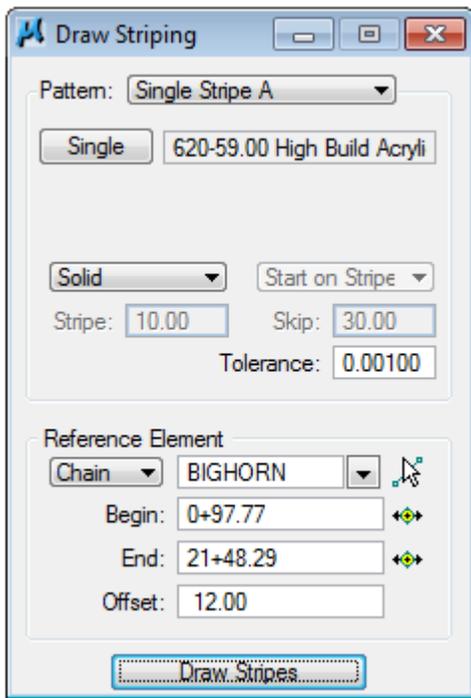


6. Draw the striping for BigHorn according to the **Draw Striping** dialog box and the other information provided below. The striping items are located under:

Payitems\Traffic Control\Pavement Marking

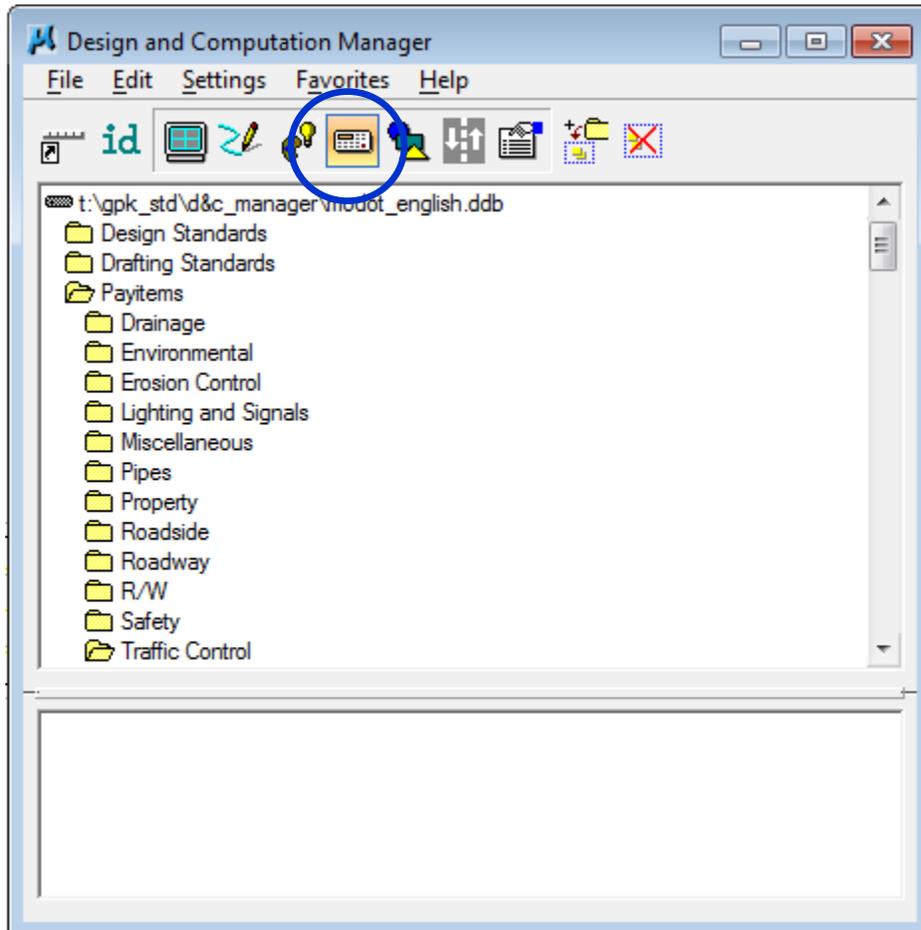
Also, the intermittent yellow strip for the centerline shall have a 10' stripe with a 30' skip.

Type	Striping	Station	Offset
Edgelines			
620-59.00 – 4” White	Solid	0+97.77 – 21+48.29	12’
Centerlines			
620-59.01 – 4” Yellow	Solid/Solid	0+97.77 – 5+00	0’
620-59.01 – 4” Yellow	Skip/Solid	5+00 – 10+00	0’
620-59.01 – 4” Yellow	Solid/Solid	10+00 – 15+00	0’
620-59.01 – 4” Yellow	Solid/Skip	15+00 – 21+48.29	0’



7. Now that we have the striping completed, we can get some quantities.

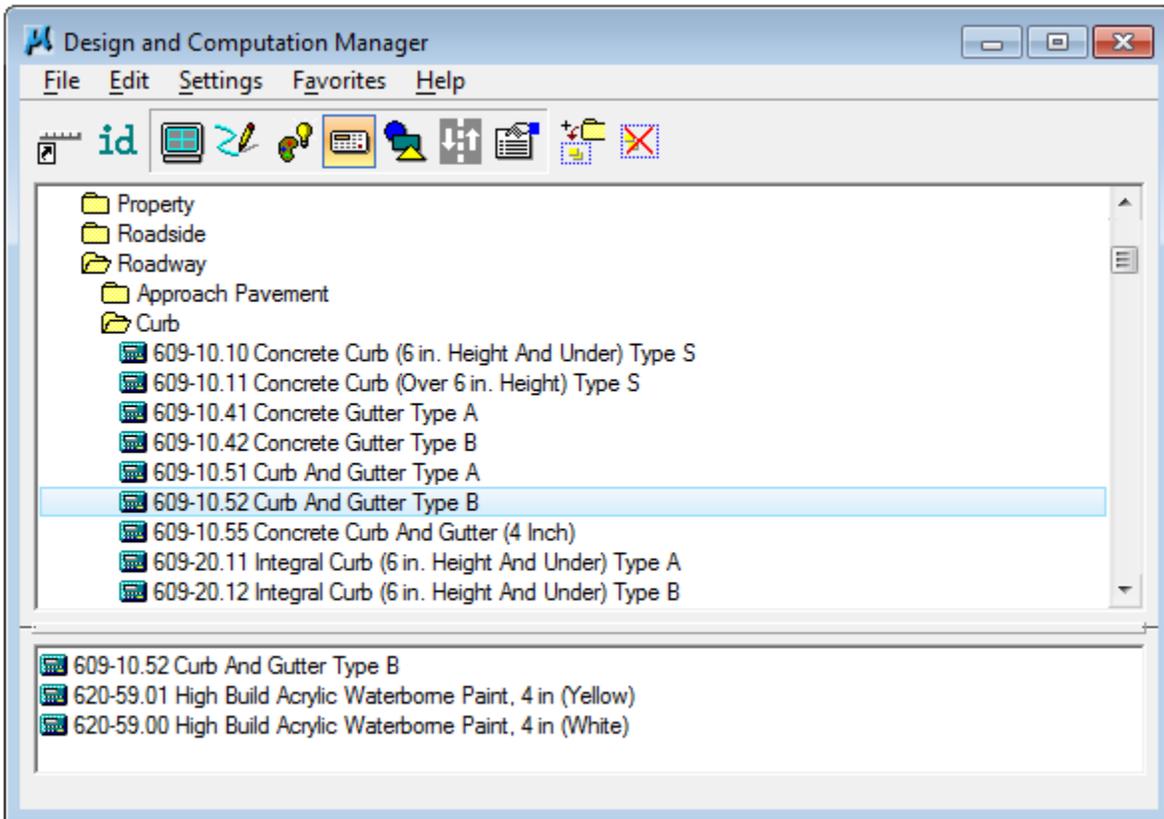
In the D&C Manager, select the **Compute** icon. This will load up the **Plan Quantity Computation**.



