AUTODESK **UNIVERSITY** 2015

CI10267

Enhance This, Enhance That - AutoCAD Civil 3D Enhancements Explained

Seth Cohen – Advanced Technologies Solutions Inc.

Learning Objectives

- Learn how to use AutoCAD Civil 3D with other file formats
- Discover the AutoCAD Civil 3D product enhancements
- Learn how to use the data translator to bring in Bentley data
- Learn how to use the Bridge Design Module in AutoCAD Civil 3D

Description

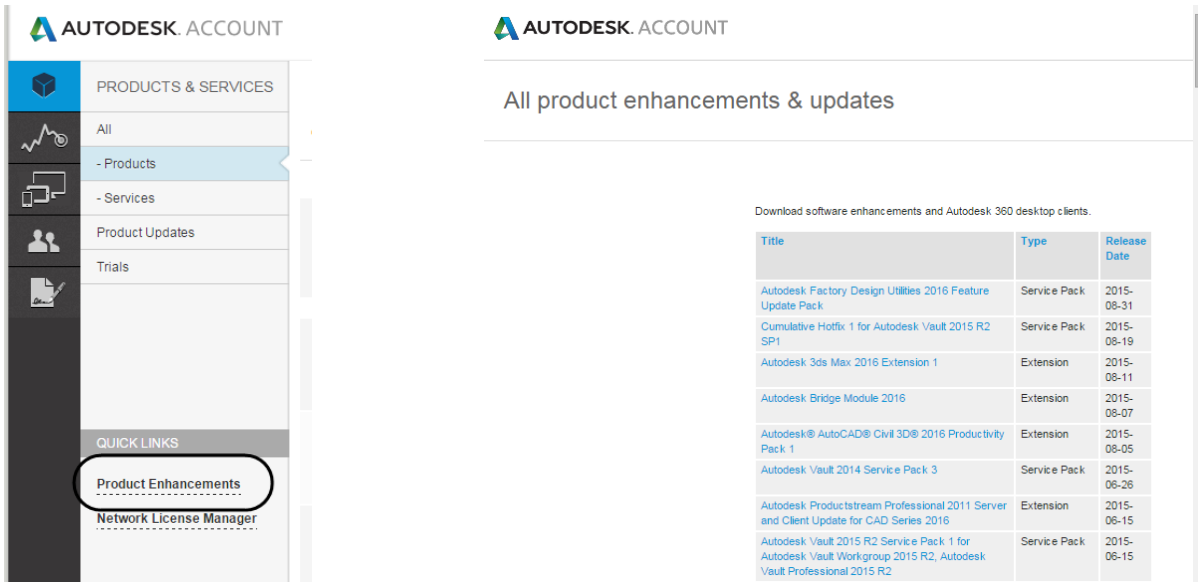
In this presentation, we will explore many of the AutoCAD Civil 3D software enhancements available from the Autodesk subscription website, and how you can use them. We will examine the Data Translation Module, Geotechnical Module, River and Flood Analysis module, and the Bridge Design module. Come learn how to use these tools to better improve your productivity.

Your AU Expert

Seth Cohen *is Vice President of Strategic Business Development and Senior Civil Infrastructure Specialist at Advanced Technologies Solutions Inc. He specializes in strategic planning processes for our clients, including long range planning, strategic planning, and CAD strategy reviews with company directors. He also conducts many classes for CAD professionals and specializes in providing project start-up and CAD standards implementation for commercial and government organizations. Seth has over 15 years of civil engineering experience, helping managers, designers, and construction firms implement CAD, produce plans, as well as aid in AMG (Automatic Machine Guidance).*

Getting the Enhancements

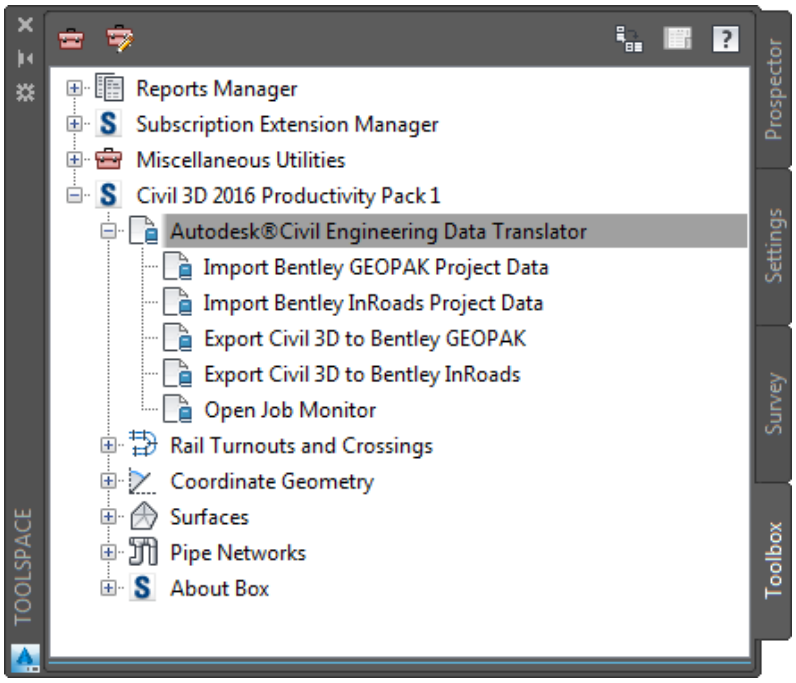
To get any of the product enhancements, you navigate to your Autodesk account, and click on the Product Enhancements link.



