Chapter 1

Introduction

1.1 Introduction

Roadway Designer is an InRoads 3D modeling tool for roadway design that has been incorporated into GEOPAK in the Bentley XM version for the same purpose. The GEOPAK version of Roadway Designer uses GEOPAK data such as alignments, profiles from your GEOPAK Coordinate Geometry (GPK), TIN models, and superelevation combined with dynamic templates to produce desired surfaces. The user can use all the GEOPAK data to create the desired surface models and still be able to cut traditional GEOPAK proposed cross sections. However, the cross sections become a by-product of the model.

For GEOPAK support, please contact the CADD Support Center.

File Names

GEOPAK Roadway Designer uses and/or creates files during the design process. The files you need to be familiar with are listed below:

job###.gpk This binary file is created when the user starts a coordinate geometry (COGO) session for the first time or through Project Manager and may be appended to during the design process. All coordinate geometry elements are stored in this file. Multiple users can access this file at the same time, and only one file should be created for each project. The "###" is the only variable in this name. It represents a job number (up to 3 alphanumeric characters) unique to a project and is defined by the user upon creation. MoDOT users should use the last 3 digits of the job number. Example J1P0999 -> job999.gpk

fname.**tin** A binary file containing triangular surfaces also known as the digital terrain model (DTM).

name.**dtm** This is the Digital Terrain Model in the InRoads format, a DTM includes stringlines representing the breaklines for each surface created, for instance you can have a DTM with the top surface model as well as the subgrade model

name.**rdp** This file contains all preferences for the Roadway Designer dialog box to be used for each user in the project, and should reside in the ProjectWise working directory. Many Roadway Designer Preference files can exist for each project.

project.**itl** This file is the Template Library containing all components, end conditions and templates available to use with the Roadway Designer Tool.

name.**ird** This file contains the entire corridor(s) design data, such as alignments, templates, transitions, superelevation, etc. use for the corridor. The “Roadway Design” file is a single user file. Many files can exist for the project.

cmjob###.**xml** This LandXML file is created during the process of importing GEOPAK coordinate geometry. The only variable in the name of this file is the ###, which are the last 3 digits of the job number (like the GPK file).

cmjob###.**alg** This binary file is created during the process of importing GEOPAK coordinate geometry. The only variable in the name of this file is the ###, which are the last 3 digits of the job number (like the GPK file).

1.2 Accessing GEOPAK Roadway Designer

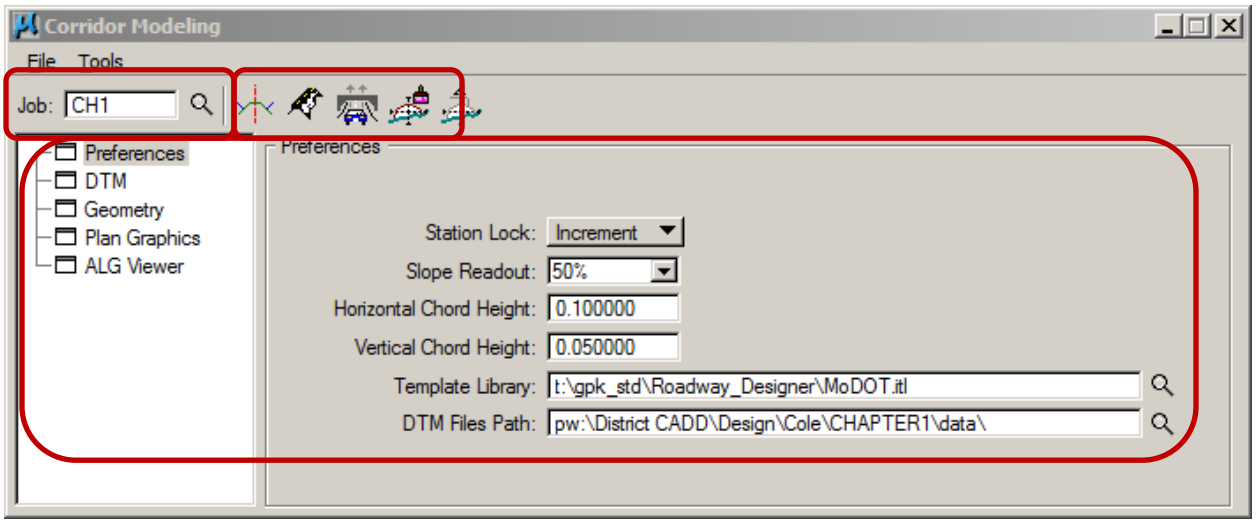
GEOPAK is started upon entering a MicroStation File. To verify that GEOPAK is active, scan the MicroStation menu bar where the Applications menu appears. Simply pull down **Applications > Activate Geopak**. Once GEOPAK is activated, the user can select the Roadway Designer through the pull down menus **Applications > GEOPAK > Road > 3DTools > Corridor Modeling** or via the road tool dialog.

1.3 Corridor Modeler Dialog Overview

The Corridor Modeler dialog box appears once the Corridor Modeler tool is selected. All GEOPAK User Preferences are honored within Roadway Designer. An additional directory is created the first time the Corridor Modeler tool is selected. This directory is called “rddbs” and it contains the necessary files Roadway Designer requires when importing GEOPAK data.

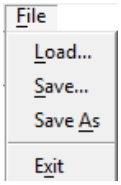
The Corridor Modeler Tool is used to access the Roadway Designer Tool. This dialog has three key areas.

- Selection of the GPK file
- Tool selection icons
- Tree view



Most of the settings in this dialog will be set when the project is setup. But the **Job** needs to be selected first. The user will select the browsing button and go the t: drive to select the appropriate coordinate geometry file (GPK).

1.3.1 Dialog Box Options

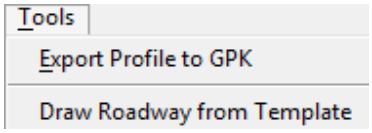


File options include **load, save, save as** Roadway Designer Preference (rdp) file into the dialog box

Exit – completely closes the dialog box.

1.3.2 Tool Options

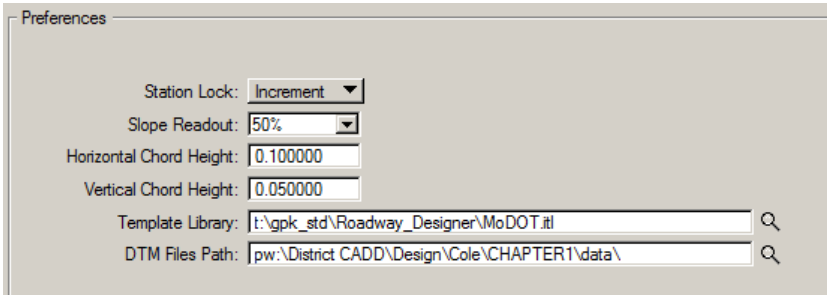
Export Profile to GPK allows the user to export overlay profiles created with Roadway Designer from the ALG to the GPK file.



Draw Roadway Template allows you to view different templates and select alignments.

1.3.3 The Preferences Tab

Once the **Job** has been selected, the user needs to set up the **Preferences Tab**. The preferences are: **Station Lock, Slope Readout, Horizontal Chord Height, Vertical Cord Height, Template Library and DTM Files Path**.