8. In the D&C Manager, navigate to the striping items used on BigHorn.

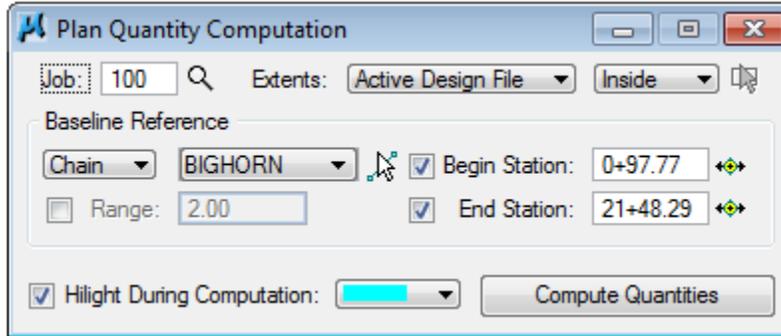
Double click on the **620-59.00 4” white** and **620-59.01 4” yellow** striping used for the BigHorn alignment.

Also select the **609-10.52 Type B Curb and Gutter** to be added to the collection list.

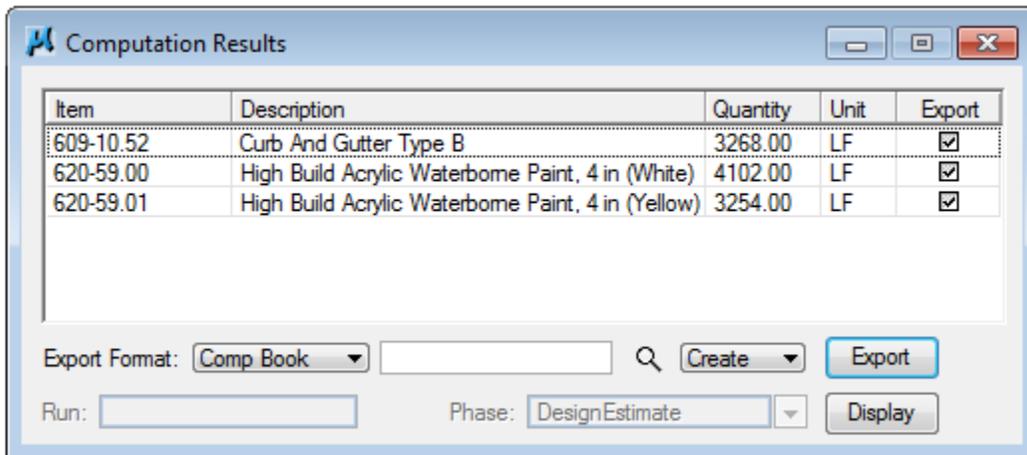


- Once the items have been select, fill out the Plan Quantity Computation dialog box just the way it looks as shown below.

Then click the **Compute Quantities** button.



Finally, the **Computation Results** box will appear and show you the quantity results for the BigHorn alignment.



3.12 Exercise 3-1

This example uses the GEOPAK Design and Computation Manager to draw the plan view items needed for the alignment of Route 50 from the ROUTE50 chain stored in the GPK file.

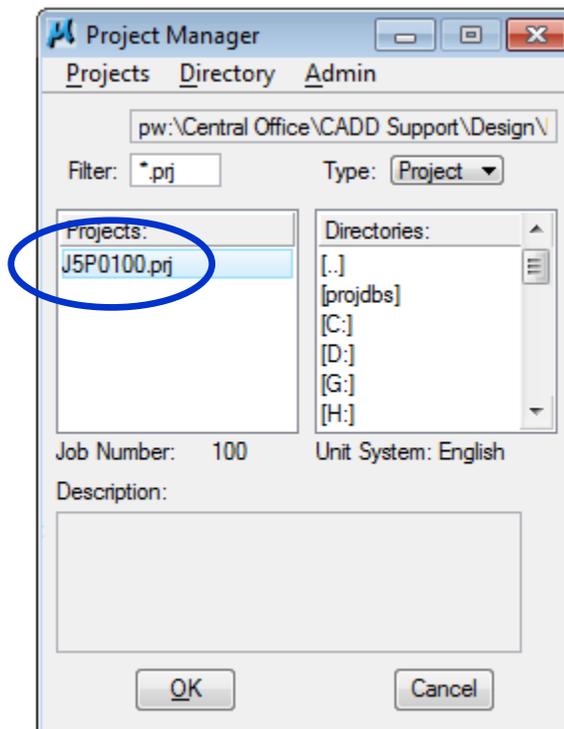
1. In ProjectWise, open the MicroStation file:

pwname: \\MoDOT\Documents\District CADD\Design\Miller##\J5P0100\data\plan_j5p0100.dgn.

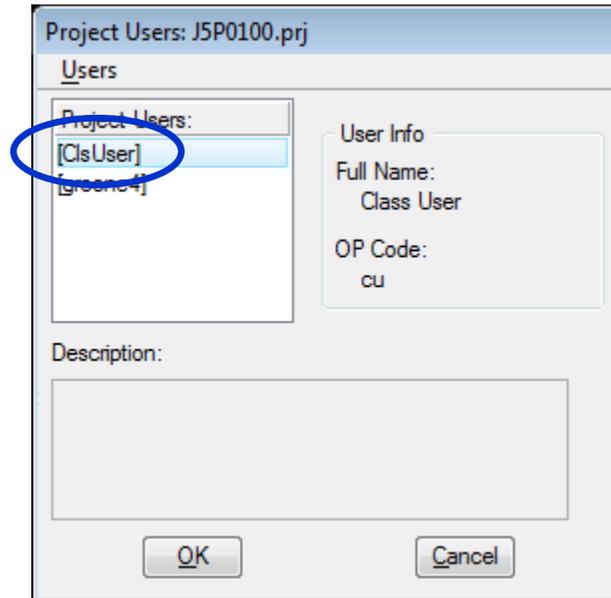
Save the file as rte50_plan_j5p0100.dgn.

