Geographic Coordinate System

Assigning Modified Geographic Coordinate System

This example will show the process of creating a custom GCS with the projection factor (grid to ground factor), attaching the custom GCS and exporting the MicroStation geometry to a file format (KML) that Google Earth can use to visualize the geometry.

Information about this project:

- MicroStation geometry was placed using Missouri State Plane coordinates
- Project is located in the Missouri State Plane “Central” Zone
- Projection factor (grid to ground) for this project is **1.000093492**

Open Windows Explorer and navigate to the following location:

- **C:\Program Files\Bentley\OpenRoads Designer\OpenRoadsDesigner\ GeoCoordinateData**

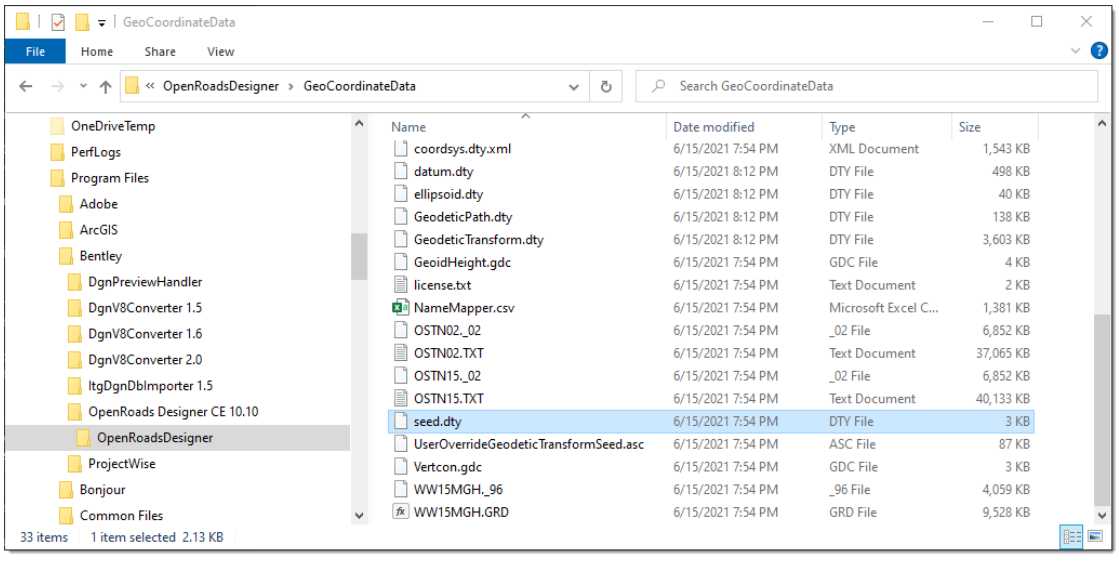
Copy the file named ***seed.dty*** and place it under your User Profile folder:

- **C:/Users/cadduser##/seed.dty**

Rename the copied seed file to your user id.

- **Example = cadduser##.dty**

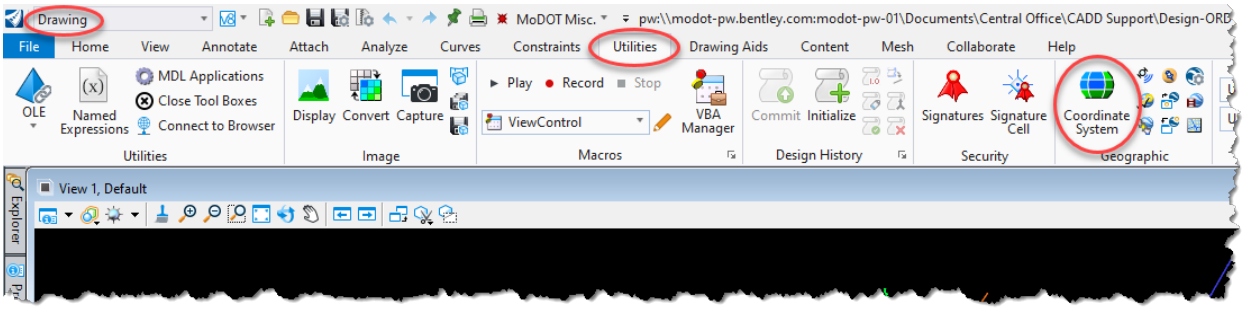
Note: This step for the creation of the user DTY file only needs to be done one time. Once it has been created, any other modified coordinate systems that you create will automatically place that system in that DTY file.

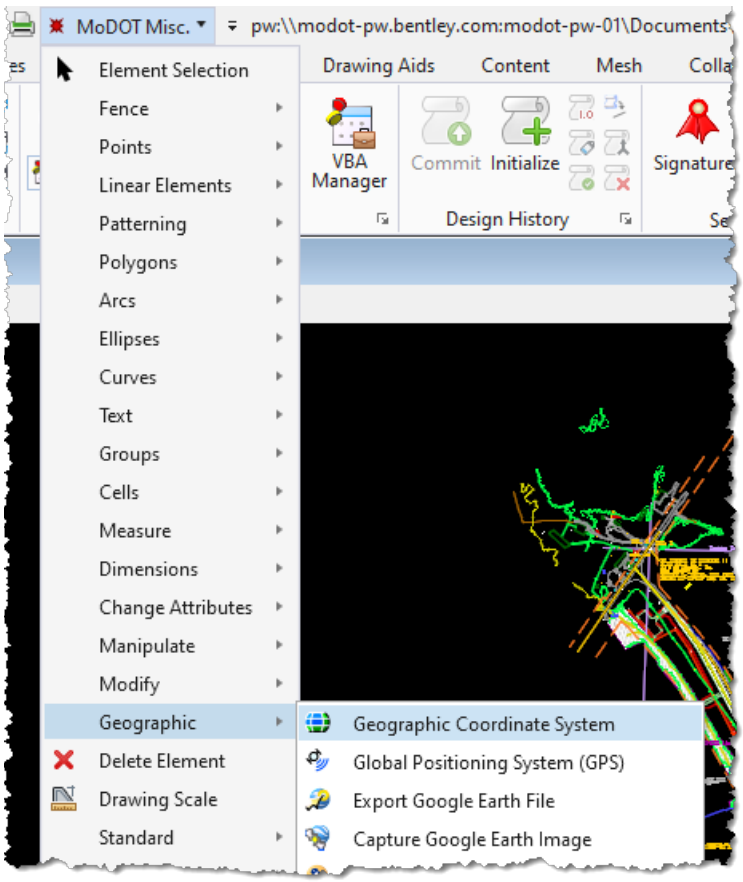


In ProjectWise, open the following MicroStation file in your user folder:

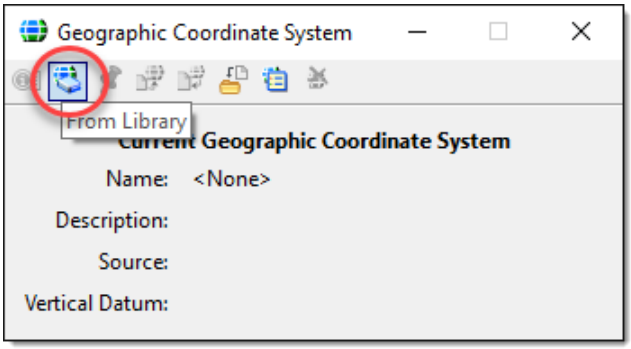
- **geographic_coordinate_system_lab.dgn**

Load the **Select Geographic Coordinate System** tool from the Drawing Workflow in the Utilities Ribbon. You can also get this by going to the MoDOT Misc. pulldown select ***Geographic*** and choose the **Geographic Coordinate System** tool.





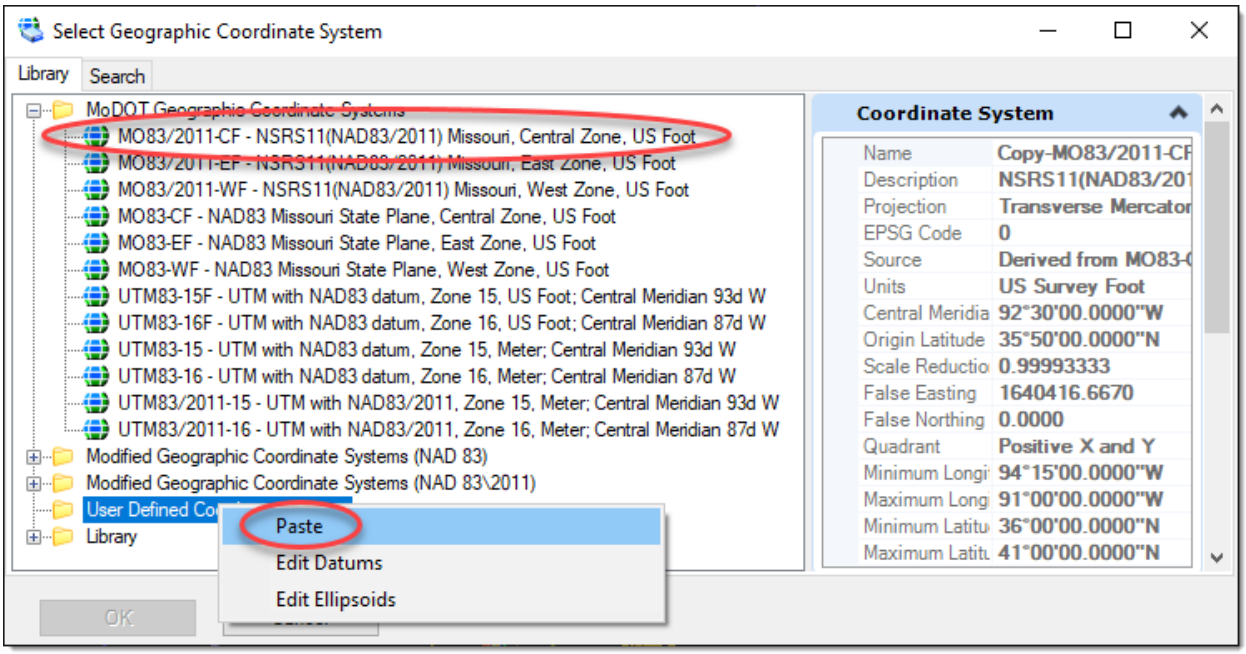
Click on the **From Library** option in the Geographic Coordinate System dialog.



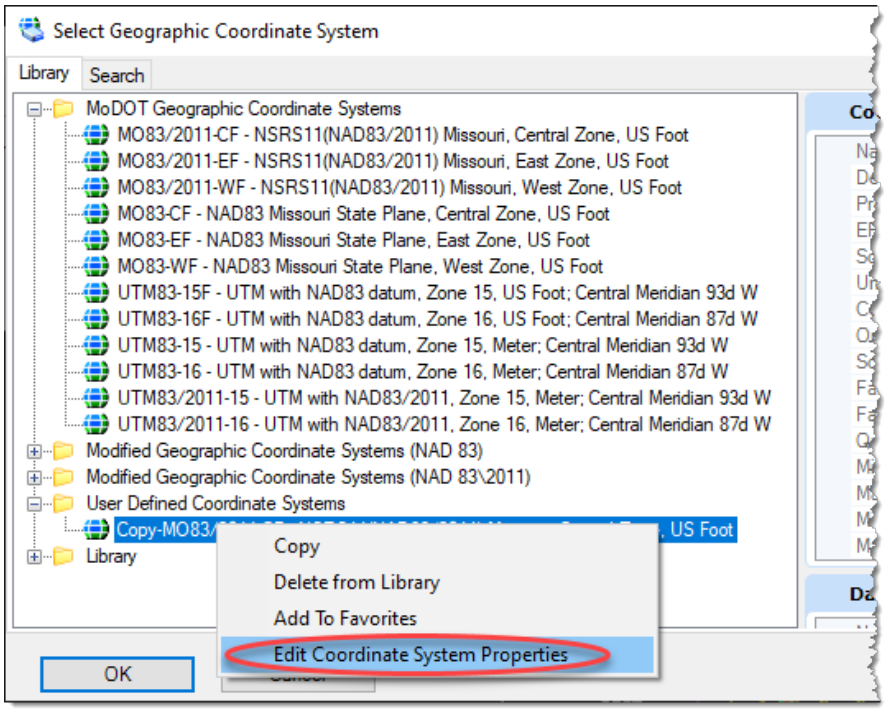
Under the **MoDOT Geographic Coordinate Systems** folder, right click over the correct **Central Zone** System and select the **Copy** option.

Now right click over the ***User Defined Coordinate Systems*** folder and **Paste** the coordinate system.

This needs to be done so you can edit the coordinate system and apply the grid to ground factor for the project you are working on.