Station Lock: Can be set up as “even” or “increment”. The recommended setting is set to “even”. This setting applies to the station interval read out in a cross sectional view.

Slope Readout: Designates a particular format for expressing slope from the slope pulldown selections. The following list explains each format in the list.

Format	Represents slope as
0.50	A decimal value.
50%	A percentage value.
0.5:1	A decimal ratio in which the second value is always 1.
0.5':1'	A decimal ratio in which the second value is always 1, in units of feet.
6":1'	A ratio of inches against a value of 1 foot.
12/2":1'	A ratio of inches against a value of 1 foot, in which inches are expressed as a fraction whose numerator is 12.
24/4":1'	A ratio of inches against a value of 1 foot, in which inches are expressed as a fraction whose numerator is 24.
48/8":1'	A ratio of inches against a value of 1 foot, in which inches are

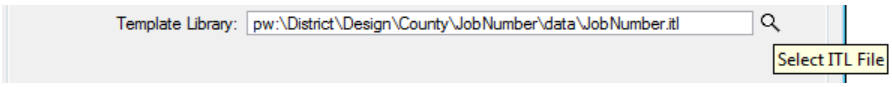
	expressed as a fraction whose numerator is 48.
96/16":1'	A ratio of inches against a value of 1 foot, in which inches are expressed as a fraction whose numerator is 96.
1:2.0	A decimal ratio in which the first value is always 1 (Ratio = 1/2.0)
500‰	A per mille value (per 1000) rather than a per cent value.
2.0:1	A decimal ratio given in run:rise format and in which the second value is always 1.

Horizontal Chord Height: Specifies the largest distance between a chord and the arc it subtends (middle ordinate). This parameter is used to control the number of points along a curve that are added during graphic display of spirals and horizontal circles. This parameter also affects the way surface breaklines are imported from graphics. A value of zero could prevent a surface breakline from being imported.

Vertical Chord Height: Specifies the largest distance between a chord and the arc it subtends (middle ordinate). This parameter is used to control the number of points along a curve while processing in Roadway Designer.

Template Library: Specifies the .itl file to be used for the project. The MoDOT Start Job tool will add this file to the project's working directory in ProjectWise for user to choose.

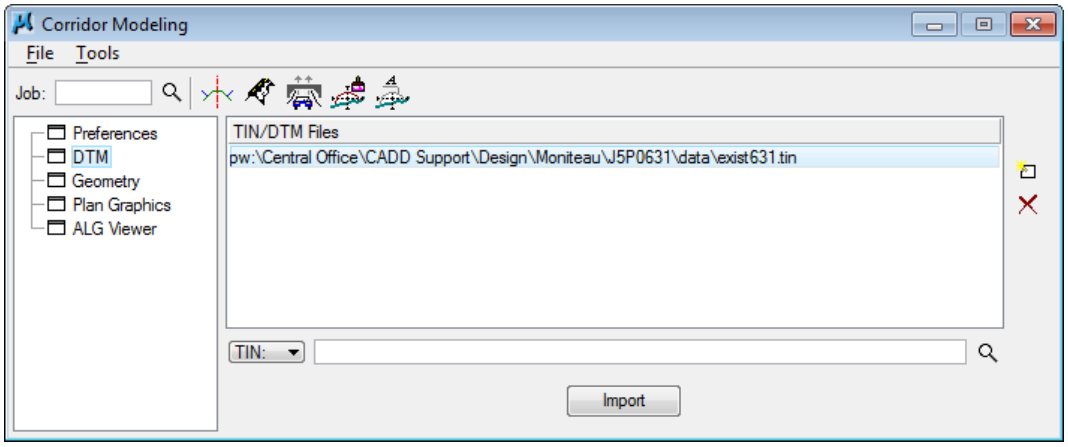
Click to search for and select a file.



DTM Files Path: when importing a DTM file, specifies the folder in which the DTM file will be created. If this preference is not defined, the DTM file is created in the same directory as the specified TIN file.

1.3.4 The DTM Tab

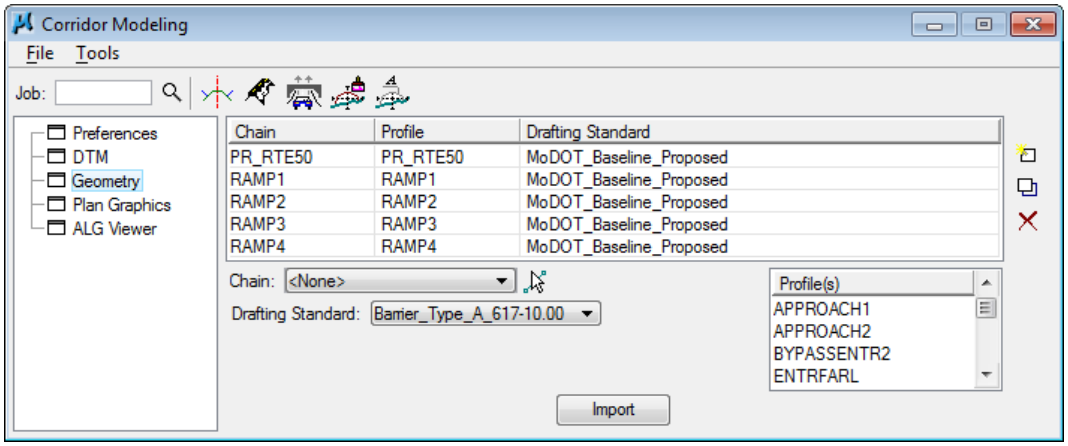
The **DTM Tab** is the area in which the user imports the GEOPAK TIN models to be used in Roadway Designer for the project. Multiple TIN models can be listed and imported to Roadway Designer.



This button allows the user to browse for the desired TIN(s) to use in the project.
This button allows the user to add the selected TIN to the list box.
This button allows the user to delete or remove a TIN model from the list.

1.3.5 The Geometry Tab

The Geometry tab is the area in which the user imports all the GEOPAK chains and profiles from the GPK to use in Roadway Designer.

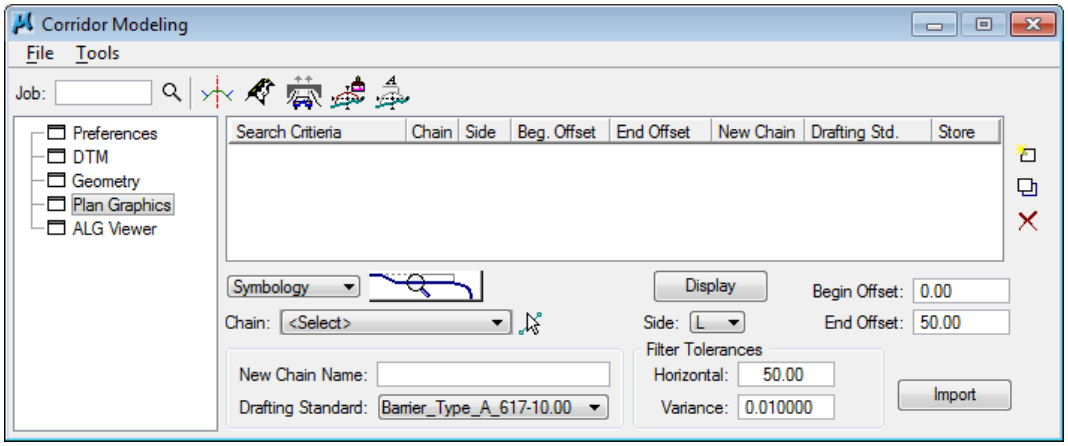


The bottom portion of this tab allows the user to select the geometry information to be added to the list box above to be imported into Roadway Designer. The user has the ability to either add chains alone or chains and profiles combinations. Each Chain to be added to the Roadway Designer MUST have a Design Standard associated with it for Roadway Designer to use in the model.