2. Click on the **Project Manager** icon and open the following GEOPAK project:

pwname: \\MoDOT\Documents\District CADD\Design\Miller##\J5P0100\project\j5p0100.prj



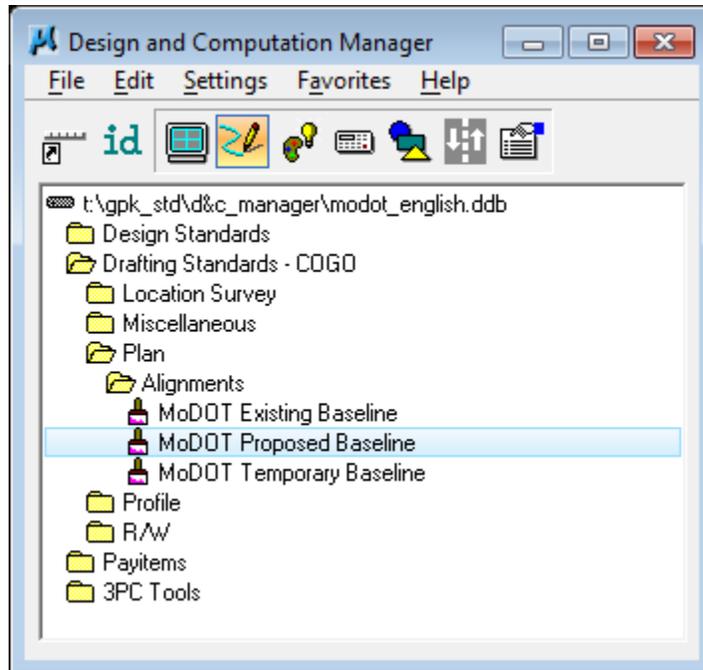
3. Enter the project as **ClsUser** for this exercise.



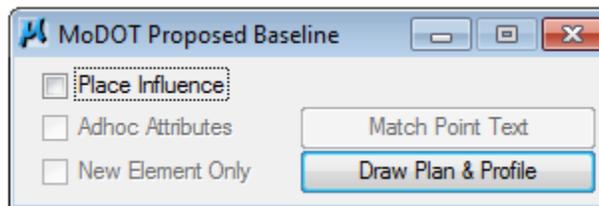
- The first step is to plot the alignment. Open the **Design and Computation Manager** dialog.

Select the item **Drafting Standards-COGO/Plan/Alignments/MoDOT Proposed Baseline**

Select the **Draw Plan & Profile** button.



Make sure *“place influence”* is unchecked.



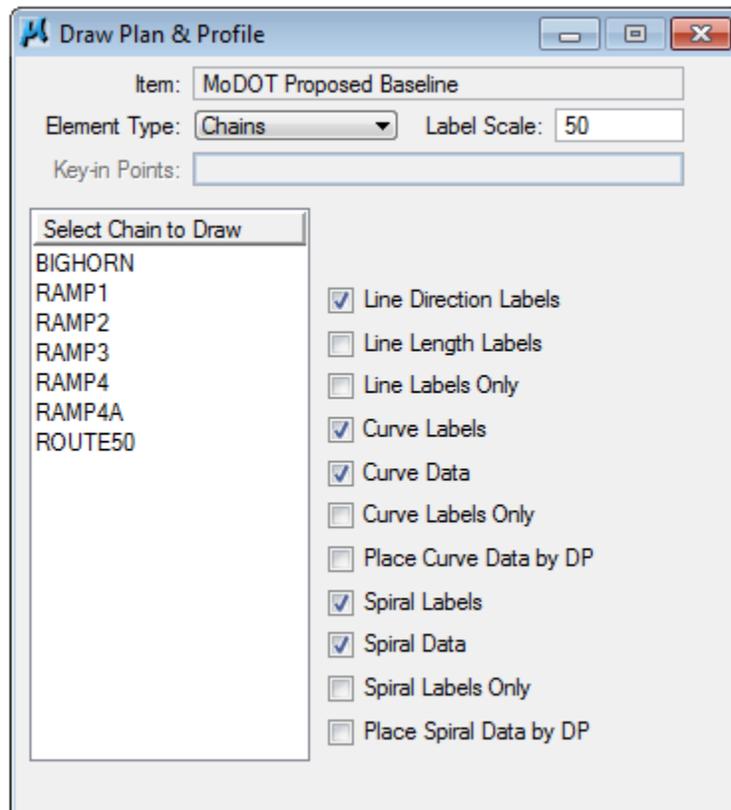
5. Select the **Chains** operation.

Set the **Labeling Scale** to **50**

Turn on the following options:

Line Direction
Curve Label
Curve Data
Spiral Label
Spiral Data

Select the chain **Route50** one time only.



6. Select the **Stationing** operation.

Be sure the **Labeling Scale** is set to **50**.

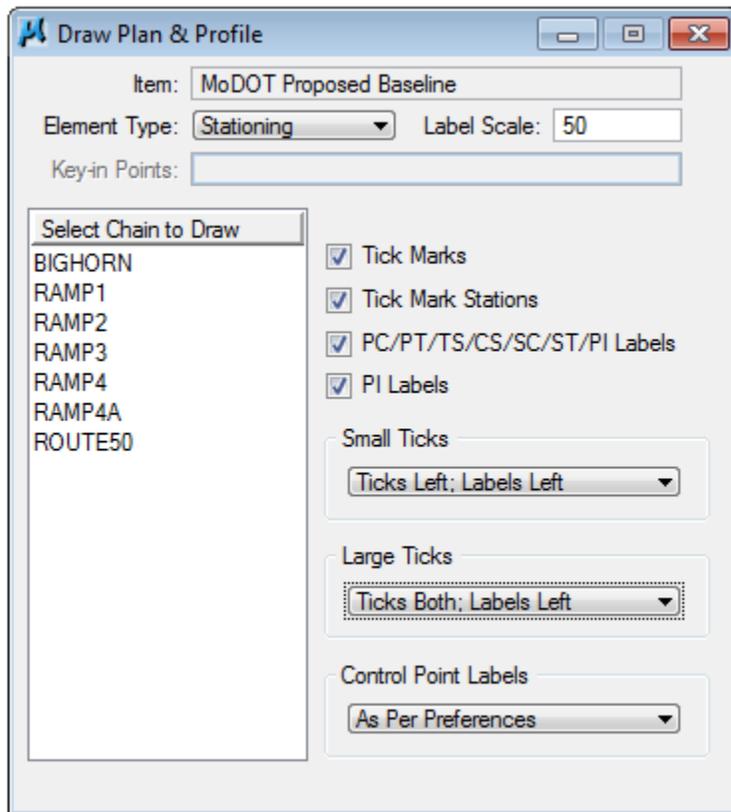
Turn on the following options:

- Tick Marks**
- Tick Mark Stations**
- PC & PT & CS ... Labels**
- PI Labels**

Set the following options:

- Small Ticks: **Ticks LT, Labels LT**
- Large Ticks: **Ticks Both, Labels LT**
- Control Point Labels: **As Per Preferences**

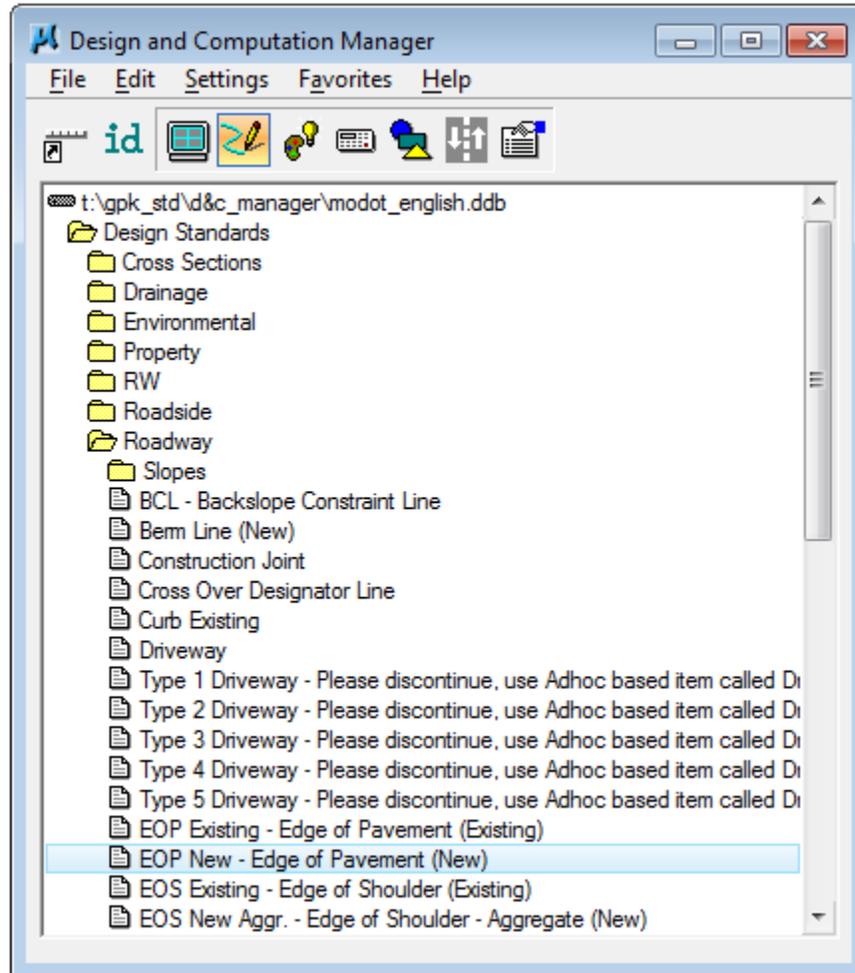
Select the chain **Route50** one time only.



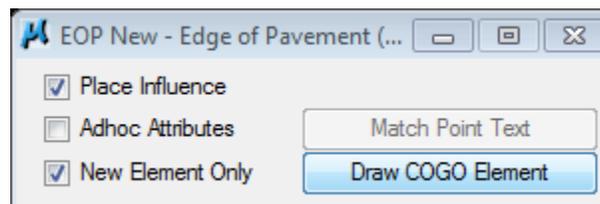
7. Now we will create the edges of pavement for **Route 50** with the following parameters.

Use the **Design and Computation Manager** item:

Design Standards\Roadway\EOP New – Edge of Pavement (New).



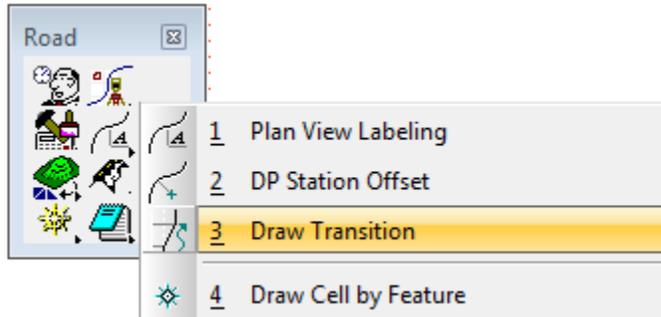
Be sure that **Place Influence** and **New Element Only** options are turned on.



7. Cont.

Activate the **Draw Transition** tool and create the pavement edges using the following settings:

Tip: A negative offset will go to the left side of the selected chain and positive offset will go to the right side of the selected chain.