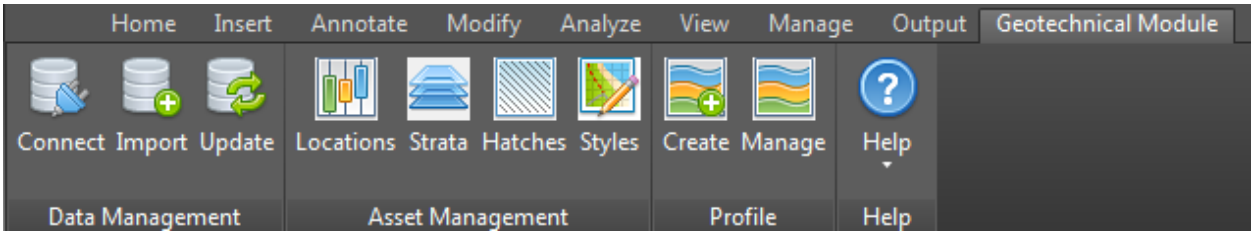
The Autodesk Product Enhancements Link

Using Enhancements

Once installed, the product enhancements will either appear in the **TOOLSPACE > Toolbox** tab, or some of them may have their own ribbon. In some cases, you will also need your Autodesk ID to use the tools.



Enhancements in the TOOLSPACE > Toolbox



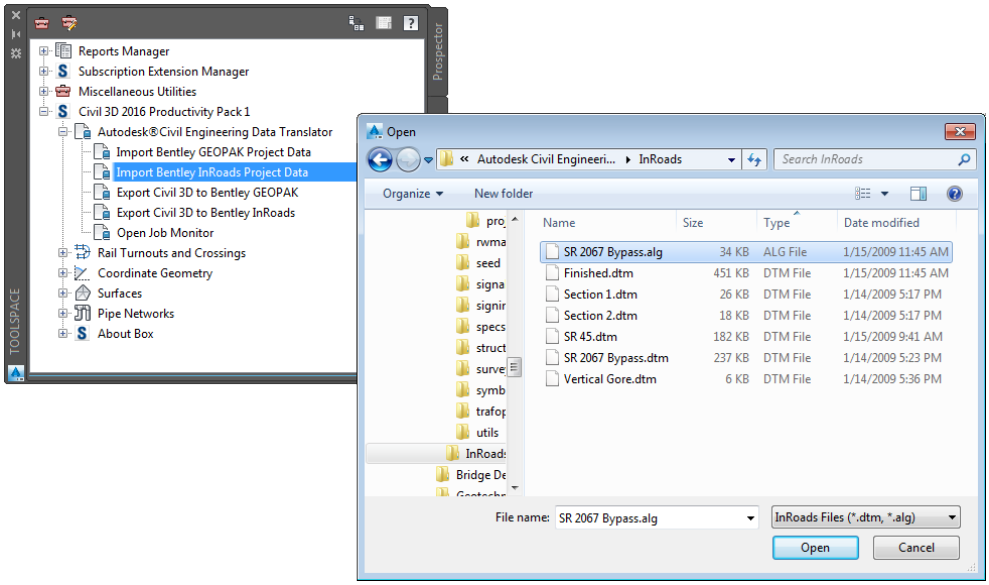
The Geotechnical Module in the Ribbon

The Autodesk Civil Engineering Data Translator

The Autodesk Civil Engineering Data Translator translates AutoCAD Civil 3D files to files that can be used in Bentley® GEOPAK® and Bentley® InRoads®, and translates GEOPAK and InRoads files to files that can be used in AutoCAD Civil 3D.

Before you even start the tool, it is a good idea to have an idea of the data that you are importing. Also, if you have access to a DGN file (MicroStation© drawing file), you may want to either import it or underlay it to make sure the data is brought in correctly.