Again, the items to the right of the dialog are used to add , modify or delete items from Roadway Designer.

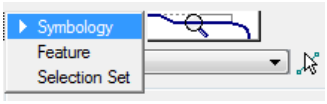
1.3.6 The Plan Graphics Tab

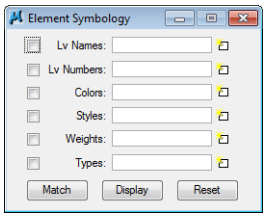
Because Roadway Designer converts all plan graphics into chains, all geometry used in the plan view drawings must be imported into Roadway Designer. This tab is the area in which to perform that task.



The bottom portion of the tab is where the user selects the search criteria parameters to select plan graphics from a Microstation Design (dgn) file. There are three methods to select elements to add to the search criteria list box**: Symbology, Feature, and Microstation Selection Set.**

Selection by Symbology: Users must specify the symbology of the desired elements in the dialog box for Roadway Designer to select to add to the search criteria.

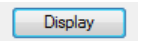




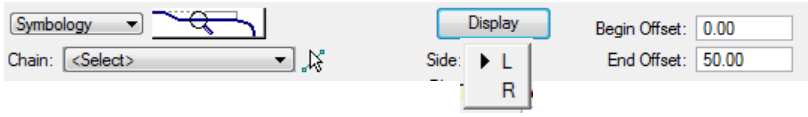
Selection by Feature: Users can select plan graphics by D&C Manager Feature, for example EOP New. The D&C Manager item can be selected by browsing using the paint brush icon next to the field.

By Selection Set: Users can create a Microstation selection set of the plan graphics desired to bring in and use this option to add it to the search criteria list box.

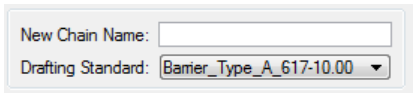
The user can select the **Display** button to visually verify on the screen if the appropriate plan graphic has been selected.



The **Chain** and the **Side** options tell Roadway Designer on what side of the reference alignment to search for the plan graphics. The **Begin/End Offset** options determine the search distance measure from the alignment out to the L/R direction specified. These offsets are always a positive number.



A **New Chain Name** must be assigned to each "new alignment" being imported. This name MUST be unique. So no two chains can ever share a name, i.e. New_EOP_NB_Left, New_EOP_NB_Right. The name for the chain has a limit of 19 characters. Elements do not need to be continuous, for instance the user can select all the driveways on the right side of the alignment and call the new chain "driveways_Left".



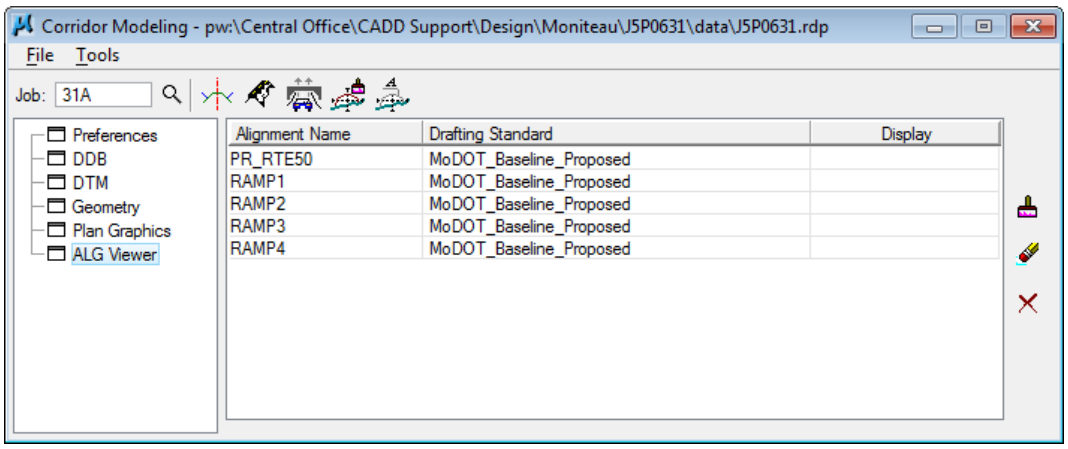
1.3.6.1 SMART UPDATE

This tool alerts the user when geometry or plan view graphics previously imported to Corridor Modeler have been modified or deleted. If a user modifies an alignment or plan view graphic, these items will appear as a blue line item in the appropriate tab. If the alignment or plan view graphic was completely deleted, then these items will appear as a red line item in the appropriate tab.

WARNING – The Smart Update alerts only will display after the Corridor Modeler dialog box has been closed and then reopened.

1.3.7 The ALG Viewer Tab

This tab allows the user to see what alignments and profiles have been imported to Roadway Designer from the GEOPAK coordinate database (GPK). These alignments are stored in the ALG file stored in the rddbs folder in ProjectWise. The viewer is strictly a viewer, user cannot manipulate the alignments, any alignment manipulation must be done in GEOPAK and then re-import the data into Roadway Designer.



1.3.8 Other Tools

Job identifies the GEOPAK job (GPK). The user can type in the GPK number in the field or can browse to the location in the t drive.

Open Create Template opens the template library set in the preferences for review or modifications. Create Template dialog is discussed in a later J2P0200.

Open Roadway Designer opens the Roadway Designer dialog box where the design takes place. Roadway Designer dialog is discussed in a later J2P0200.

Drive Roadway opens the Drive Roadway dialog box where the user can create a drive through of the desired corridor. This tool is discussed in a later J2P0200.

Draw Cross Section from Surfaces opens the Draw Cross Sections dialog boxes, which allows the user to draw GEOPAK cross sections from the model created in Roadway Designer. This tool is discussed in a later J2P0200.

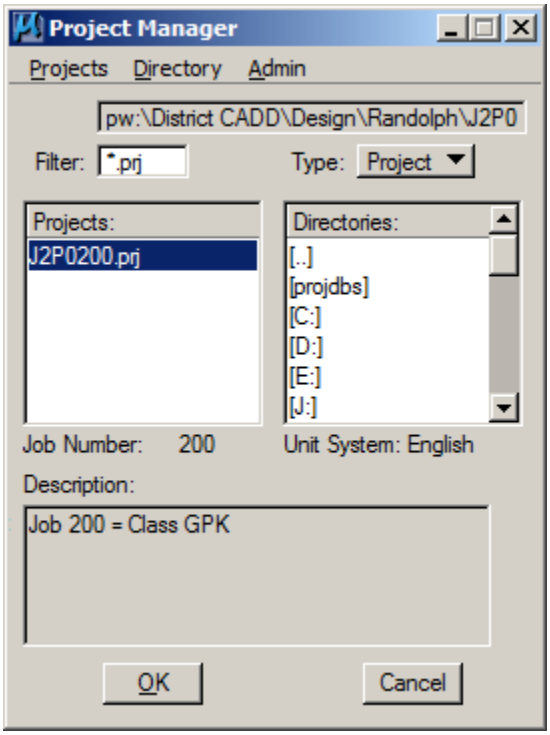
Cross Section Labeling opens the cross section labeler dialog box, which allows the user to label the proposed cross sections created from the Roadway Designer model.