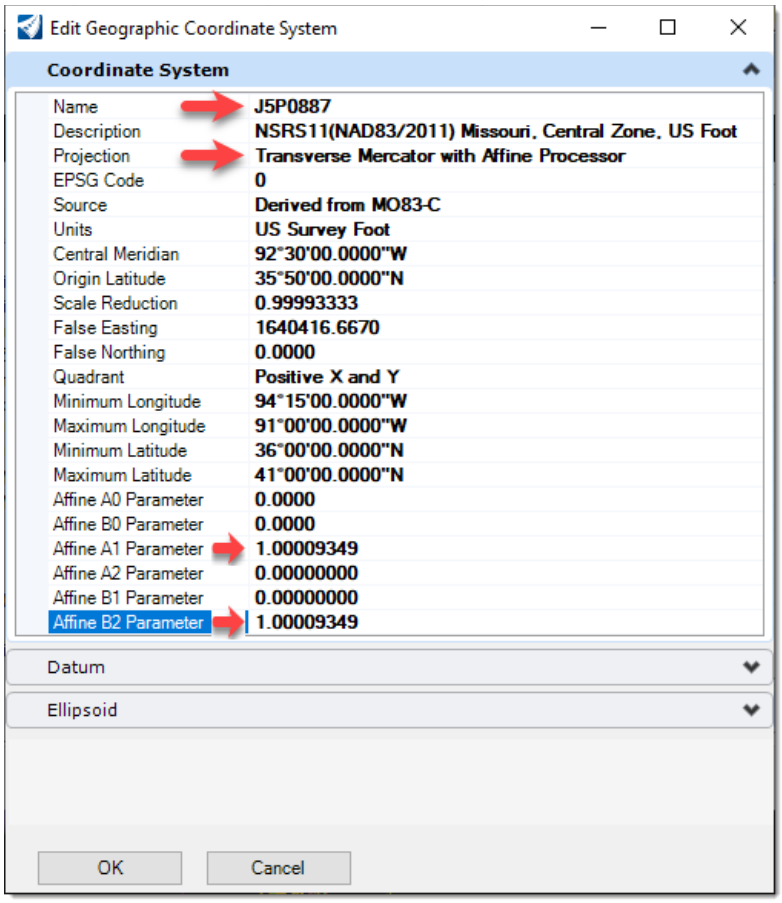
Right click over the coordinate system under the ***User Defined Coordinate Systems*** folder and select the **Edit Coordinate System Properties** option.



In the **Edit Geographic Coordinate System** dialog, we will need to edit some items.

Edit the following items:

- **Name** – whatever you wish to rename the system to
- **Projection** – Transverse Mercator to Transverse Mercator with Affine Processor
- **Affine A1 Projector** – input the grid to ground factor
- **Affine B2 Projector** – input the grid to ground factor

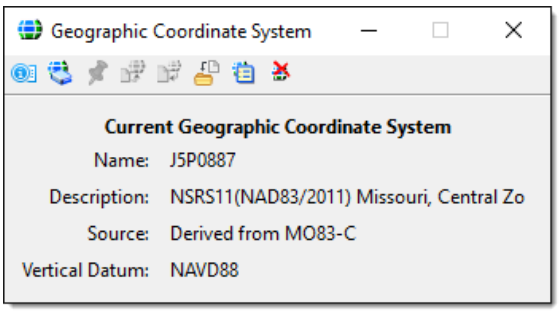


Once those items have been edited, click **OK**.

You have now successfully created a custom geographic coordinate system that can be used on any dgn file.

To apply the custom GCS, select that system and click **OK**.

You will now see the GCS applied to the dgn file.



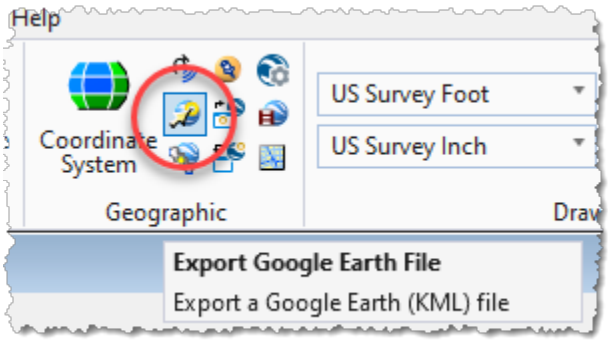
You can save the changes to the DGN file.

MicroStation Data into Google Earth

Once a coordinate system has been applied to a dgn file, you can use the Geographic tools in MicroStation to create a KML file which can be used in Google Earth to show the MicroStation geometry and graphics over the top of Google Earth imagery.

Note: Make sure Google Earth is installed on your machine prior to doing this operation.

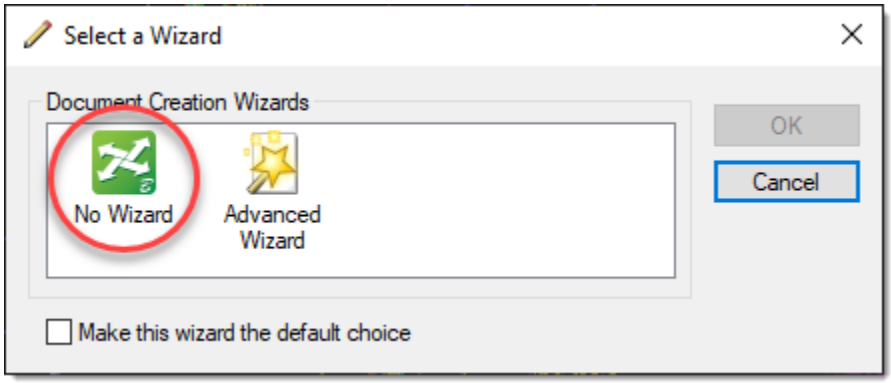
Load the **Export Google Earth (KML) File** tool from the Geographic tools in the Utilities Ribbon in the Drawing Workflow. You can also get this by going to the MoDOT Misc. pulldown and select ***Geographic*** > **Export Google Earth File** tool.