To use the enhancement, you double-click the appropriate tool in the **TOOLSPACE > Toolbox tab**.



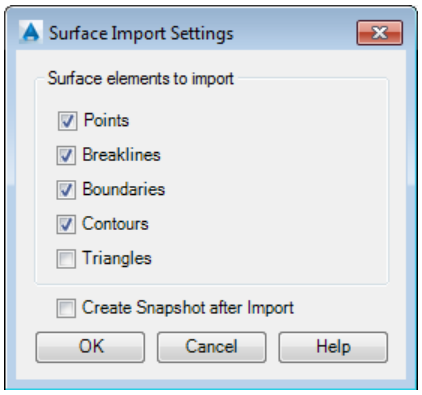
Double-clicking the Import Bentley InRoads Tool

So that you have an understanding of what each of the Bentley file types that you can import/export are, below is a table of each extension.

File Extension GEOPAK	**Description**
.GPK	This is a binary file that contains all the data for the horizontal and vertical alignments for a project.
.TIN	This is a binary file that contains surface data.
File Extension InRoads	**Description**
.ALG	This is a binary file that contains all the data for the horizontal and vertical alignments for a project.
.DTM	This is a binary file that contains surface data.

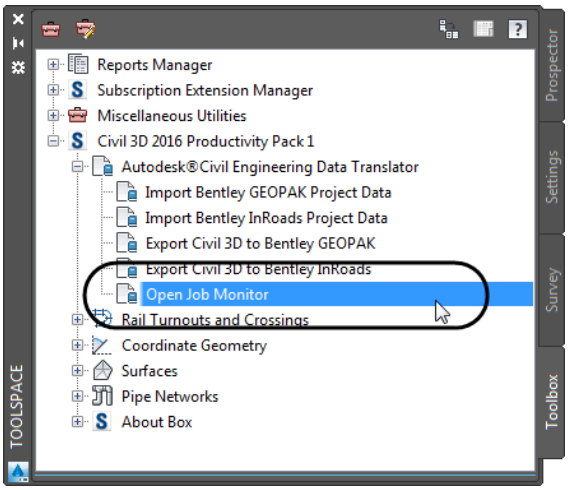
Using the Tool

In describing this tool here, we will examine the import process into Autodesk AutoCAD Civil 3D. Once you start the tool, you will then select the InRoads or GEOPAK file you need to translate. Depending on the type of file you select, you may be prompted with an additional dialog box asking you what you want to import. For instance, when you import a surface file, you will be prompted with the surface data you want to use to create the surface.



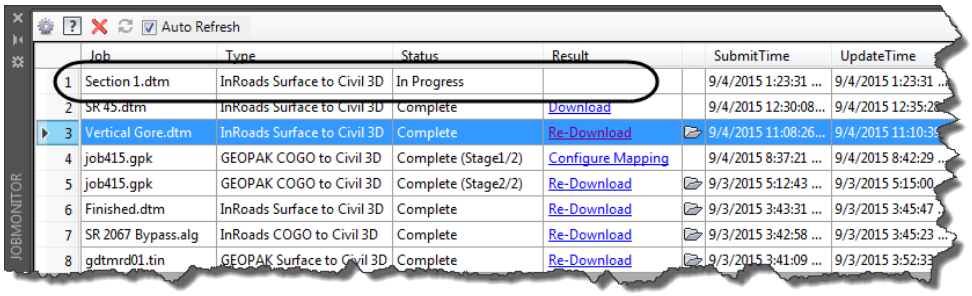
The Surface Import Settings Dialog Box

Once you click OK, the file is uploaded to the Autodesk cloud services for processing. To see the progress of your file being translated, open the Job Monitor palette from the Toolbox tab.



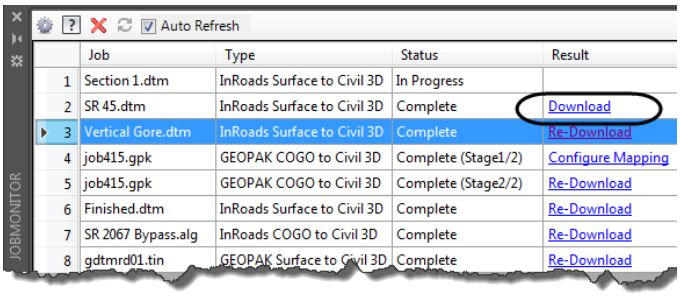
The Open Job Monitor Tool

The **JOB MONITOR** palette shows you the progress of your job(s), as well as when your job is ready to be downloaded.



Job In Progress

Once your job is completed, click the **Download** link to download the file(s) to a folder of your choice.