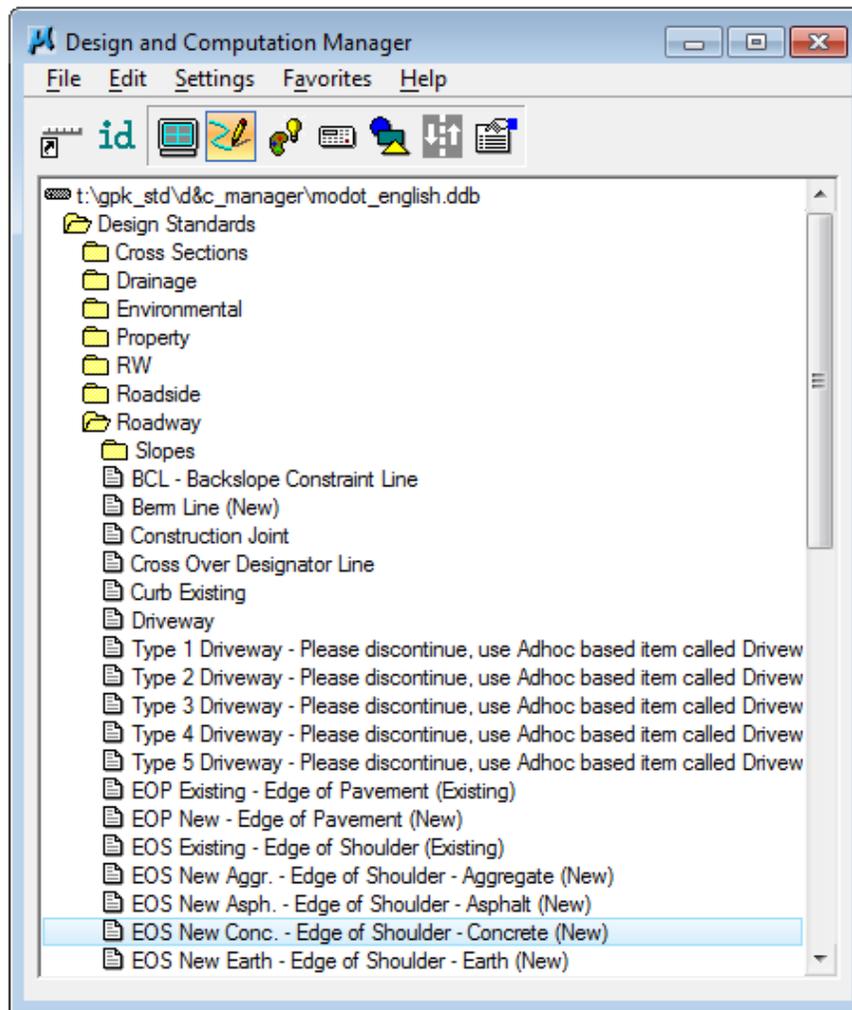


<u>Beginning Station</u>	<u>Beginning Offset</u>	<u>Ending Station</u>	<u>Ending Offset</u>
Start of Chain	-54	End of Chain	-54
Start of Chain	-30	End of Chain	-30
Start of Chain	30	End of Chain	30
Start of Chain	54	End of Chain	54

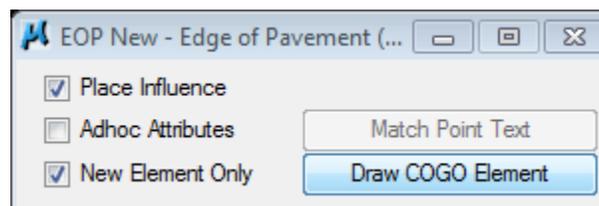
8. Use the **Draw Transition** tool to create the edges of shoulder for **Route 50** with the following parameters.

Use the **Design and Computation Manager** item:

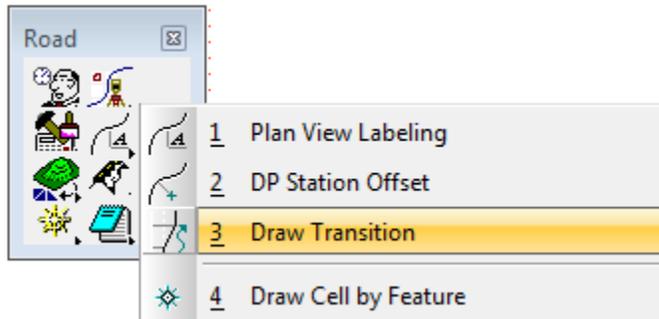
Design Standards\Roadway\EOS New Conc. – Edge of Shoulder - Concrete (New).



Be sure that **Place Influence** and **New Element Only** options are turned on.



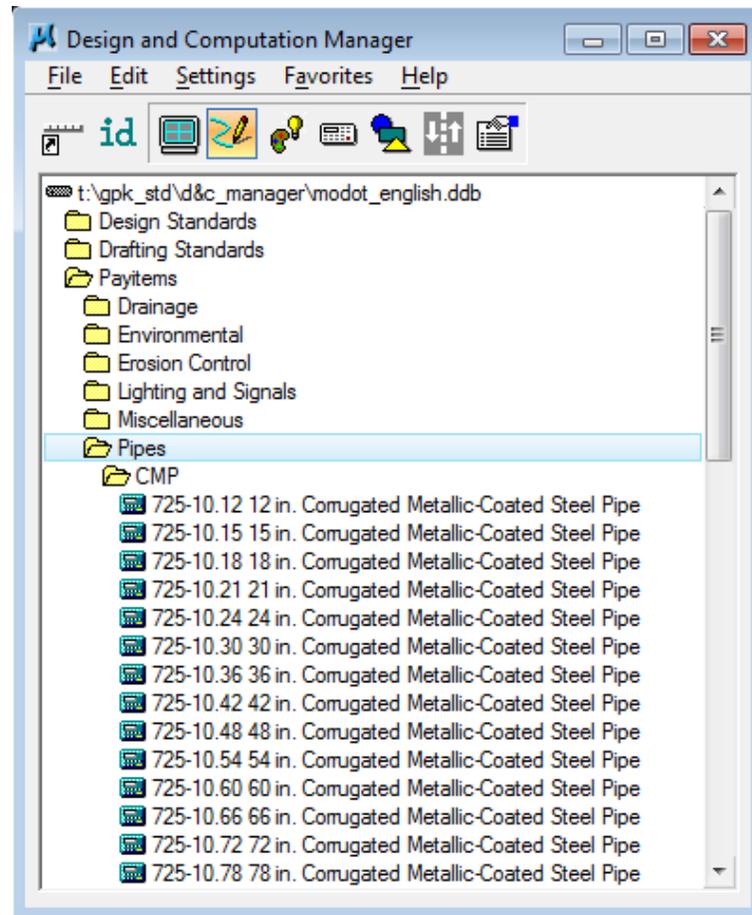
8. Cont.



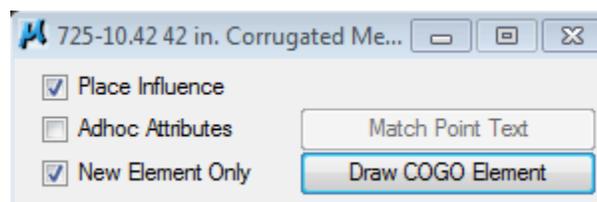
Use the following settings in the **Draw Transition** Tool:

<u>Beginning Station</u>	<u>Beginning Offset</u>	<u>Ending Station</u>	<u>Ending Offset</u>
Start of Chain	-64	End of Chain	-64
Start of Chain	-26	End of Chain	-26
Start of Chain	26	End of Chain	26
Start of Chain	64	End of Chain	64

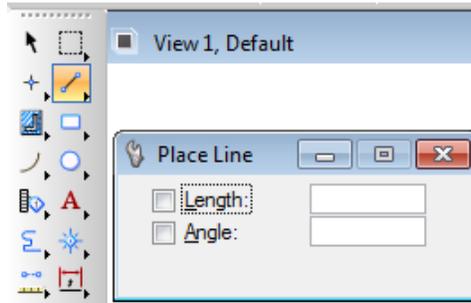
9. Next we will place some pipes in the drawing using the following **Design and Computation Manager** item:
Payitems\\Pipes\CMP\725-10.42 42 in. Corrugated Metallic-Coated Steel Pipe



