

InRoads Data to IHSDM

C:\Users\Public\cae\Standards\WSDOT\Reports\Station Offset and Station Base\WSDOT IHSDM LandXML.xsl

Overview

The Interactive **H**ighway **S**afety **D**esign **M**odule, or IHSDM, is an application developed by the Federal Highway Administration. This program is a series of modules that provide software analysis tools for evaluating safety and operational effects of geometric design decisions on two-lane rural highways.

WSDOT has been involved in the development and review of IHSDM's suite of tools, including the Policy Review Module, the Crash Prediction Module, the Design Consistency Module, the Intersection Review Module and the Traffic Analysis Module. For more information about WSDOT's IHSDM implementation, refer to the Design Office's IHSDM website:

<http://www.wsdot.wa.gov/Design/Policy/IHSDM.htm>

This document describes the process for translating InRoads geometric data into IHSDM. This work flow includes generating a station-offset report with the design surface data as well as translating geometry data using LandXML. The process has been developed for InRoads XM or higher, and works with IHSDM 2007 (v4.0.5) or higher.

Workflow

The InRoads data required for IHSDM are horizontal and vertical geometry alignments, Roadway Designer superelevation sections (if applicable), and the design surface.

Geometry

Once InRoads horizontal and vertical alignments have been established, they can be exported into an XML file for IHSDM. For superelevation, you must include critical superelevation stations as event points on the horizontal alignment for a complete analysis.

Superelevation

If you want to include critical superelevation stations in your geometry project, follow these steps:

1. Select the *Tools > View XML Reports* command.
2. In the **Bentley InRoads Report Browser**, select *File > Open* and navigate to your alignment's IRD Roadway Design file. Change the files of type in the Open dialog box to the IRD file extension and click **Open**.
3. In the report browser, open the Roadway Design folder and select the **WSDOT Roadway Design Superelevation To Even Points.xsl style** sheet.
4. Select the *File > Save As* command to save this data as a text file, and then close the report browser.
5. In InRoads, select the *File > Text Import Wizard* command.
6. In the *Data Type* field, use the dropdown to select **Horizontal Event Points**. Navigate to the file that you created in step 4.

7. Work through the steps in the **Text Import Wizard**.

For example, start the import at line 4, or after the heading remarks. On step 4, configure the column data formats (station, offset, style).

You can review these event points using the *Geometry > Horizontal Curve Set > Event Points* command.

LandXML Export

The following steps describe how to export the geometry using the LandXML translator. The file names and locations are crucial for referencing the output files for IHSDM. You can either:

- Save your XML files to the *C:\Users\Public\cae\Standards\WSDOT\Reports\Station Offset and Station Base* folder, which is the same folder that contains the WSDOT IHSDM LandXML.xsl style sheet
- Save your XML files in your project folder and then copy the files into the Bentley folder
- Change the path and name within the XML file (in this case, the full short path of *\Station Offset and Station Base\MyGeom.xml* must be provided)

The preferred method is to save the files directly to the WSDOT CAE XML data folder.

1. In InRoads, select the *File > Translators > LandXML Translator* command.
2. Select the **Export Alignment** tab.
3. Use the *Filter* button to select the specific horizontal alignment. Use LandXML Version 1.0, Include **Active Children Only**, and set the linear units.
4. Specify a file name.

NOTE: Because this XML file and the XML report that you create for the design surface are referenced together, it is a good idea to save this LandXML file with the name **MyGeom** in the *C:\Users\Public\cae\Standards\WSDOT\Reports\Station Offset and Station Base* folder.

5. Save the LandXML file.

Design Surface

IHSDM uses seven surface features from InRoads. After your design surface is generated from the Roadway Designer, you can change the feature names for the benefit of IHSDM's naming scheme, or copy these features into a new surface and change those feature names.