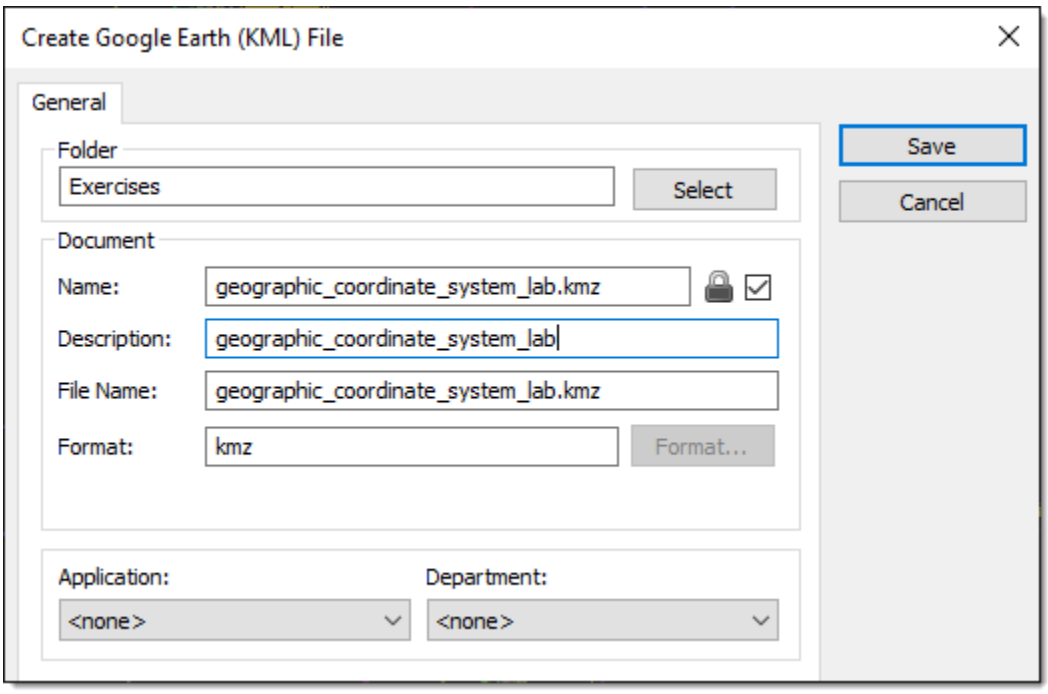


You can create the KML file inside or outside of Projectwise. We will store the file inside ProjectWise for this example.

Note: You can always export the KML file out of ProjectWise if necessary.

Select **No Wizard** and then store the KML file to the desired folder in ProjectWise. Make sure the Name and File Name are the same.





Save the KML file.

Once you click the **Save** icon, ***leave the computer alone***.

The conversion of the MicroStation file to a KML file may take a little time, depending on how large the microstation file is. When the KML is created, Google Earth will also open and zoom in to the area for the project according the view constraints of the MicroStation file.

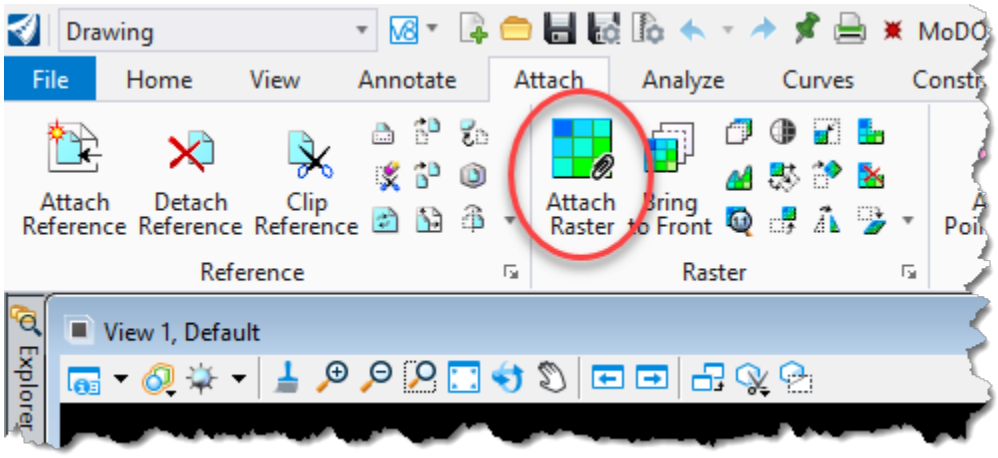
Tips: KML files can be used by anyone that has Google Earth install on their machine.

When using Google Earth tools, levels and reference files can be turned off/on in the KML file. This is similar to how geometry can be displayed or not displayed in a dgn file.

Using Web Map Server Imagery in a MicroStation File

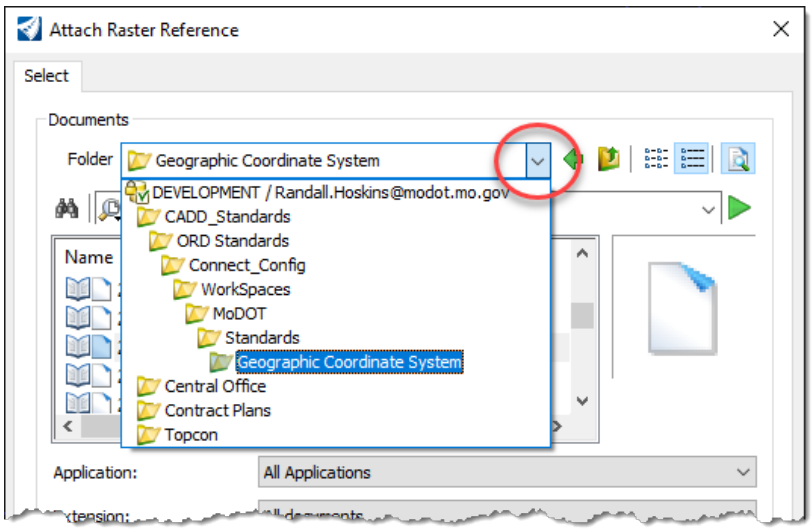
This example will show the process of attaching imagery through a web map server. We will then create an image from the web map server imagery of the limits of the project.

One way to attach a raster is in the Attach Ribbon under Drawing Workflow. Just select the tool called Attach Raster.