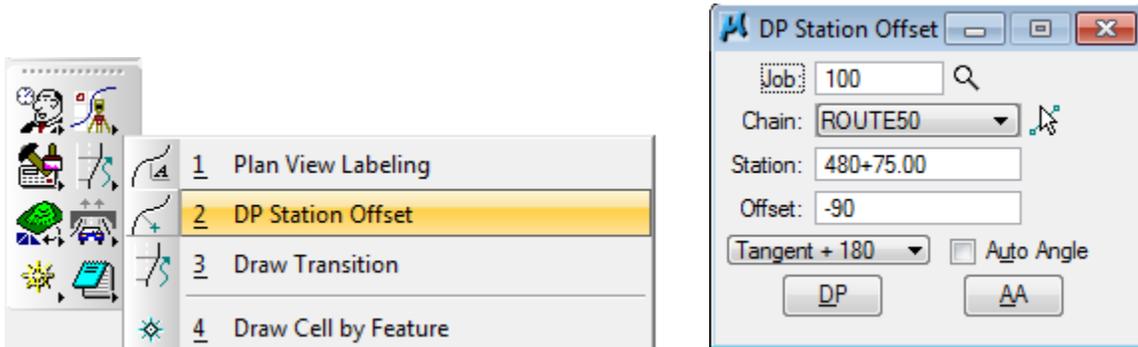
Be sure that **Place Influence** and **New Element Only** options are turned on.



9. Cont. In MicroStation, activate the **Place Line** or **SmartLine** tool.



Then activate the **DP Station/Offset Tool** and use the following settings below to draw the 42” pipe in the file:



<u>From Station</u>	<u>Offset</u>	<u>To Station</u>	<u>Offset</u>
454+00	130	456+00	-120

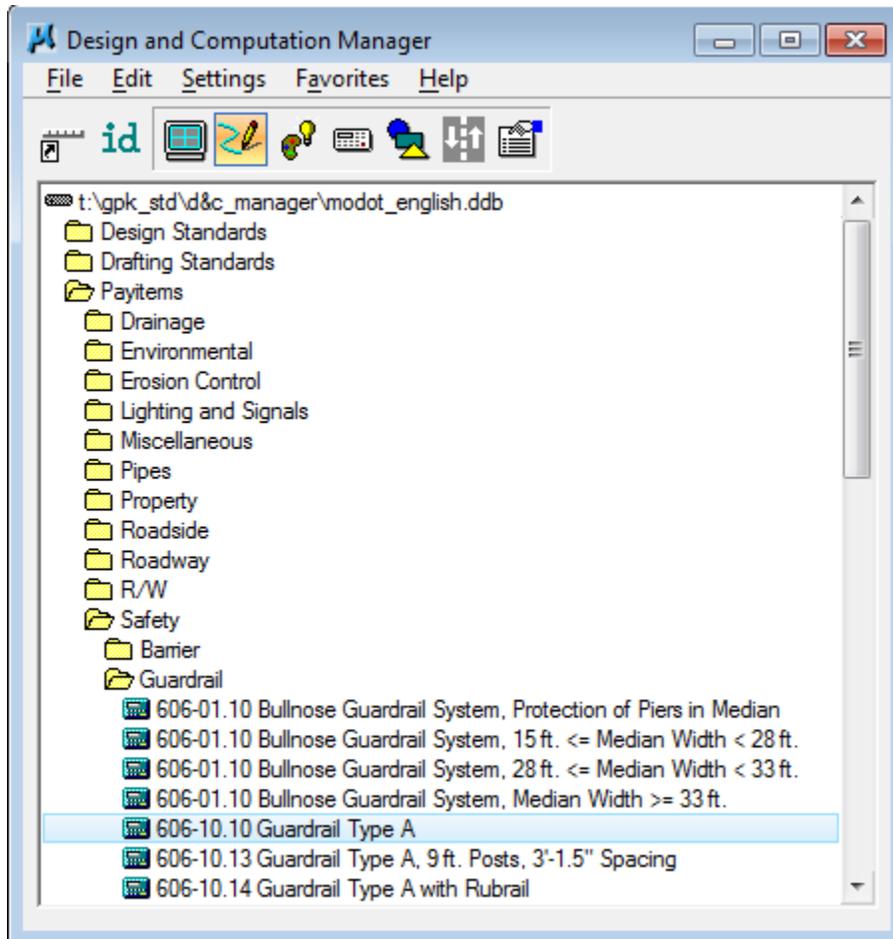
10. Use the same procedure in the previous step to draw the **72 inch** pipe.

<u>From Station</u>	<u>Offset</u>	<u>To Station</u>	<u>Offset</u>
480+00	110	480+75	-90

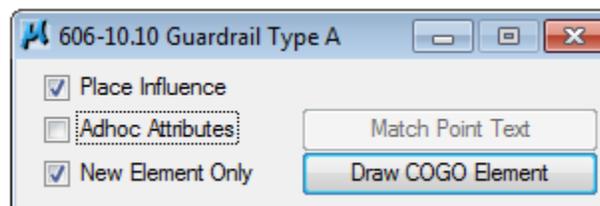
11. Finally, we will create the guardrail that will be installed on Route 50 using the following parameters below:

Use the **Design and Computation Manager** item:

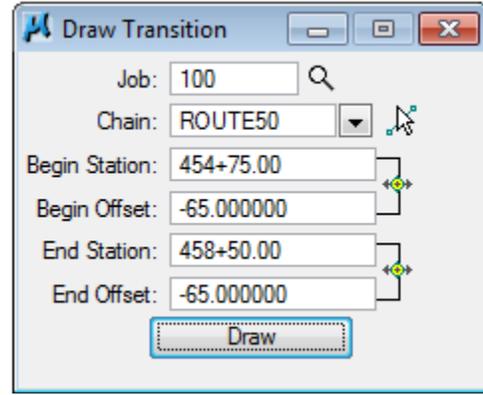
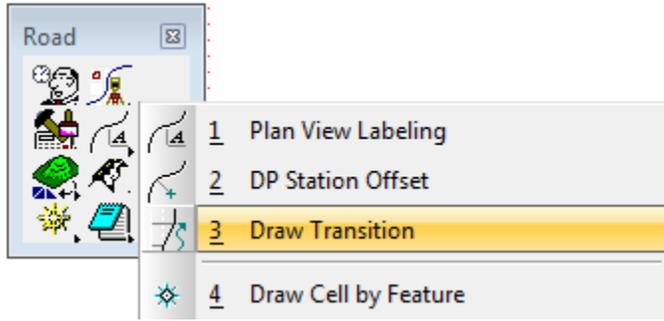
Payitems\Safety\Guardrail\606-10.10 Guardrail Type A



Be sure that **Place Influence** and **New Element Only** options are turned on.