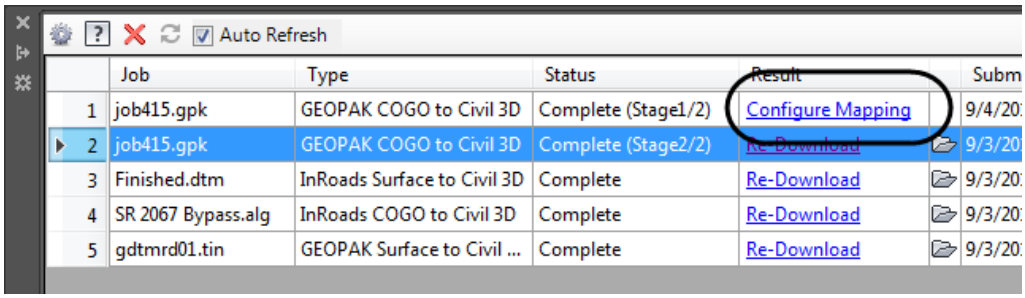


Download Link

Things to Know about the Tool

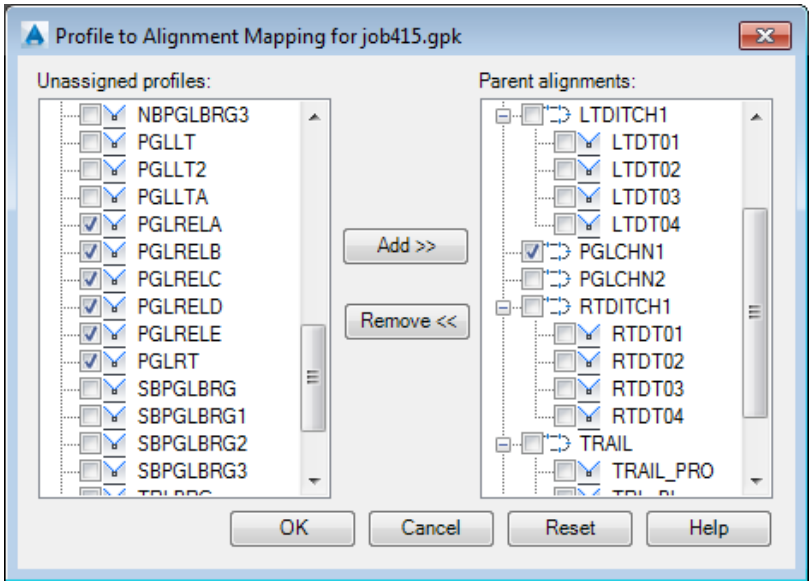
There are some items that you want to be aware when using the translator tool.

First, when translating a .GPK file into a .DWG, you will need to know what profiles belong to what horizontal alignments. In the JOB MONITOR palette, you will be notified to **Configure Mapping** of the profiles.



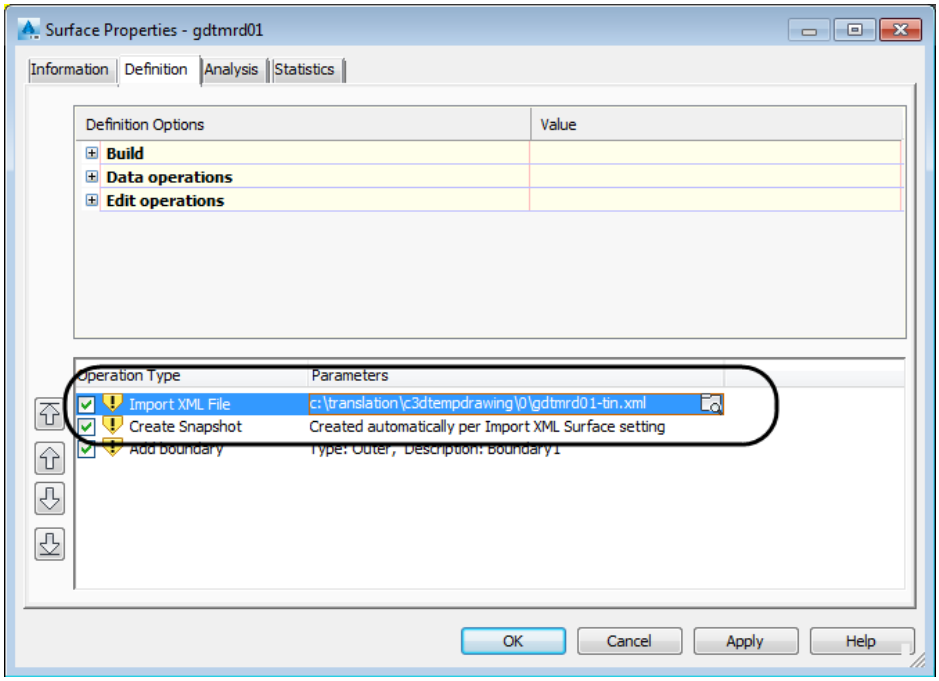
Configure Mapping Link

Once you click the **Configure Mapping** link, you are prompted to map the unassigned profiles in the .GPK file to the parent alignments in the .GPK file. It is very important that you know which profiles should fall under which horizontal alignments. To map the appropriate profile(s), toggle the profile(s) on the left, and then toggle on the parent alignment they should fall under, and click the **Add** button.