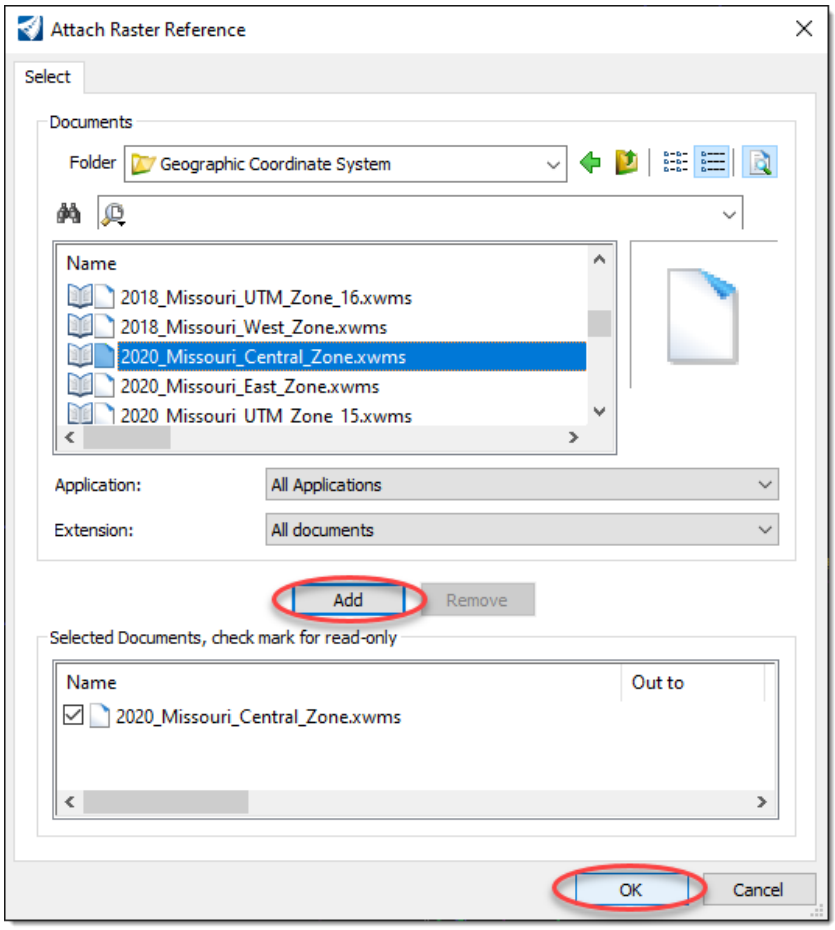
The links to the web map server imagery are now located inside of ProjectWise.

Under the folder options select the Down Arrow and navigate to **CADD_Standards > ORD Standards > Connect_Config > WorkSpaces > MoDOT > Standards > Geographic Coordinate Systems** and attach the appropriate web map server (.xwms) that corresponds to the zone in which the project is located in.



Use the **2020_Missouri_Central_Zone.xwms** for this example.

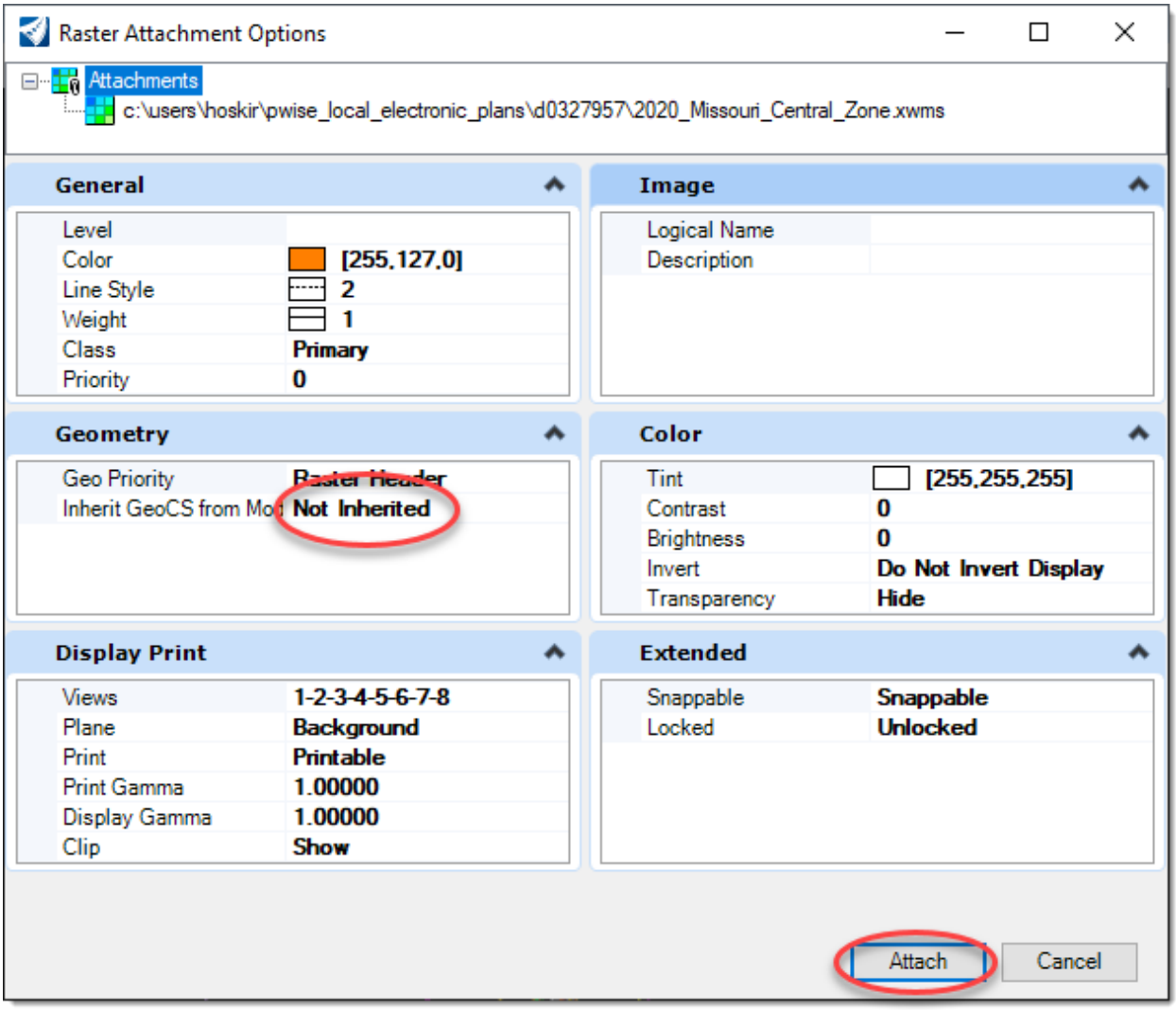
Click **Add** then **OK** to attach it.



Before you can attach the imagery, the **Raster Attachment Options** dialog will appear. This gives you the capability of modifying how you want the imagery to be attached.