1.4 Class Exercise: Setting Up Corridor Modeler Preferences

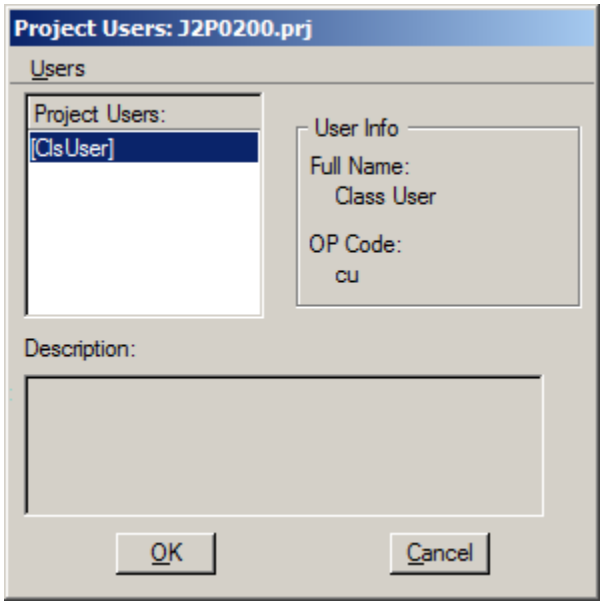
1) Open the **plan.dgn.**

2) Using Project Manager open the following project:

pw:\District CADD\Design\Randolph\J2P0200\project**J2P0200.prj**

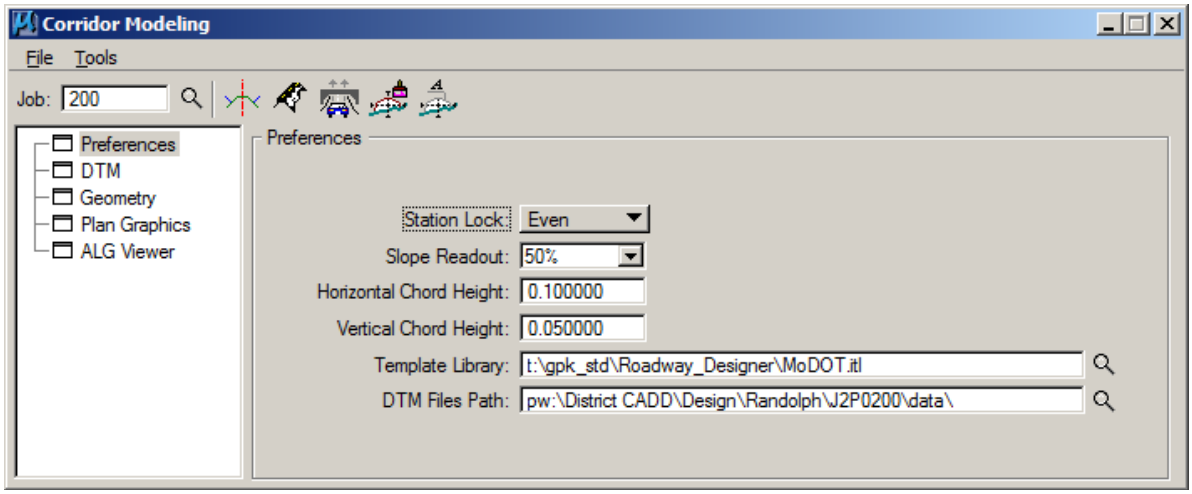


3) Select **ClsUser** as the project user.

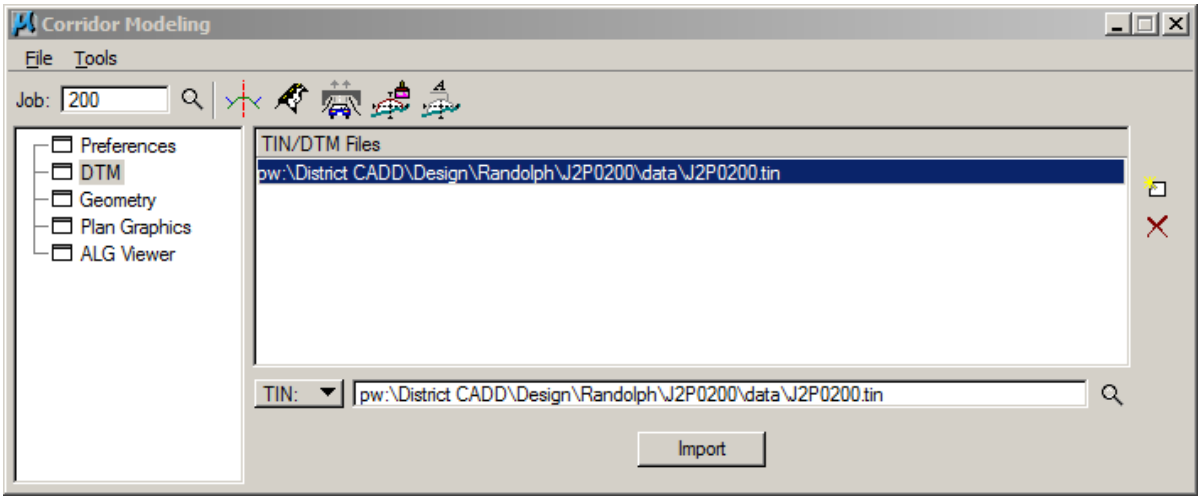


4) From the GeoPak Road Tool Palette, select **Corridor Modeling**:

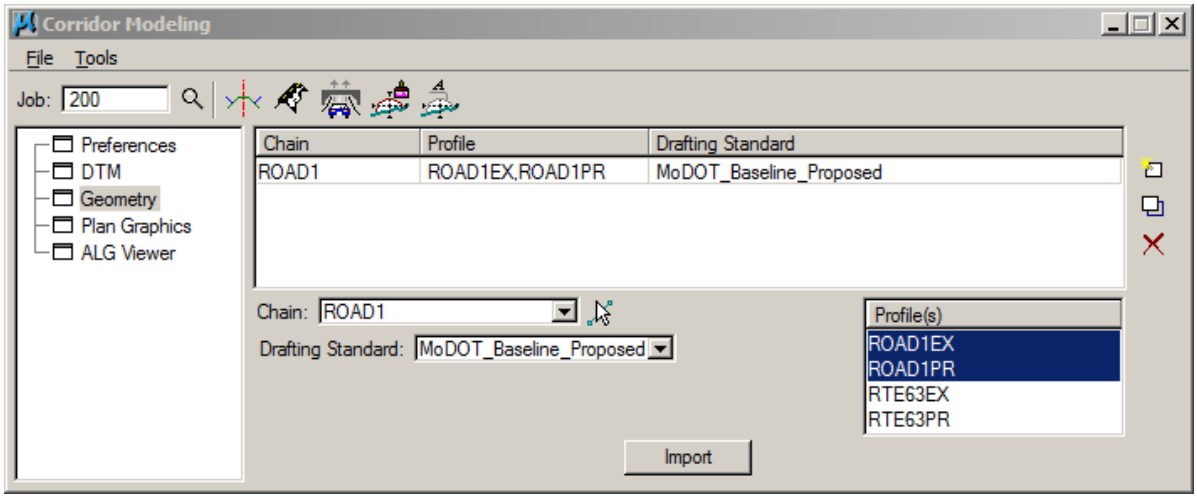
5) Verify and/or Define the settings in the **Preference** section:



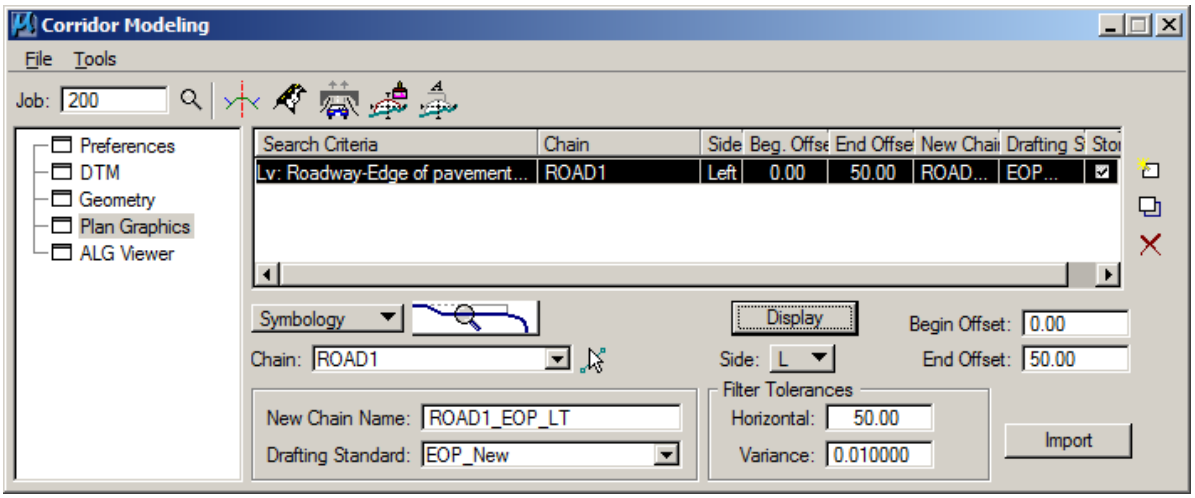
6) In the **DTM** section, import the **J2P0200.tin**



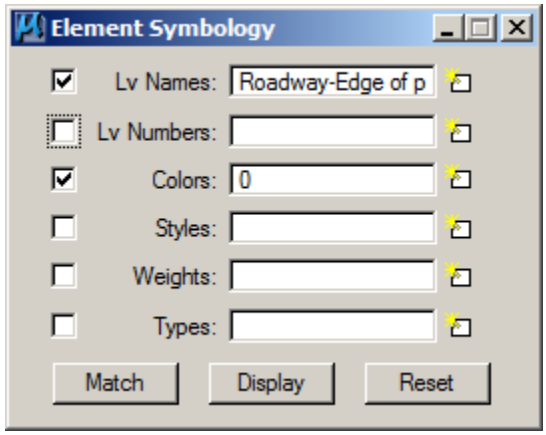
7) In the **Geometry** section, import the **Road1 Chain** and **Profiles**



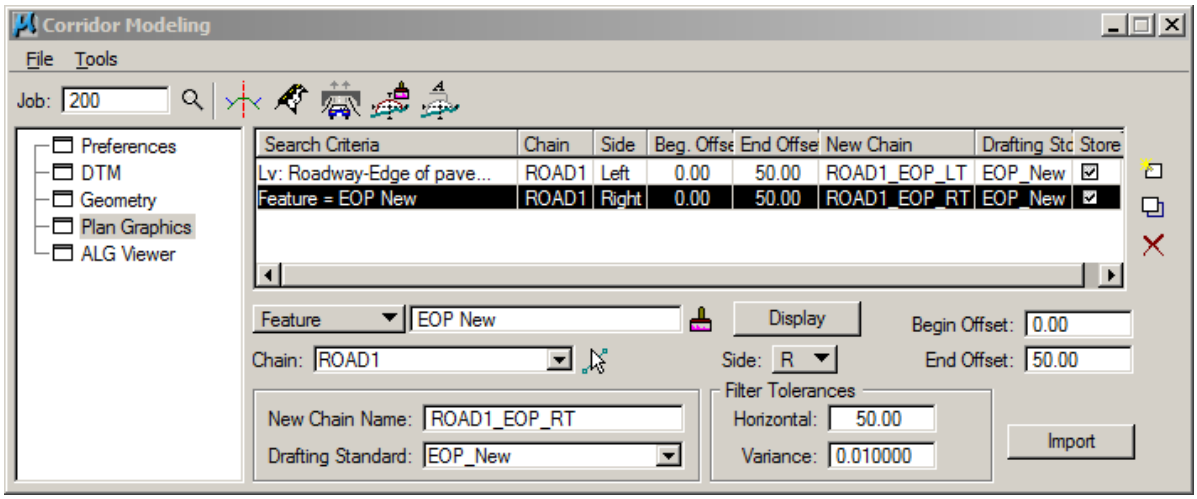
8) In the **Plan Graphic** section, import the **Road1 <u>Left</u> Edge of Pavement** using the **Symbology** method.



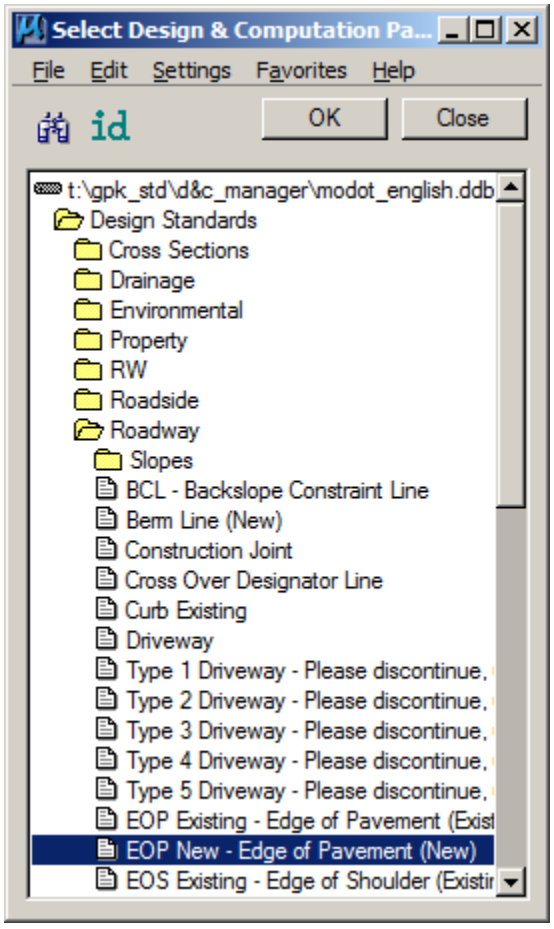
Level Name = Roadway-Edge of pavement
Color = 0



9) This time in the **Plan Graphic** section, import the **Road1 <u>Right</u> Edge of Pavement** using the **Feature** method.

