

MicroStation – Working with Geographic Coordinate Systems

Overview

Geographic Coordinate Systems (GCS) can be assigned to U.S. Survey Foot (USFt) MicroStation WSDOT base files so that they are geographically aware – they know where they are on the Earth – and can relate to other GCS aware data.

Projects using Project Datum (PD) coordinates will need to request a PD GCS from the HQ CAE Help Desk. Project Datum Combined Factors are typically determined by the project surveyor using documented local monumentation and the WSDOT Project Datum Calculator.

The method below uses a seed or template DGN to share the GCS with project files. Along with the DGN, a projection file (PRJ) file is provided to translate data to ArcGIS.

This tech note provides instructions for requesting a Geographic Coordinate System and assigning it to a DGN base (USFt) file.

Requesting a project GCS

To request a project GCS, provide the following information to [HQ CAE Support](#) via email:

- Project ID (example: XL1234,)
- Project Name (example: Smith Creek Culvert Replacement)
- Project Description (example: Fish Passage Project)
- Project Primary SR and Mile Post range (example: SRX, M.P. 31 - M.P.33)
- Project file structure location (network resource or ProjectWise) (example: ProjectWise Project, WSDOT/Documents/_HQ/Fish Passage/ORproj/005)
- Copy of the Project Datum Combined Factor calculation document (or pointer to documentation location on network)

If the Project Datum Combined Factor calculation document is not available, provide additional information:

- State Plane Datum that the Project Datum is based from; i.e. NAD 83(91) Wash North or NAD83(11) Wash South
- Derived project datum Combined Factor (CF)

You will receive two files or be notified by email that the files have been posted to the project folder:

- A DGN resource file for assigning the project PD GCS to USFt base files.
- A PRJ file used for ArcGIS applications.

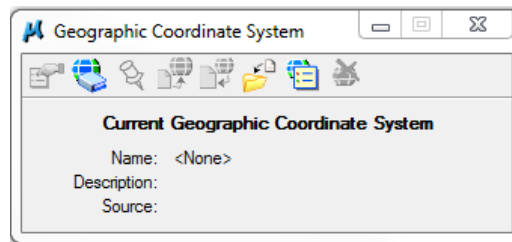
These files become part of the project documentation and should be stored in the project structure on a network drive, or in ProjectWise.


In network or local drive projects, browse to *ProjectID\CAD_RSC\GCS*

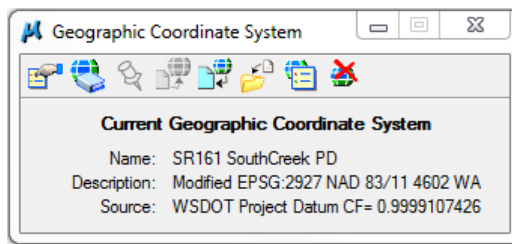
In ProjectWise [Fish Passage] projects, navigate to *ProjectID_CAEData_DatumandControl*

Assign the GCS to your project files

1. Verify that a **ProjectID_PD_GCS.dgn** and **ProjectID_PDCalc.prj** file are present according to the instructions above.
2. Open any new USFT DGN file, or any file in your project where the data is oriented to, and coordinately correct to your project datum.
3. In MicroStation, select *Tools > Geographic > Select Geographic Coordinate System*.



4. Click on the **From File** icon .
5. Browse to the appropriate GCS folder noted above and select the **ProjectID_PD_GCS.DGN** file.
6. Click **Open**.



The file inherits the GCS from the seed file and is now geographically aware and can be projected to any other known datum when referenced using the Attachment method Geographical Reproject.

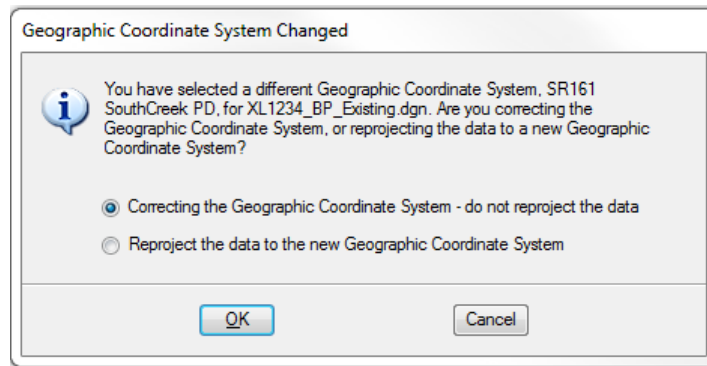
WARNING: Do not use the Geographical Reproject attachment method with a WSDOT V8i 3D DGN.