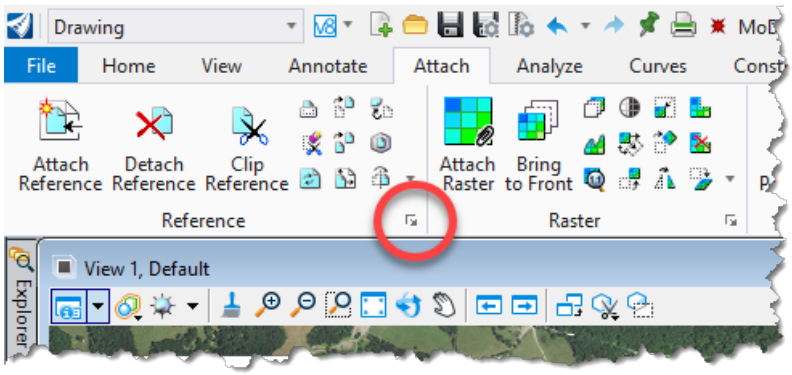
Make sure the “Geometry – Inherit GeoCS from Model” option is set to **Not Inherited**. This allows the imagery to inherit the geographic coordinate system applied to the dgn file and should fall into place correctly with the MicroStation geometry.

Finally select **Attach** to see the web map server imagery.

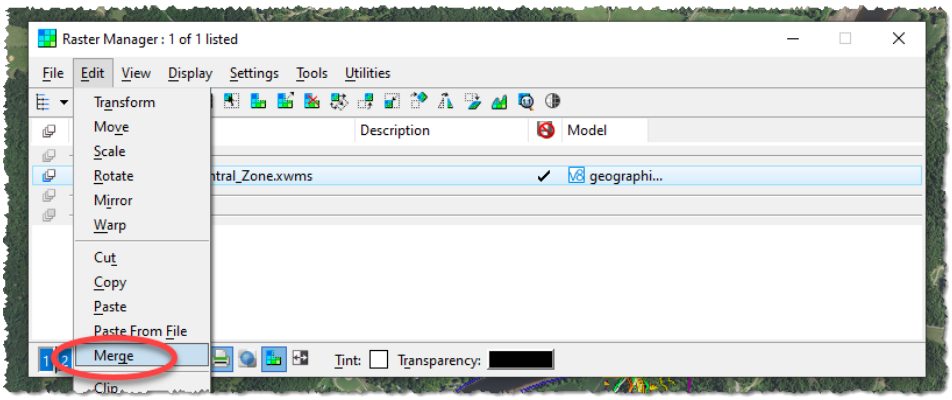


Creating an image of the area for a project

Once the web map server imagery has been loaded, you can create an image of the area for the project. In order to do this, you will need to open the **Raster Manager** in the **Attach** ribbon of the under the **Drawing** workflow. Just select the arrow down in the corner of the Raster tools to open the Raster Manager.

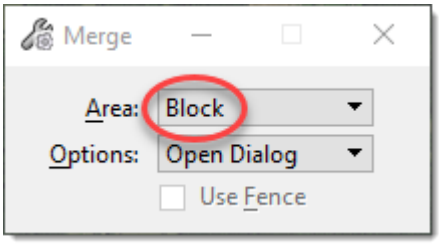


Under the **Edit** menu, select **Merge**.



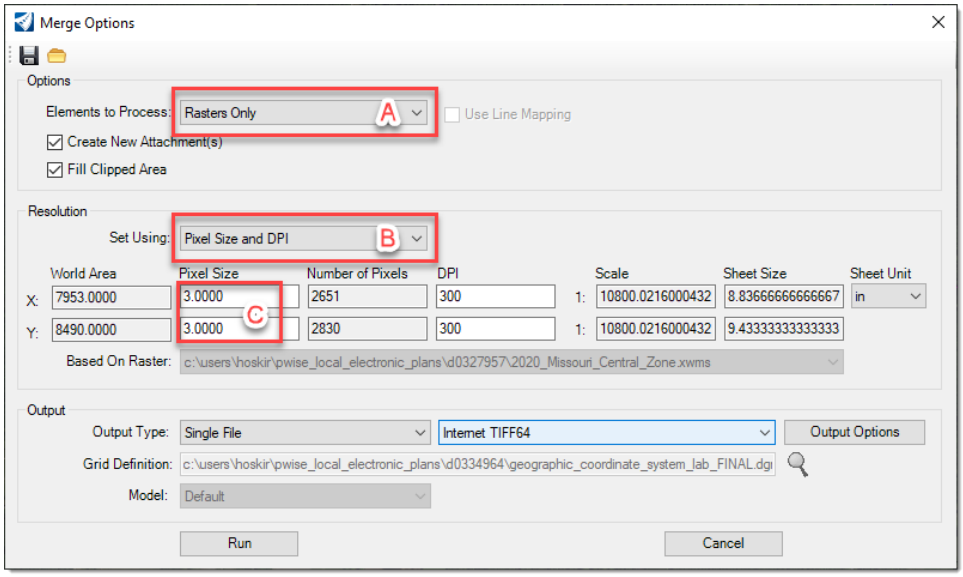
Now use the options in the *Merge* tool to define the area for the image you want to create from the web map server imagery.

For this example, we will use the **Block** option.



Once you have defined the **Block** for the image being created, you will need to review the options in the Merge Options dialog. There are a few options that you will need to change.

a. Element to Process: **Rasters Only**
b. Set Using: **Pixel Size and DPI**
c. Set the Pixel Size to **3.** This will approximately match the pixel size of the web map server imagery. Leave the DPI set to 300.

