

InRoads – Importing Legacy Photogrammetry Data

Overview

When you request new Photogrammetry data for InRoads projects, expect to receive two data files: a MicroStation DGN graphics file and an InRoads Digital Terrain Model (DTM) surface. These files reflect Photogrammetry data in State Plane coordinates measured in the current WSDOT unit of measurement (US Survey Feet).

Legacy WSDOT Photogrammetry information had been provided in MicroStation DGN file format only. This data may also be used for InRoads projects, but must be converted and imported.

To use this data, the legacy files must be updated and converted to the expanded levels environment. The data must be cleaned up and adjusted to Project Datum, and then a WSDOT utility attaches intelligent tags to the elements to be used for importation into InRoads.

Current Photogrammetry Data

Since the current Photogrammetry deliverables include an InRoads surface file, simply open the surface in InRoads and view the data.

Legacy Photogrammetry Data

This procedure requires a working knowledge of both InRoads and MicroStation. A collaborative effort between Engineers and Technicians yields the best results. Old Photogrammetry and survey datums may require the assistance of a Photogrammetrist or a Surveyor. If you are not sure about your data, contact a specialist.

Stable, accurate existing surfaces are an essential part of the design. When manipulating data, always be sure to thoroughly document your process.

Update Old Files

Photogrammetry files need to be in MicroStation V8 'Expanded Levels' format for this process. New Photogrammetry files have a title block that documents that they are in the correct WSDOT resource environment. Contact the WSDOT CAE Helpdesk for training on converting 63-level DGN files to Expanded Level.

Older 63-level Photogrammetry files were converted to SRV files for use with CAiCE. If you are attempting to bring these files into InRoads, refer to the tech note "*Converting CAiCE data to InRoads*" that is available on the WSDOT CAE web site.

For best results, some older files may need to be updated by the Photogrammetry group in the HQ GeoMetrix Office.

Surface Size

Consider how you want to manage your surfaces in InRoads. Larger surfaces take much longer to load. If you have a large project, you may want to create smaller surfaces that you can work with separately, or merge together in InRoads at a later date.

If you are working a smaller project, you may want to combine multiple Photogrammetry DGNs to convert into a single surface. In this case, use the following process to merge the DGNs before doing a conversion.

Merge Multiple DGNs in MicroStation

Create a new MicroStation file using the **Inroads3D.dgn** seed file to contain the combined Photogrammetry files. Do not open the file at this time.

If you opened the new file, you will need to select *File >Close* command to get back to the MicroStation Manager dialog.

1. In the MicroStation Manager select the *File >Merge...* command.
2. In the Merge dialog's *Files to Merge area*, click on **Select...**
3. Navigate to the DGN's that you want to merge.
4. Highlight the files and select **Add**.
5. Click on **Done** to close the dialog.
6. In the Merge Into: area, click **Select...**
7. Navigate to the file you created in the first step.
8. Click **Merge**.
9. Open and review the combined DGN file.

If this file is large file and working very slowly, you can adjust the view settings to speed things up.

10. Select the *Settings > Rendering > View Attributes* command.
 - Disable **Pattern/Bump Maps** and **Shadows**.
 - Set Display: to **Wireframe**.
 - Enable **Graphics Acceleration**.
11. Click **Apply** or **All**.

You may adjust these settings individually for the View Number selected or to all views.

Once the settings are configured, select the *File > Save Settings* command.

Clean Up DGN File before Conversion

Information on the default level will not convert into the InRoads surface, so this information must be moved to a standard WSDOT level. Address all of the data on the default level.

Create a backup

This is a good time to create a milestone backup. The backup file represents a merged DGN with all data on WSDOT standard levels.

1. Create a backup of the merged file named **LXXXX_PHOTO_StatePlane.dgn**.
2. Make sure that you continue to work in the merged file and not the backup.

Adjust the file to Project Datum

Photogrammetry files are provided in the State Plane coordinates system. It is highly recommended to adjust the file to project datum now. This procedure brings the Photogrammetry data to relative ground coordinates to minimize inverse vs. field measurement errors. It does not otherwise manipulate the data.

If the DGN is not converted to project datum at this time, the two resultant products (the 2D MicroStation file and the InRoads surface) will need to be adjusted separately. This approach may cause discrepancies due to human error involved with repetitive processes.

1. Generate or acquire a State Plane to Project Datum Combined Factor (CF) and the supporting documentation
2. Place the documentation in your project folder structure in the project \Survey\)SurveyDoc folder.
3. Use the WSDOT **State Plane to Project Datum** utility to convert to your project datum.
This utility is located in the WSDOT Items *category* of the **WSDOT Toolbox** in MicroStation.
4. Open the **WSDOT Toolbox**.
5. Expand the *File Utilities* category.
6. Click once on the **State Plane to Project** utility and the **View Description File** button for more information.
7. Double-click on the utility to launch it.

Create a 2D MicroStation Basemap

1. Select the *File > Export > 2D* command to create a basemap named **LXXXX_2dBase.dgn**.
2. In the *Conversion Options* section, enable the **Preserve Z Range** option.
3. Save your 2D basemap

This retains all of the Photogrammetry text.

NOTE: When 2D files are opened in MicroStation, the DGN verification message will appear. Click on **Continue** and choose **PS&E Base File** to open the 2D file.

Prepare the Merged DGN for InRoads

Clean out any information that is not necessary in your surface, such as the Photogrammetry title blocks and north arrows.