Mapping Profile(s) to the Correct Alignment

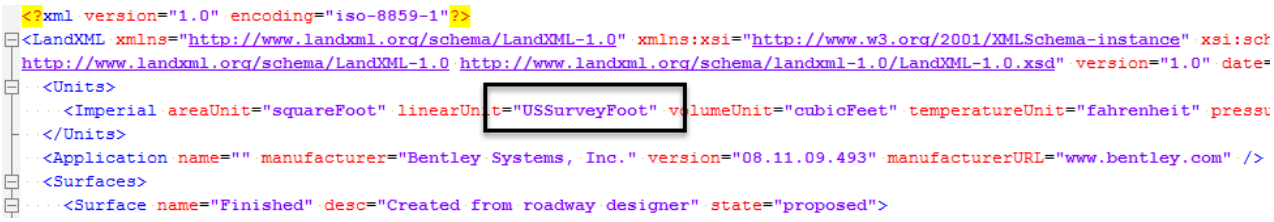
As of this writing, there are some issues when you import a surface into a Civil 3D drawing. First, when you import the file, what Civil 3D is doing is simply referencing a .XML file. By default, this path is locked into a path that you most probably do not have on your hard drive (see image below). To resolve this issue, simply navigate to the Surface Properties and, in the Definition tab, browse to where the file is located.



Default Incorrect Path to Surface .XML file

On this same topic of surface issues, when the translator translates the file, it translates it using International Feet. There is no way as of this writing to choose US Survey Foot. What you need to do is open the .XML file, and find the linearUnit tag, and change it from foot, to USSurveyFoot.

Before – linearUnit Setting set to International Feet

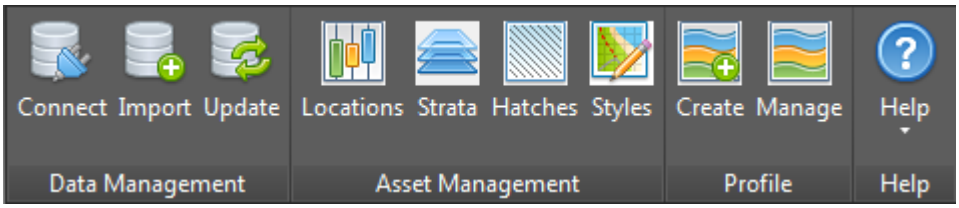


After – linearUnit Setting set to US Survey Feet

Autodesk Geotechnical Module

The Autodesk Geotechnical module integrates with AutoCAD Civil 3D. Project data can be used to generate models within AutoCAD, creating 3D surfaces of geology, 3D boreholes, logs on plan and dynamic profiles. The enhancement makes full use of AutoCAD Civil 3D objects. Standard commands can be used to edit and model the data, and you can even customize the look and feel of the borehole data.

The integration is dynamic and as changes are made to the data, Civil 3D updates the model(s), borehole sticks and profiles. The powerful features of AutoCAD Civil 3D can be used to edit and manipulate the geological surfaces as well.



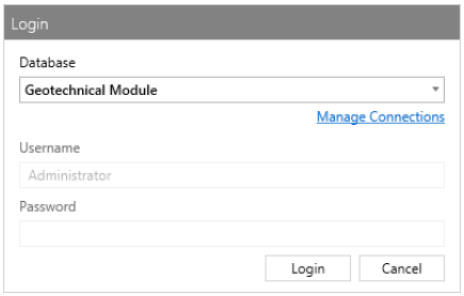
Ribbon Geotechnical Tools

Using the Tool

To use this tool, you basically go from left to right. First, you use the **Connect** command to access project data from the local Geotechnical Module database installed on the local machine. It can also be used to connect to a central HoleBASE SI database. The Connect command is also used to create projects in the local Geotechnical Module database.