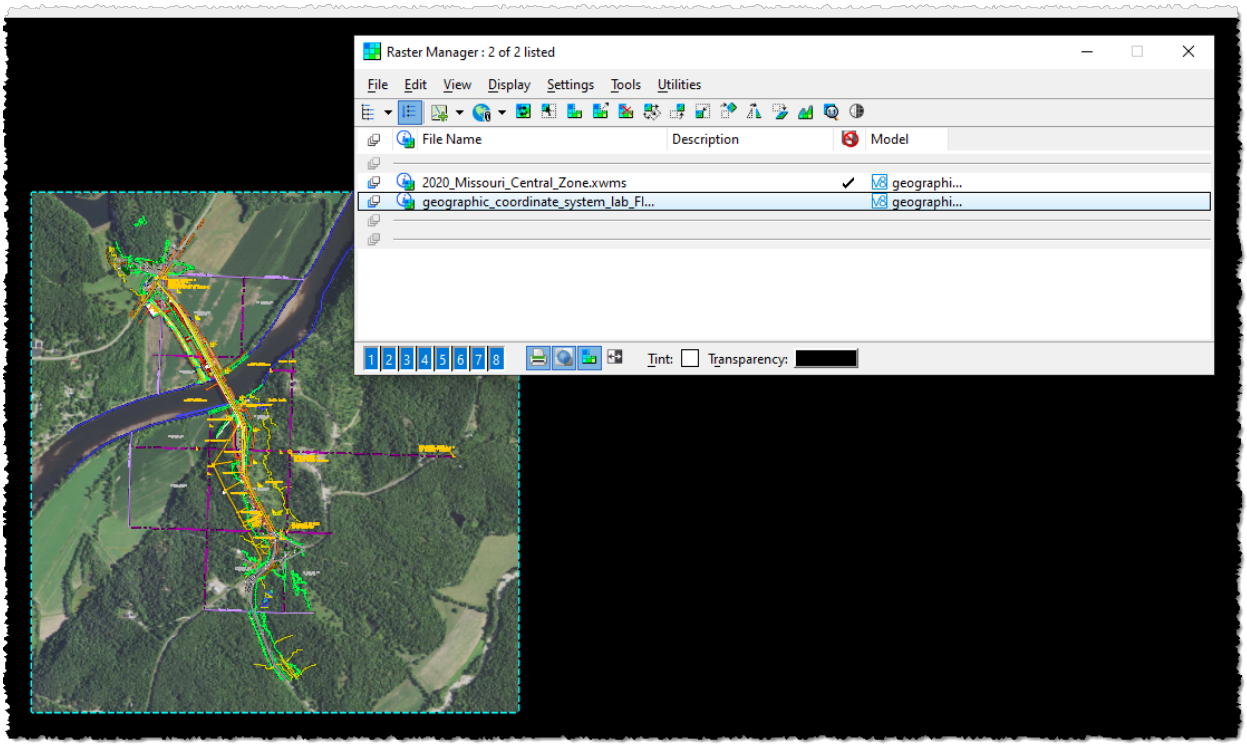


Click **Run** (No Wizard) when all the options are set the way you want it. Store the image to the desired location inside or outside of ProjectWise.

For this example, store the image inside of ProjectWise in the same location as the dgn file.

NOTE: The actual creation of the image may take a few minutes, depending on the size of the image being created. ***SO BE PATIENT*** and leave MicroStation alone while the image is being processed!!

You will now see the new image created from the web map server in the *Raster Manager* dialog. The web map server that is still attached to the dgn file can be detached or turned off in the view you have opened.

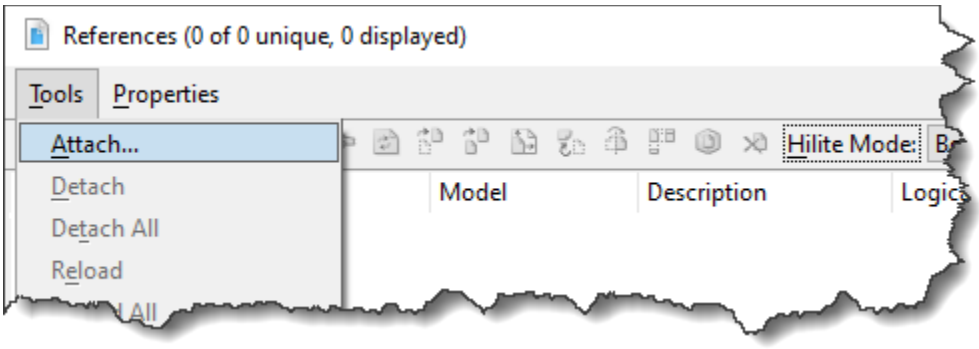


Save the changes to the DGN file.

Using an ArcGIS Shapefile in Open Roads Designer

This example will demonstrate how to take an ArcGIS shapefile and use it as a reference file in a MicroStation file.

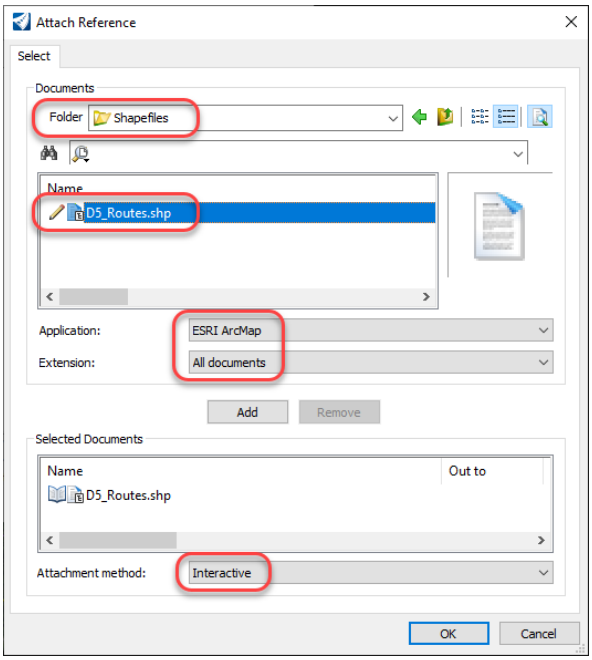
Open the **Reference** dialog. Under the *Tools* menu, select the **Attach** option. This will allow you to navigate to the stored shapefiles.



Once the attach dialog opens navigate to the **Shapefiles** folder in your user folder.

To see the shapefiles you will need to change Application to **ESRI ArcMap** and extensions to **All Documents**.