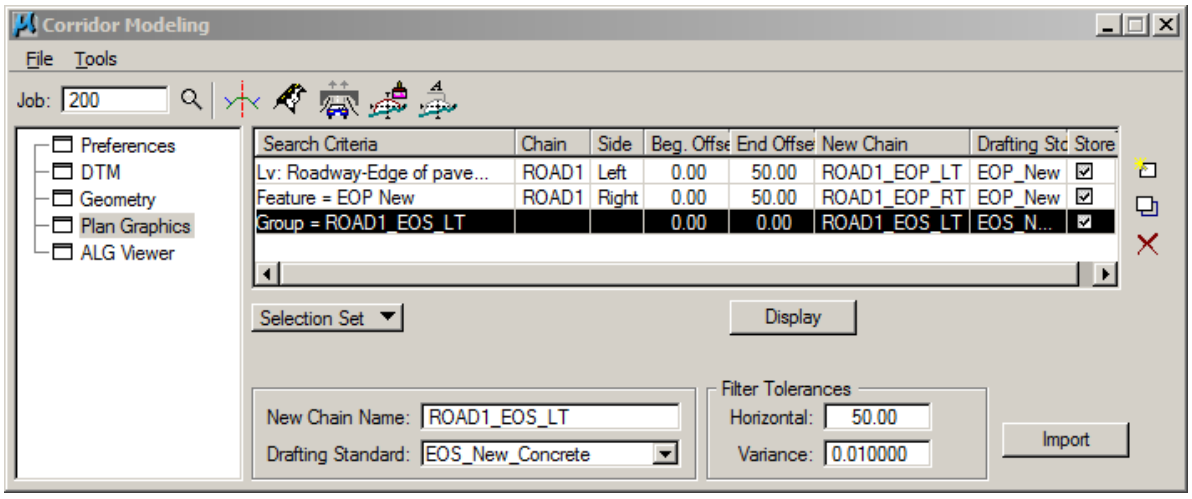


Level Name = Roadway-Edge of pavement
Color = 0

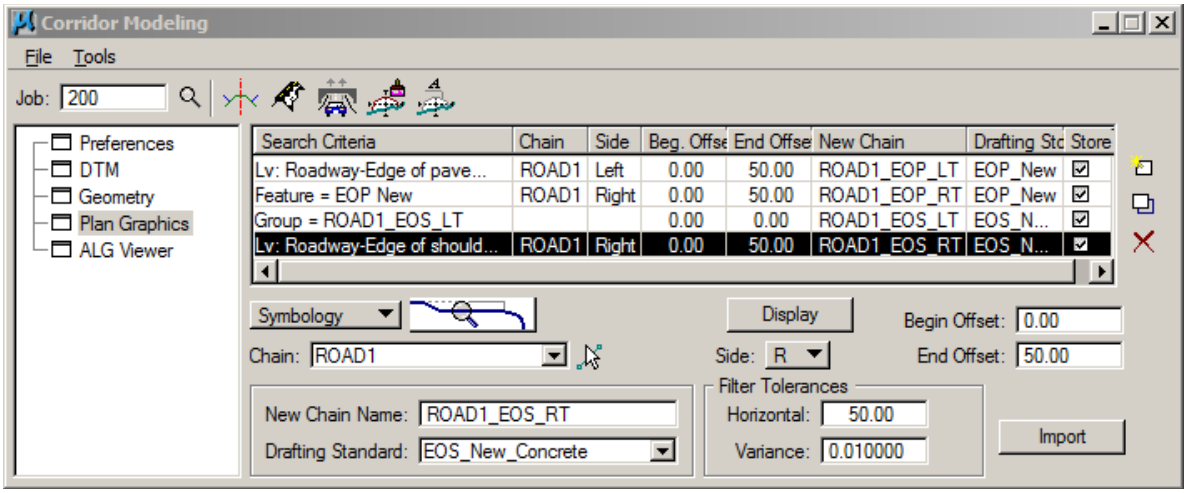


10) This time import the **Road1 <u>Left</u> Edge of Shoulder** using the **Selection Set** method.

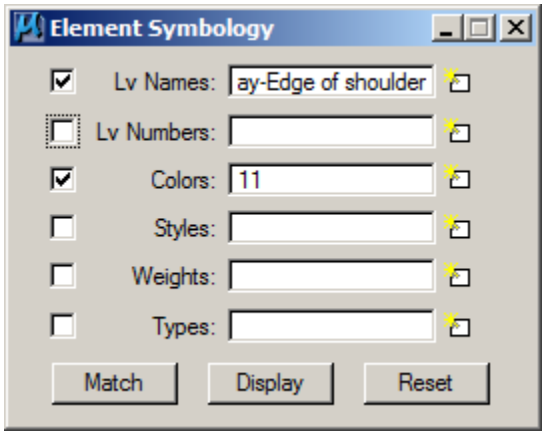
*** Note that the shoulder does not start until Station 25+30



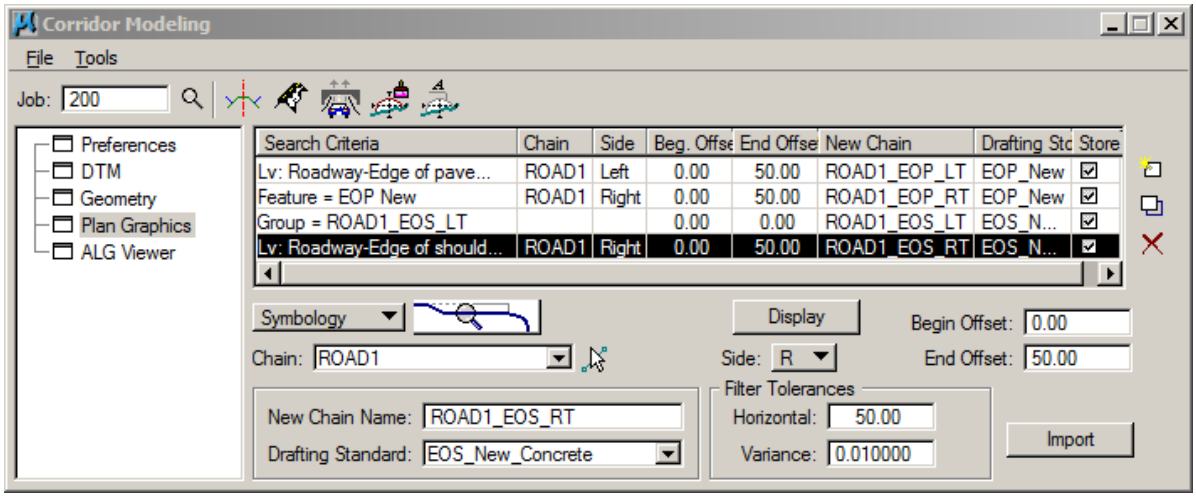
11) This time import the **Road1 <u>Right</u> Edge of Shoulder** using the **Symbology** method.