Connecting

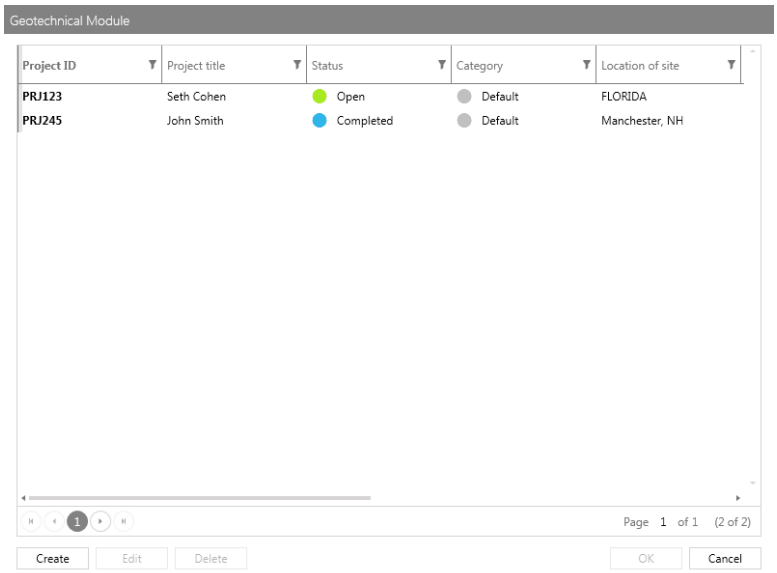
The first time you use the command, the Login dialog box appears. From the Database drop down list, you select the Geotechnical Module database to connect to. The Username and Password can be ignored as these are only used when connecting to a HoleBASE SI database.



The Login Dialog Box

Creating a Project

Once logged in, you will need to create project for the geotechnical information to be stored in.

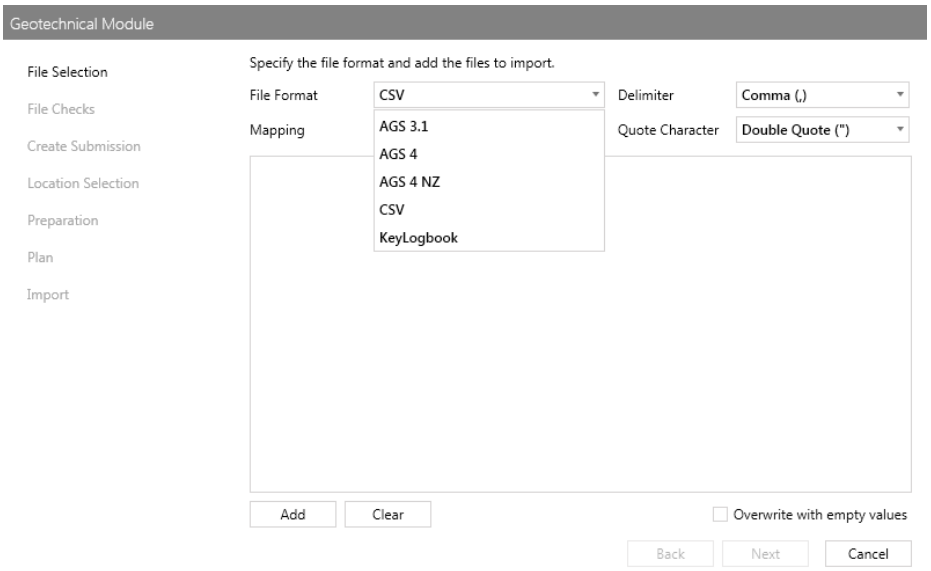


Geotechnical Project Dialog Box

Import Data

Once a project is selected, it is saved to the .DWG file, and you are ready to import data into it. To import data, select the **Import** tool from the Data **Management** panel. The formats supported are AGS, CSV, and KeyLogbook. The module will also check for validity of the file before importing the data.

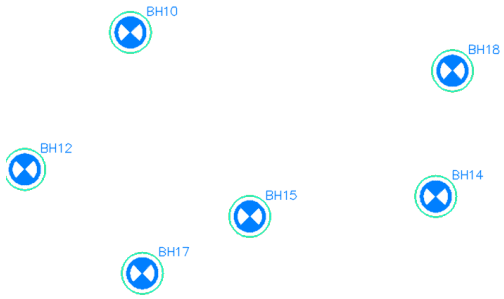
For a list of the column formatting, open the help file. You can do so from the Help panel in the Geotechnical Module Ribbon.



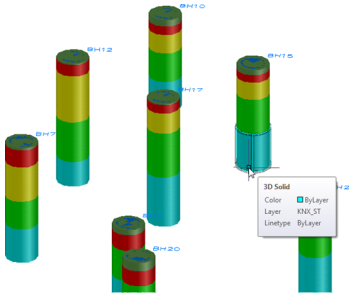
Import Geotechnical Data Dialog Box

Managing Locations

Once the data is imported, it will display in the active drawing. The data is truly 3D and can be viewed as such. The module creates AutoCAD 3D solids from the data, and Civil 3D Cogo Points that you can stylize to your standards.