Change feature names using the *Surface > Feature > Feature Properties* command. The table below provides the feature types and names:

InRoads feature type	IHSDM name
leftForeSlope	Ditch_L
leftShoulder	Shoulder_L
leftEOP	Edge_Driving_Top_L
center	CL_Asphalt_Top
rightEOP	Edge_Driving_Top_R
rightShoulder	Shoulder_R
rightForeSlope	Ditch_R

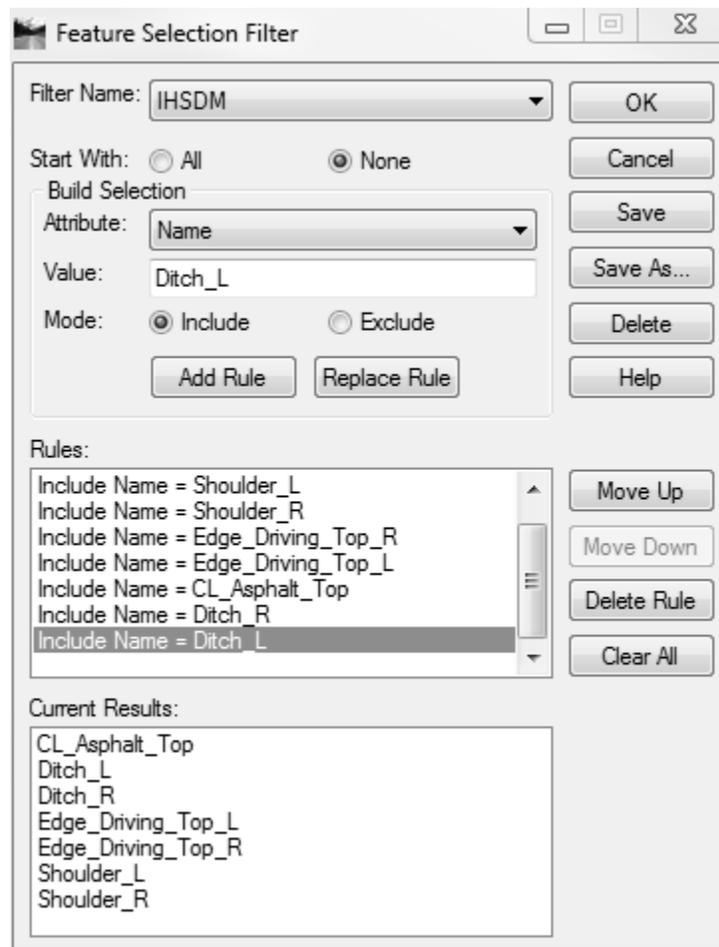
For example, your left edge of pavement feature is called **L_ETW** in your design surface. This feature, or any feature in that location that is essentially the leftEOP, should be renamed to **Edge_Driving_Top_L**, which is the feature name that will be used by IHSDM.

Exporting the Surface:

Create a Station Base report to export the surface to an XML file.

1. Select the *Tools > XML Reports > Station Base* command. In the Station Base Report dialog, specify the alignment and station limits on the *General* tab.
2. On the *Include* tab, toggle on **On-Alignment**. If you are including the superelevation stations, also toggle on **Event** horizontal points.
3. Set an interval for the report (otherwise it will open with blank data).
4. On the *Features* tab, select the seven features that are used in IHSDM (see the table in the previous section for the specific names).

You can either select these features individually, or create a feature filter for IHSDM features.



IHSDM Style Sheet

The following steps explain how to create an input file for IHSDM.

1. In the **Bentley InRoads Report Browser**, select the **WSDOT IHSDM LandXML.xsl** style sheet in the *Station Offset and Station Base* category.
2. Save this file as **MyOutput.txt**, in the *C:\Users\Public\cae\Standards\WSDOT\Reports\Station Offset and Station Base* folder.

This file needs to initially be saved as a text file to maintain the integrity of the style sheet schema. It will later be renamed as an XML file.

1. In Windows Explorer, open the **MyOutput** text file in Notepad.
Make sure that the value of the encoding attribute on the first line is **"ISO-8859-1"**. If this value is different, replace it with the correct value.
2. Save the output text file with an XML file extension.

The file should be named **MyOutput.xml**.

You can open the **MyOutput.xml** file in Notepad to modify a couple of variables: in the Roadways section, there is a **terrainType** variable to hold the terrain type (flat, rolling or mountainous). There is also a variable to hold the classification (arterial, collector or local).

You can also modify these parameters within the IHSDM application, after your data has been imported into a project.

This output file is now ready to be imported into IHSDM. The IHSDM import wizard is a straightforward process.

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