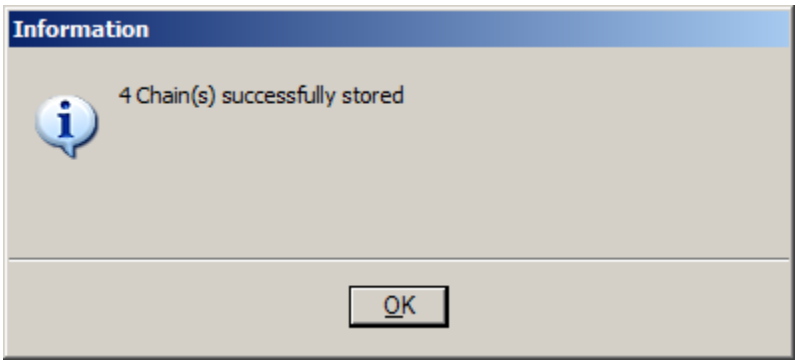
Level Name = Roadway-Edge of shoulder
Color = 11



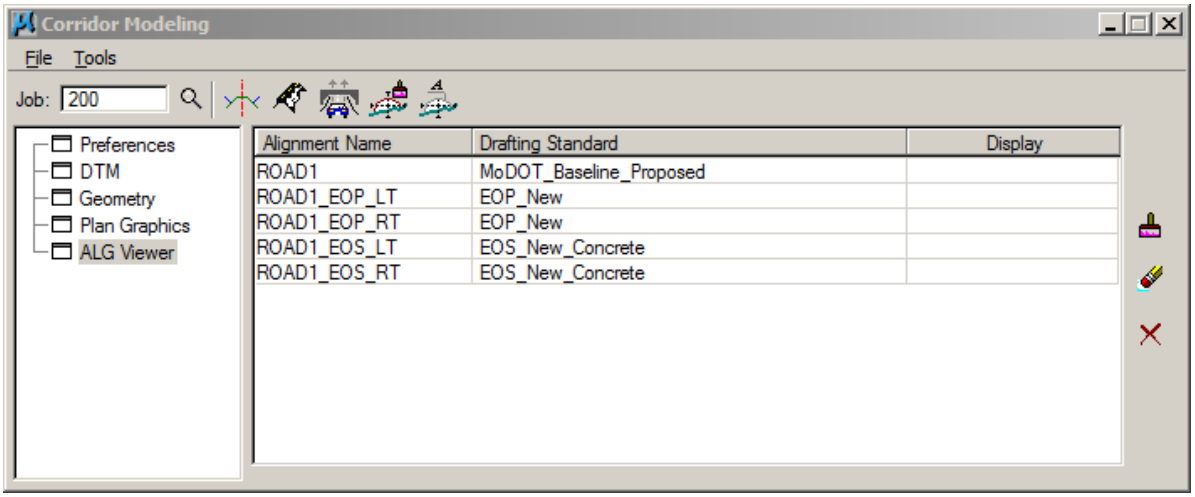
12) Lastly, make sure the **Import** button is selected to import the Plan Graphics



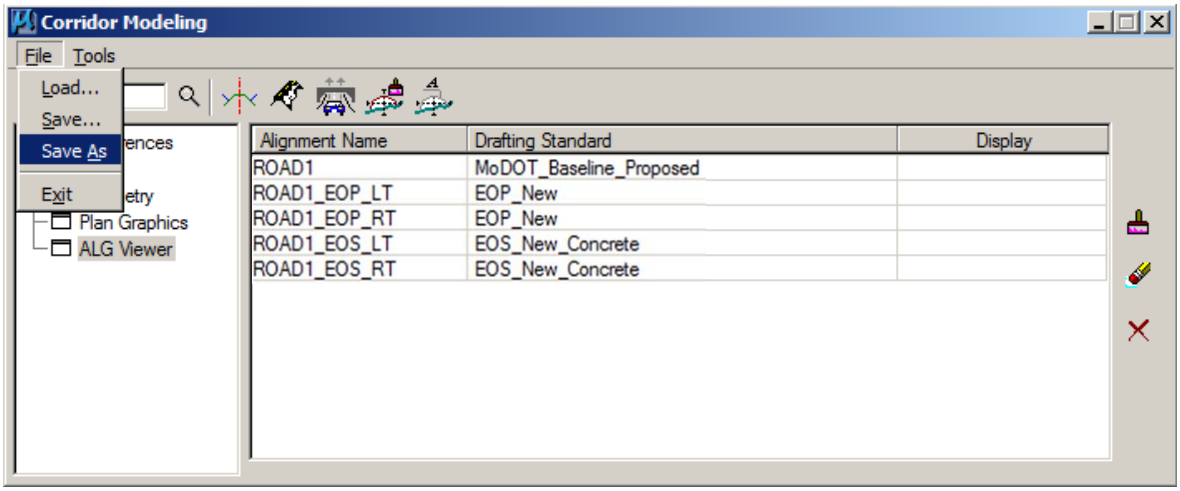
You should get the following dialog



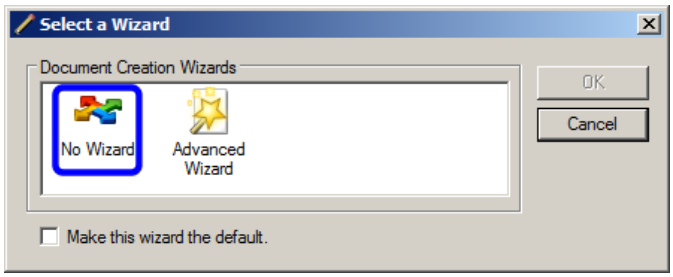
13) In the **ALG Viewer** section, review the Alignments that have been imported.



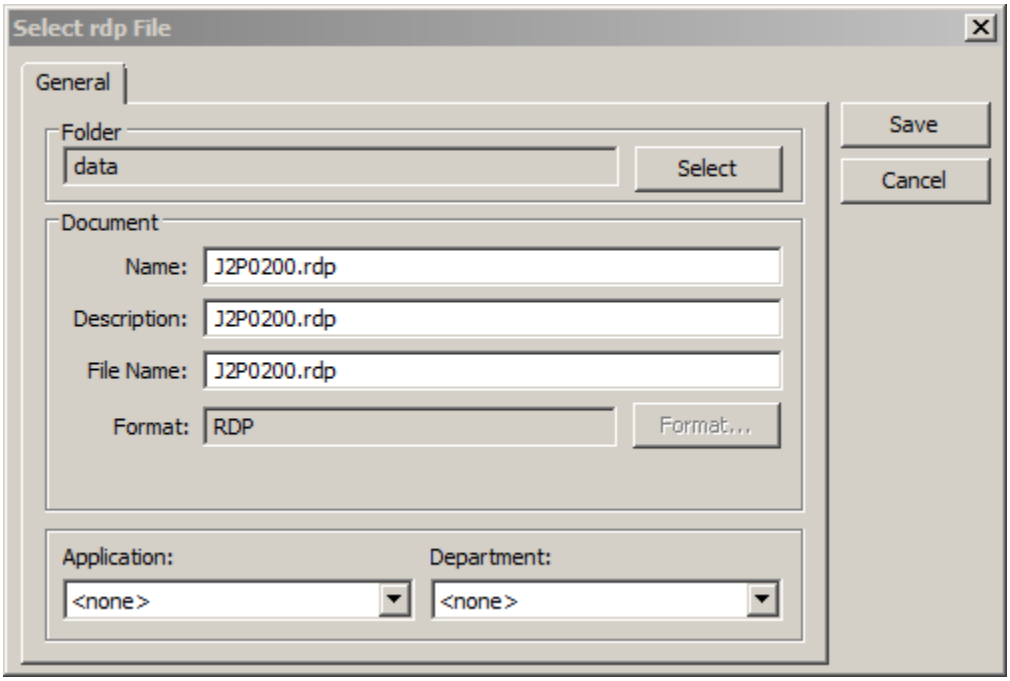
14) From the Corridor Modeling Dialog select **File > Save As**