11. Cont. Now activate the **Draw Transition Tool** and draw in the guardrail using the following settings:



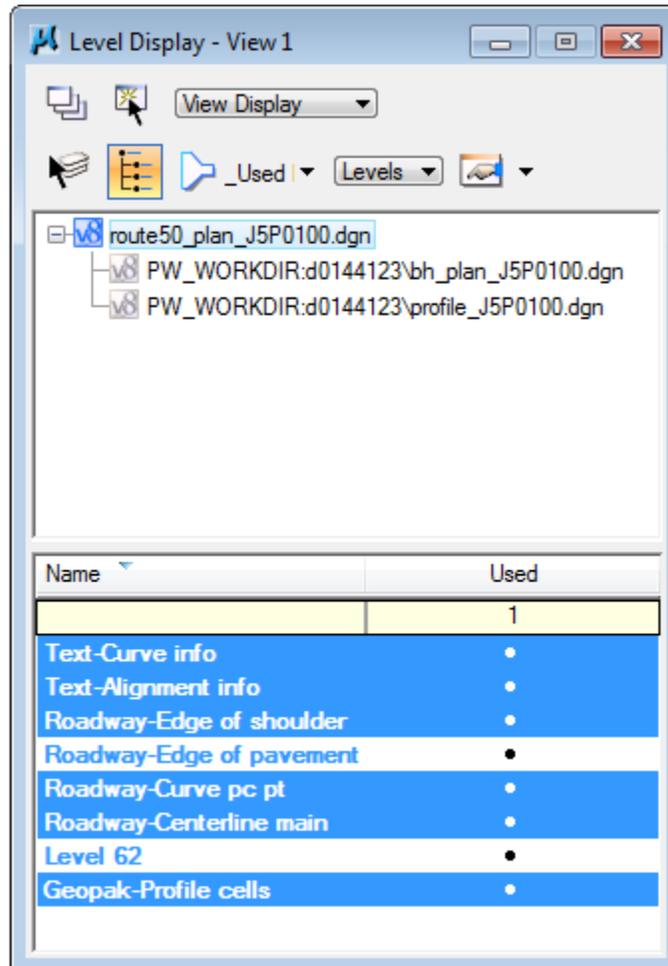
<u>Beginning Station</u>	<u>Beginning Offset</u>	<u>Ending Station</u>	<u>Ending Offset</u>
454+75	-65	458+50	-65
455+50	65	452+00	65
479+50	-65	483+00	-65
481+00	65	477+50	65

Save the changes to the DGN file.

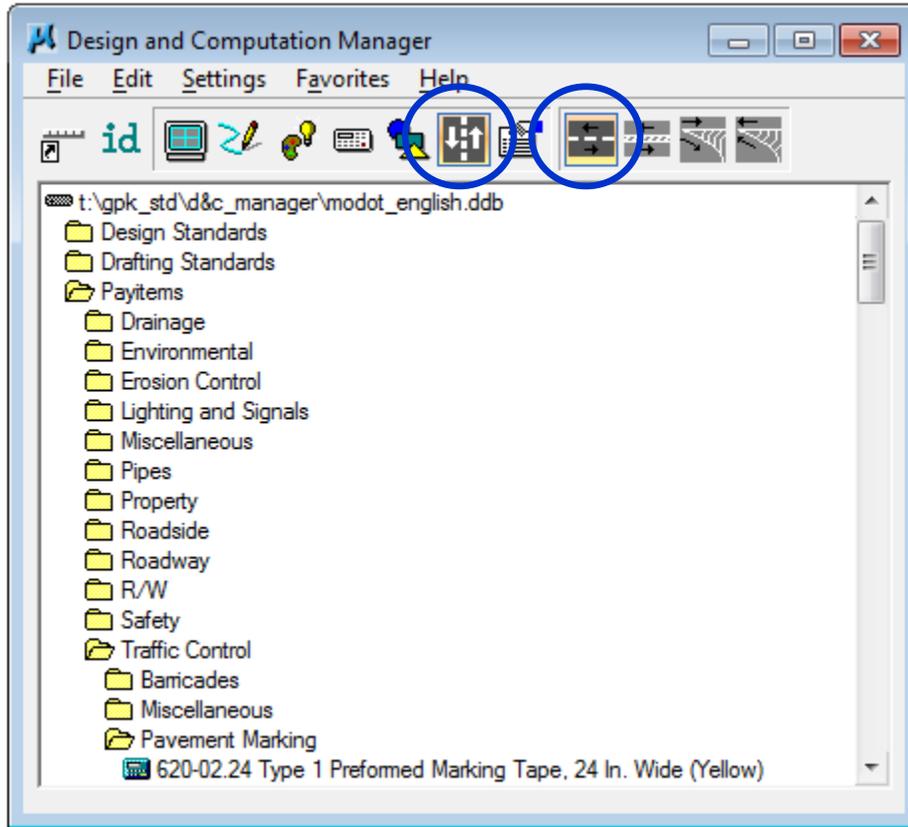
3.13 Exercise 3-2

1. Stay in the file you currently have opened, which should be:
 pwname: \\MoDOT\Documents\District CADD\Design\Miller##\J5P0100\data\rte50_plan_j5p0100.dgn

2. In the **Level Manager**, turn off the level called **Roadway-Edge of Pavement** in the active file. Then open the **Design and Computation Manager** to begin drawing the striping.



3. Select the **Pavement Marking** option in the D&C Manager then select the **Draw Striping** that is contained in the pavement marking tools.

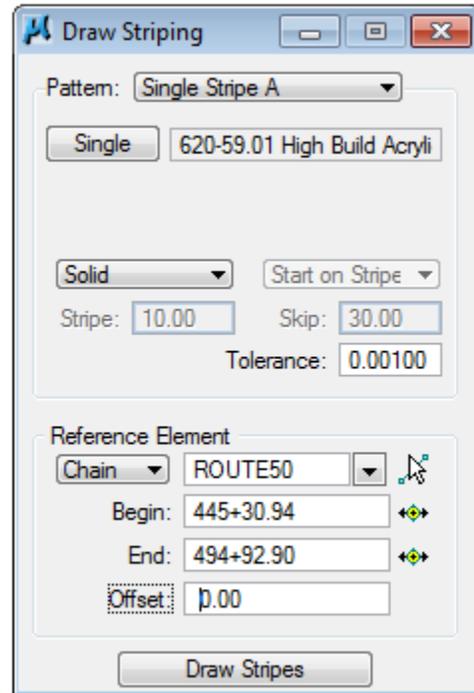


- Now go through and draw the striping for Route 50 according to the **Draw Striping** dialog box and the other information provided below. The striping items are located under:

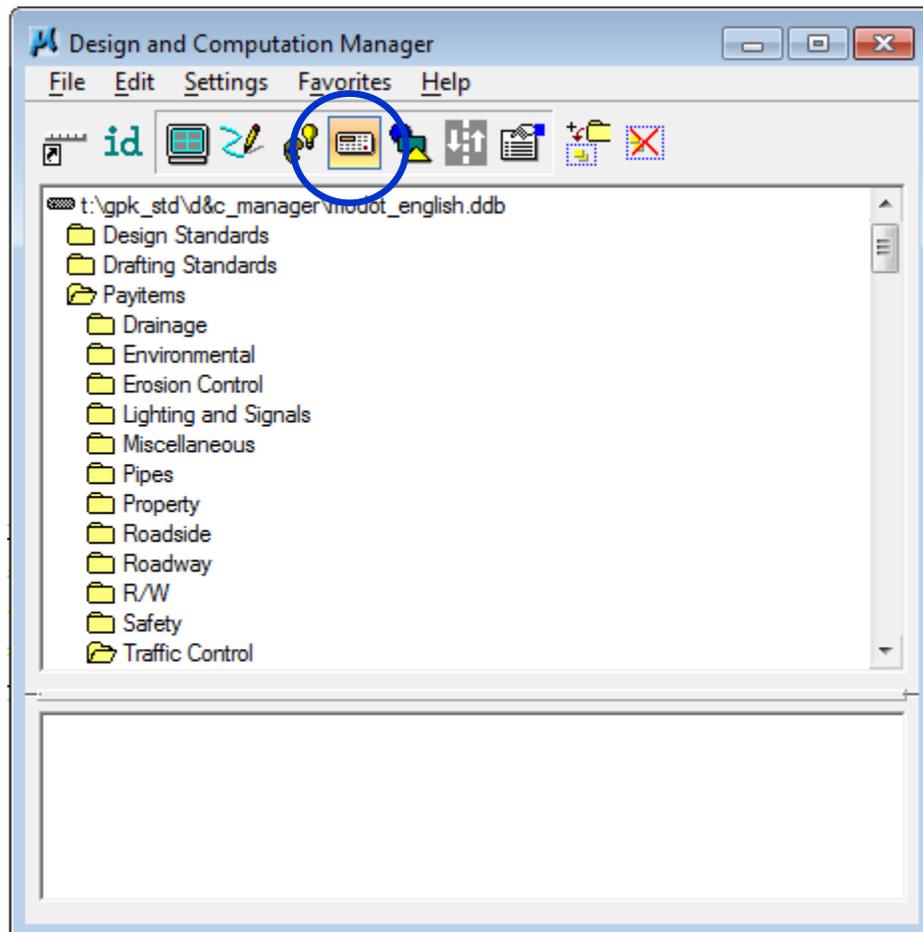
Payitems\Traffic Control\Pavement Marking

Also, the intermittent white strip for the centerline shall have a 10’ stripe with a 30’ skip.

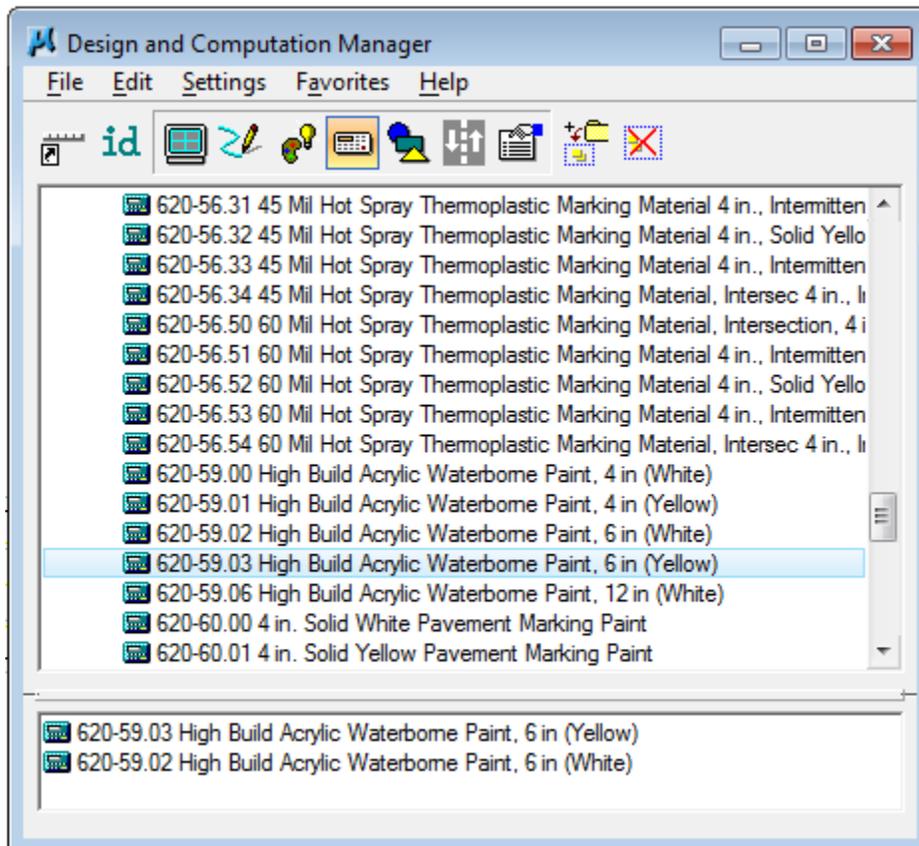
<u>Type</u>	<u>Striping</u>	<u>Offset</u>
620-59.03 – 6” Yellow	Solid	30’
620-59.02 – 6” White	Skip	42’
620-59.02 – 6” White	Solid	54’



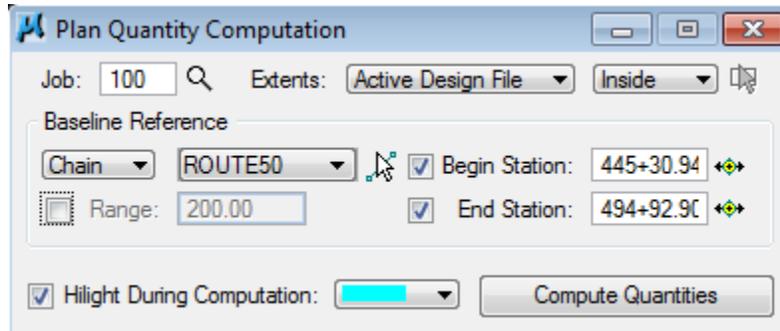
5. Now that we have the striping completed, we can get the quantities for the striping. In the **D&C Manager**, select the **Compute** icon. This will load up the **Plan Quantity Computation**.



6. In the D&C Manager, navigate down to the striping items used on Route 50. Then double click on the **6" white** and **6" yellow** strip used for the striping on Route 50. This will add the two items to be calculated when you compute the quantities.



7. In the **Plan Quantity Computation** dialog box, fill it out just the way it looks as shown below. Then click the **Compute Quantities** button.



Finally, the **Computation Results** box will appear and show you the pavement markings quantities for Route 50.