The current WSDOT V8i DGN Global Origin XY is shifted from the design plane center and will impact 3D referencing to WSDOT 2D or 3D DGN when using the Geographical Reproject attachment method.

This issue is represented by a reference offset of -2.1475 on each axis (XY for 2D and XYZ for 3D) from the design plane center. This offset cannot be altered and moves the data from its original coordinates.

SOLUTION: Make a copy of the 3D dgn and append the file name with the datum the file is to be reprojected to. Open the file and verify the current GCS is correct for the data in the file. Then change the GCS to the datum it needs to be reprojected to. Use the **Reproject the data to the new Geographic Coordinate System**. Verify the file was transformed to the new coordinates.

If the DGN file already had a different GCS assigned the following dialog may appear.



To simply change the datum – not the coordinate values, select **Correcting the Geographic Coordinate System – do not reproject the data**.

To move the data to the new GCS, select **Reproject the data to the new Geographic Coordinate System**. WARNING: This will change the coordinates of the data to the corresponding coordinates in the new system.

7. Click **OK** and review the results.

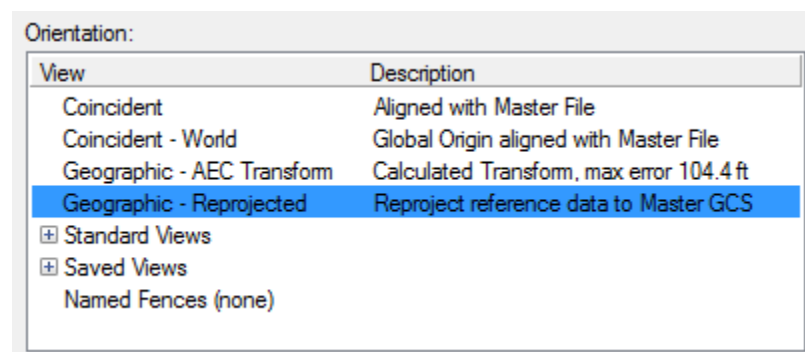
Note that the MicroStation Undo command includes GCS assignment functions and can get the data back to the previous state if necessary.

Using the PRJ file for use in ArcGIS

The PRJ file is used by ESRI ArcGIS applications to define the geographic coordinate system applied to datasets. This process sets a DGN file up and uses one of a number of ways to bring the data into a GIS workspace.

1. Create a new USFt “source” DGN that will contain information to be sent to GIS.
2. Assign the project GCS per above.
3. Reference project DGNs to the “source” file.

When referencing a DGN with an assigned GCS to another GCS assigned DGN, the orientation options include Geographic – Reprojected. This will display the reference GCS as it would be in the master GCS.



4. Copy (merge) to master only the data intended for ArcGIS.
5. Compress the file to clean up the file.
6. Copy the project PRJ file to the same folder as the “source” DGN.
7. Rename the copy to exactly the same name as the DGN file. For example:


XL1234_BP_GIS.dgn

XL1234_BP_GIS.prj

8. For projects stored on network or local drives, skip to step 13.

For ProjectWise

ArcGIS applications cannot access ProjectWise files at this time. It is necessary to export the two files to a network or local drive.

9. Select both files in ProjectWise, right-click and select **Export**.
10. In the Document Export Wizard select *Send to Folder – Creates an unmanaged local copy*.
11. In the next screen, browse to the destination folder and click **Next**.
12. In ArcMap click on the add data button  , navigate to the location of your DGN file, select the file, and click Add to add the file to ArcMap.
13. You can learn more about working with CAD data in ArcGIS [here](#).

For questions or comments on this tech note, contact your regional CAE Support Coordinator or the WSDOT CAE Help Desk at (360) 709-**8013**.