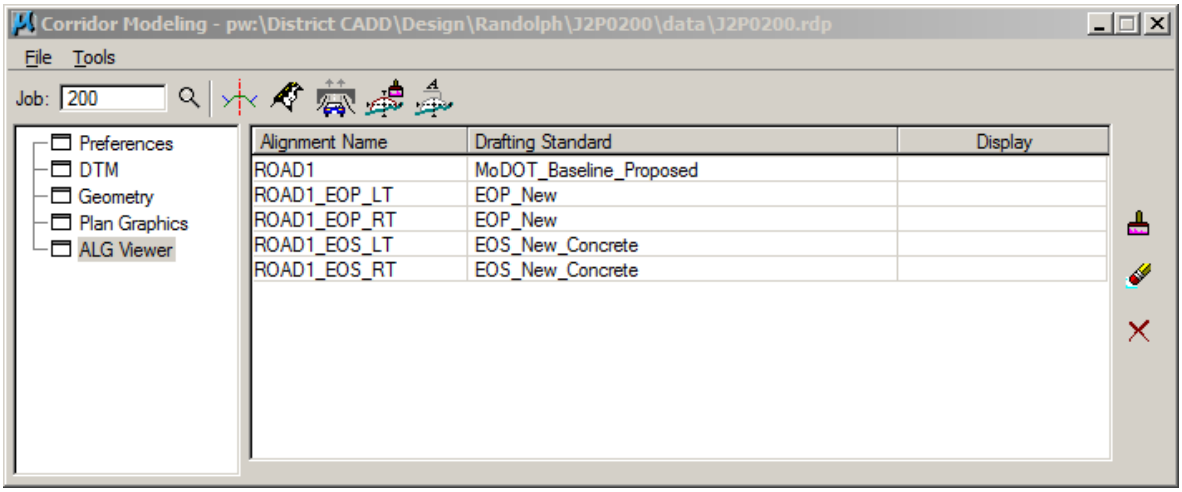
Select the **No Wizard** option



Name the preference file **J2P0200.rdp**

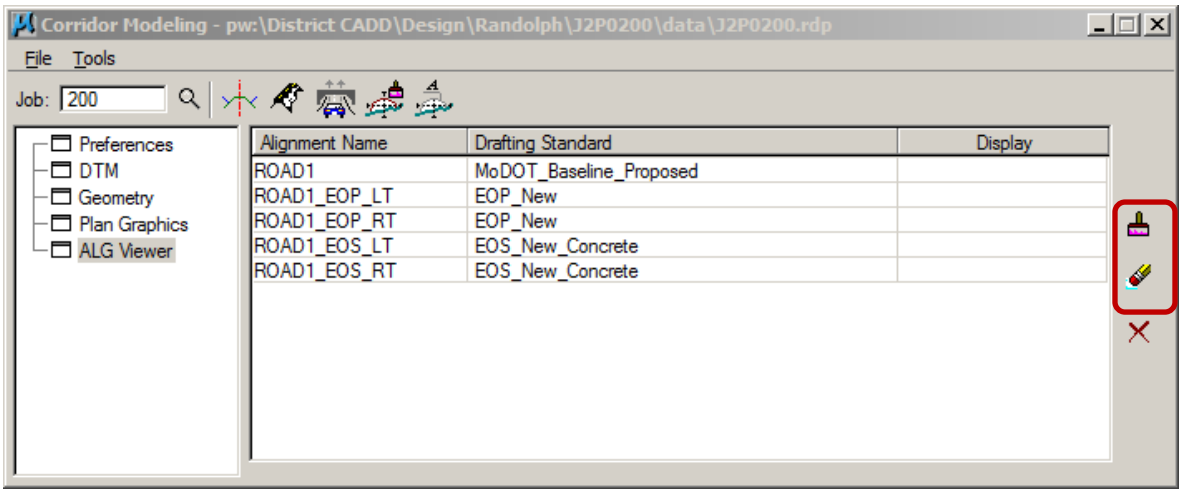


15) Once saved, notice in the banner of the dialog that the path and filename of the active Roadway Designer Preference file is now listed.



16) Open the **topo.dgn.**

17) Using the **ALG Viewer** section, display and undisplay the alignments that have been imported by using the tools to the right of the dialog.



1.5 Individual Exercise: Setting Up Corridor Modeler Preferences

1) Open **plan.dgn** and continue to use **J2P0200.rdp** from the previous exercise.

2) Import the following items from the Route63 Alignment:

Chain and Profile Elements	**Drafting Standard**
Rte63 Chain and Profile	**MoDOT_Baseline_Proposed**

Edge of Pavement Elements	**Drafting Standard**
Route63_EOP_LT_IN	**EOP_New**
Route63_EOP_LT_OUT	**EOP_New**
Route63_EOP_RT_IN	**EOP_New**
Route63_EOP_RT_OUT	**EOP_New**

Edge of Shoulder Elements	**Drafting Standard**
Route63_EOS_LT_IN	**EOS_New_Asphalt**
Route63_EOS_LT_OUT	**EOS_New_Asphalt**
Route63_EOS_RT_IN	**EOS_New_Asphalt**
Route63_EOS_RT_OUT	**EOS_New_Asphalt**

Note: When importing plan graphics have Road1 and Route63 plan dgn's displayed.

When finished update the **J2P0200.rdp**

3) In the **ALG Viewer** section, review the Alignments that have been imported.

4) Open the **topo.dgn**.

5) Using the **ALG Viewer** section, display and undisplay the alignments that have been imported.

1.6 Review Quiz

1. Where can you find the Corridor Modeler Application?

2. What is the name of the subdirectory that is created when the Corridor Modeling application is first opened?

3. What is the extension of the Corridor Modeler preference file?

4. **True** or **False**: Only one GEOPAK TIN at a time can be imported.

5. If you were to import geometry from job999.gpk, what would be the name of the resulting file that is created in the /rddbs subdirectory?

6. **True** or **False**: The ALG file can be accessed by multiple users at the same time.

7. **True** or **False**: A blue line in the list of items in the Geometry or Plan Graphics means an item has been deleted.

8. RDP stands for?

9. Do the Global User Preferences (located under **Application > Road > User Preferences**) have any effect on Roadway Designer?