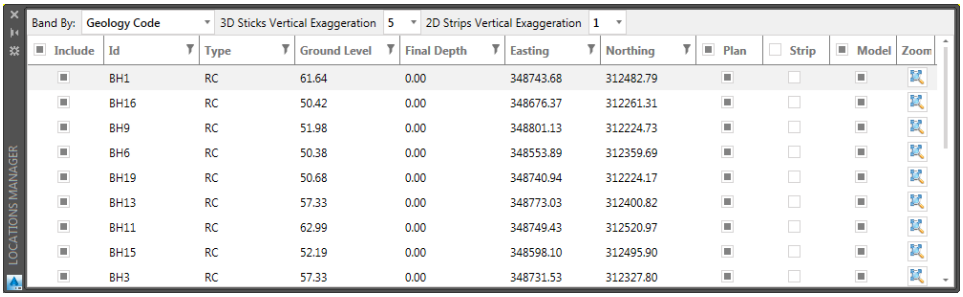


2D View of Borehole Data



3D View

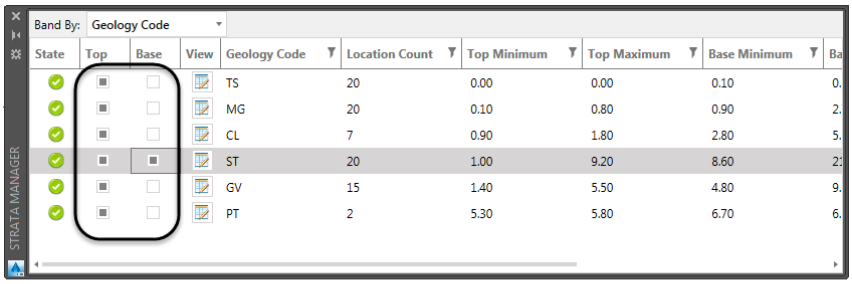
Use the **Asset Management** panel to manage the Locations, Strata, Hatches, and Styles of the borehole data.

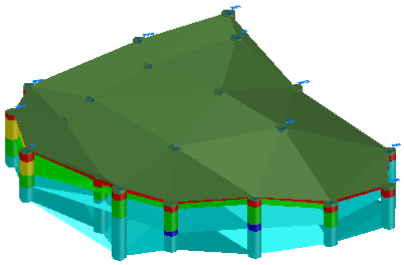


Include	Id	Type	Ground Level	Final Depth	Easting	Northing	Plan	Strip	Model	Zoom
	BH1	RC	61.64	0.00	348743.68	312482.79				
	BH16	RC	50.42	0.00	348676.37	312261.31				
	BH9	RC	51.98	0.00	348801.13	312224.73				
	BH6	RC	50.38	0.00	348553.89	312359.69				
	BH19	RC	50.68	0.00	348740.94	312224.17				
	BH13	RC	57.33	0.00	348773.03	312400.82				
	BH11	RC	62.99	0.00	348749.43	312520.97				
	BH15	RC	52.19	0.00	348598.10	312495.90				
	BH3	RC	57.33	0.00	348731.53	312327.80				

LOCATIONS MANAGER Palette

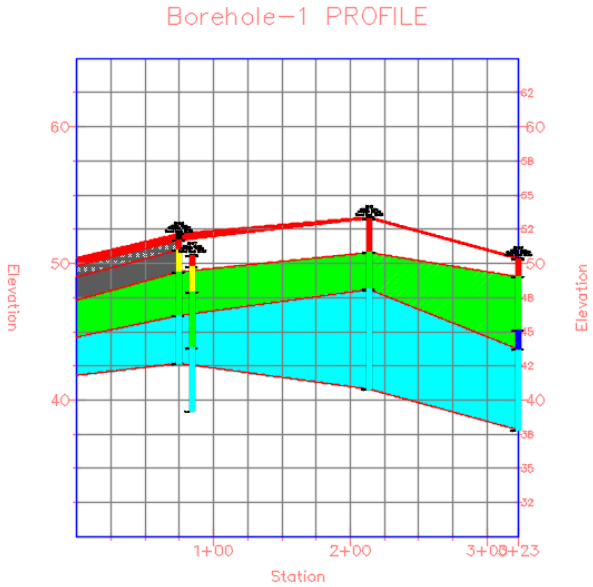
In the **STRATA MANAGER**, you can toggle on the Top or Base (bottom) and Civil 3D surfaces will automatically be generated.





STRATA MANAGER Palette, and Created Surfaces

Once you have the surfaces created, you can use the **Create Profile** tool in the **Profile** panel. You want to use the tools in the Profile panel to generate, and re-generate your profile views instead of manually creating them. If you manually create profile views, it will take you a lot longer to do so, and you will not have some of the dynamic features available in the Geotechnical tools.