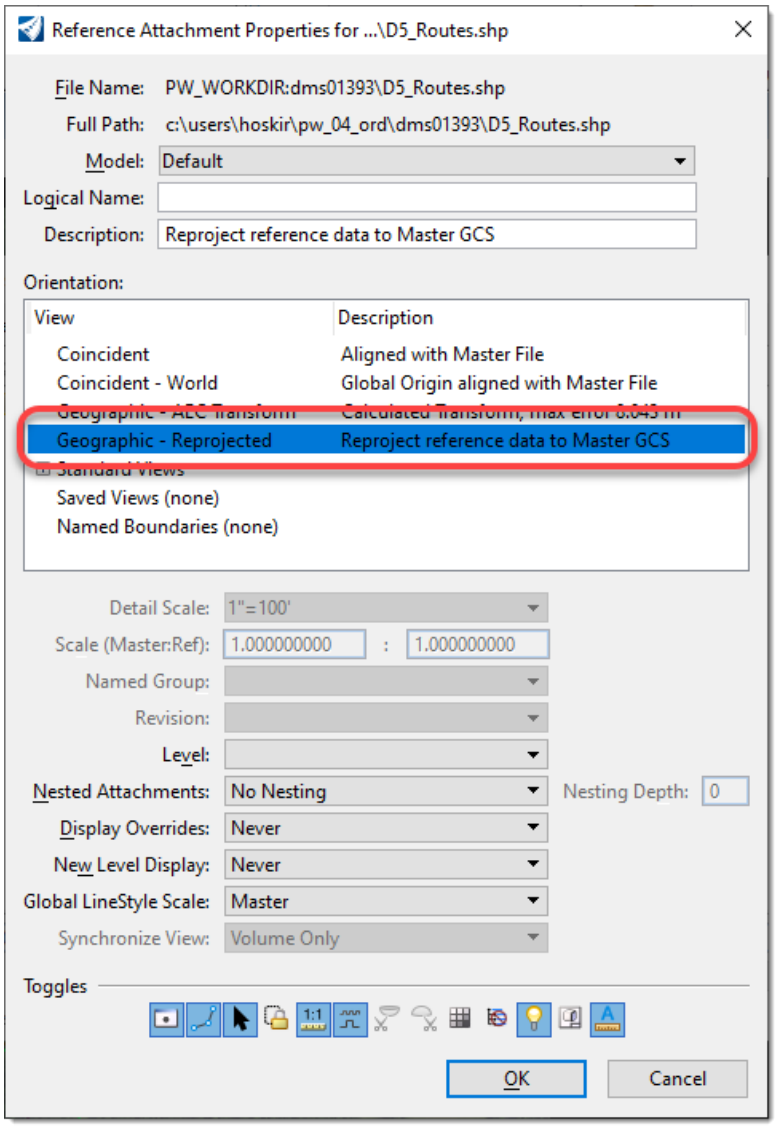
Select the **D5_routes.shp** and select **ADD**, make sure the Attachment method is set to **Interactive** and select **OK**.



Before attaching the shapefiles, you will need to change the attachment method on how the shapefile gets attached to the dgn file.

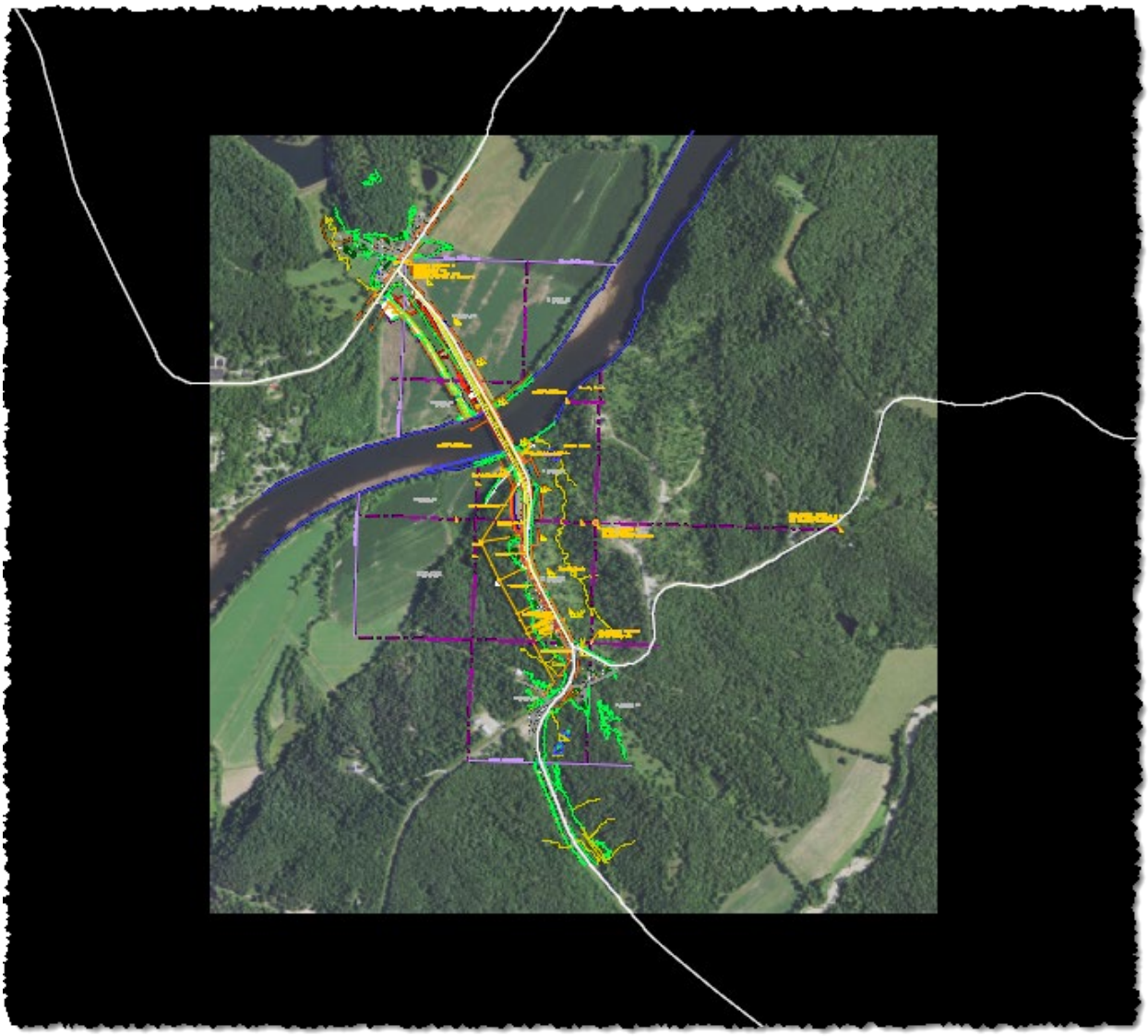
Within the *Attach Reference* dialog, change the Attachment Method to **Geographic – Reprojected.**

Using the *Geographic – Reprojected* attachment method allows MicroStation to take the coordinate system applied to the shapefiles being attached and reprojects them to the geographic coordinate system applied to the MicroStation file.



Click **Open** when you are ready to attach the shapefiles.

You should now see the attached shapefiles in the MicroStation file.



Save the changes to the dgn file.