To delete specific cells, select the *Edit > Select By Attributes* command.

4. In the Levels area, select **All**.
5. In the Types area, select **Cell**.
6. Select the *Settings > Cell* command.
7. Enter the name of the cell, then select all the cells to delete.

Adjust the MicroStation Graphics Scales

Adjust the graphic scale factor if necessary. This can be done for line work and cells.

For line work, use the following steps to revise the scale of all selected line styles:

1. Select the *Edit >Select All* command.
 - In the **Key-in** dialog, enter *change linestyle scale 100*.
 - Press the **<Enter>** key and left-click in the MicroStation view window
2. For cells, use the following steps to change the scale:
 - Open the **WSDOT Toolbox** in MicroStation
 - Expand the *Element Utilities* area.
 - Select the **Global Cell Scale** by double-clicking
 - Select the cells to scale
 - Enter the Scale that you want the cells to be scaled to, for example 100.

NOTE: There are many cells that reflect the actual size of features and are placed at unique scales so that they reflect the true size on the ground, for example detector loops, trees, and painted arrows. These cell sizes are independent of the plotting scale. Other cells, which are symbols, should always be the same size regardless of plotting scale. These get adjusted appropriately for the desired plotting scale.

Delete All MicroStation Tags

Tags are non-graphical attributes that may be attached to elements that are drawn in MicroStation. We need to delete all the tags and redo them. When files are merged together, the tags from one file may in conflict with the tags from other files.

1. Select the *Element >Tags >Define* command.
2. Remove all sets that start with **inciv**.
3. Leave the **wdotscale** tag.
4. Close the Tag Sets dialog.

Create New Tags

Run the **Tag Photo Elements** utility to create new tag attributes:

1. Select the *Utilities >Macro >Macros...* command.
2. Use the *Macros In:* pull down list to select **TagPhotoElements**.
This option is located in the middle of the dialog box.
3. In the *Macro Name:* field, select **TagElements**.
4. Click **Run**.

Isolate 2D & 3D features

InRoads imports graphics to one point type at a time; therefore we need to create two files - one for all 2D data, and another for 3D data. Then isolate and delete the 2D data from the 3D file, and vice versa.

Remove 2D data from the 3D file

1. Select the *File > Save As* command to create two files: **LXXXX_2DFeatures.dgn** and **LXXXX_3DFeatures.dgn**.
2. Verify that the **LXXXX_3DFeatures.dgn** file is open.
3. Select the *Edit > Select By Attributes* command.
4. Leave all types selected.
5. Click the **Tags** button to open the Select By Tags command.
6. In the *Tag* field, select **inciv_ftr.contour**.
7. Set the *Operator* field to **equal to**.
8. In the *Expression* field, enter DNC.
This entry is case sensitive.
9. Click the **Insert** button.
We've just set up a selection that calls up all elements whose tags indicate DNC or Do Not Contour – 2D.
10. Close the Select By Tags command.
11. In the Select By Attributes dialog, make sure the *Mode* is set to **Selection**.
12. Click the **Execute** button.
All of the 2D information will be selected.
13. Delete the elements.
14. Compress the file using the *File > Compress > Design* command.

Remove 3D Data from the 2D File

1. Open the **LXXXX_2dFeatures.dgn** file.
2. Repeat the steps above but set the operator in the Select By Tags command to **not equal to**.

Import DGN Information into an InRoads Surface

1. Open InRoads in a WSDOT project.
2. Open the **LXXXX_2DFeatures.dgn** file.
3. Create a new surface, **LXXXX_Photogrammetry.dtm**, in InRoads.
4. Switch to the top view in the **LXXXX_2DFeatures** file and fence all of the data.
5. With **LXXXX_Photogrammetry** as the active surface, select the *File > Import > Surface* command.
6. In the Import Surface command, set *Load From* to **Fence** mode.
7. Enable **Used Tagged Graphics Name**.
8. Enter AAA as the seed name.

When data is imported, InRoads may create an extra feature using the seed name. If “AAA” is used, the extra feature will be placed at the top of the feature list and is easily located.

9. Enable **Exclude From Triangulation**.
10. Click the **Apply** button and close the Import Surface dialog.
11. In MicroStation, open the **LXXXX_3DFeatures.dgn** file.
12. Repeat the procedure used to import the 2D features, but disable the **Exclude From Triangulation** checkbox.

If any extra features were created with the features seed name, they need to be deleted.

13. Select *Surface > Edit Surface > Delete Features* command.
14. Look for features that begin with **AAA** and delete them.

View the New Surface

1. Select the *Tools > Options* command and click on the *Factors* tab.
2. Set all the factors to *100*.
3. View all of the surface features.
4. In MicroStation, select all of the elements in the file.
5. Using the Key-in command, enter *Change Linestyle Scale 100*.
6. In the in the 2D basemap reference, note that:
 - the cells in the surface will have lost their rotation
 - cells that usually reflect actual ground size (such as trees) are all placed at the same scale
 - some line styles may not match exactly
7. Triangulate and view the surface in front view.

Any large vertical errors will appear as spikes in the DTM.
8. If the DTM looks good in this view, re-triangulate using the *Surface > Triangulate Surface* command.

Begin with a maximum triangle length of **75'-100'** then increase the length if necessary.

This provides a more realistic view of areas that may require additional survey.
9. Save, document, and back up your new surface.

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