Profile View From Borehole Create Profile Tool

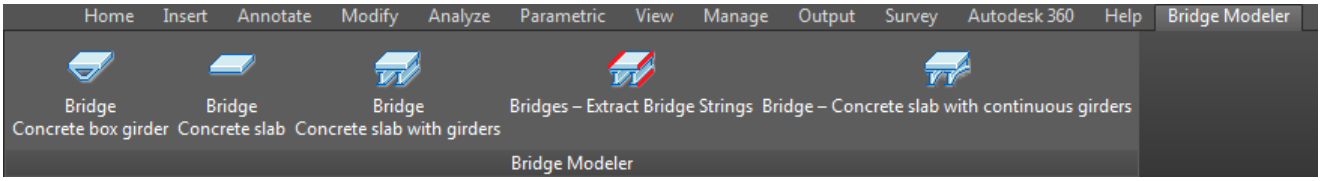
Autodesk Bridge Module

The Autodesk® Bridge Module enables you to create bridge models based on critical geometry in a corridor model and existing ground surface. You can create Civil 3D alignments and profiles from key bridge strings such as bottom of lowest girder or top of barrier. You can also quickly transition bridge parameters created in the Civil 3D version of Bridge Modeler into the Autodesk® Revit Structure Bridge Modeling extension (REX) where additional modeling can be accomplished.

The supported bridge types include Girder bridges (steel or concrete girders), Concrete slab, and Concrete box girder. Bridge elements include Abutments, piers, bearing configurations, Bridge deck, barriers, and roadway bed.

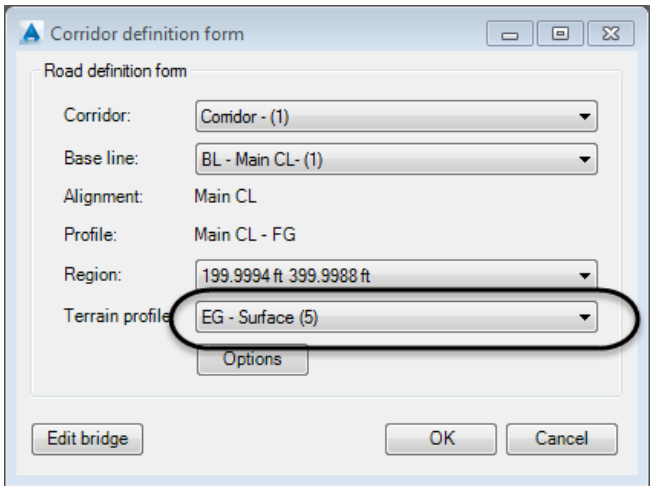
Using the Tool

The Bridge Modeler ribbon tab contains all the tools necessary to create bridges in Civil 3D.



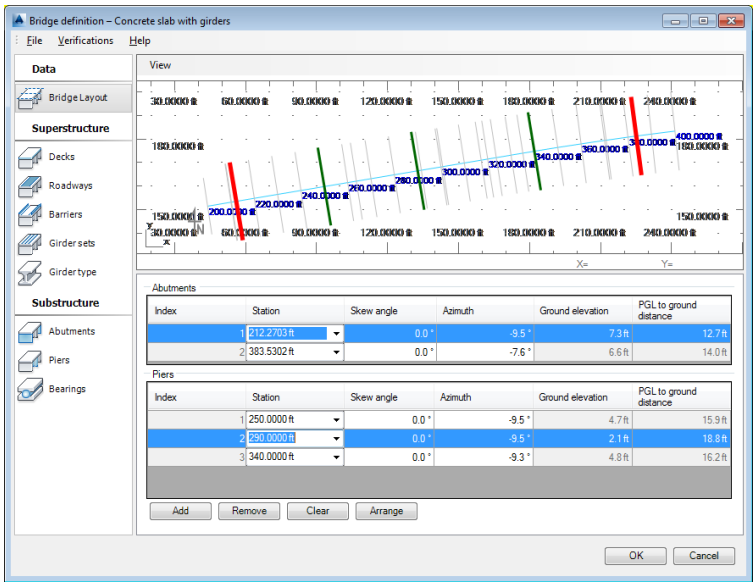
Bridge Modeler Ribbon Tab

Prior to using this tool, you will need to create a region for the station to station limits of the bridge. Then, you pick the bridge type that you are interested in creating. After starting the tool, you select the corridor to create the bridge from, and be sure to choose the existing surface in the Terrain Profile drop-down. The bridge modeler tool uses the surface defined here to define the depths of the piers.



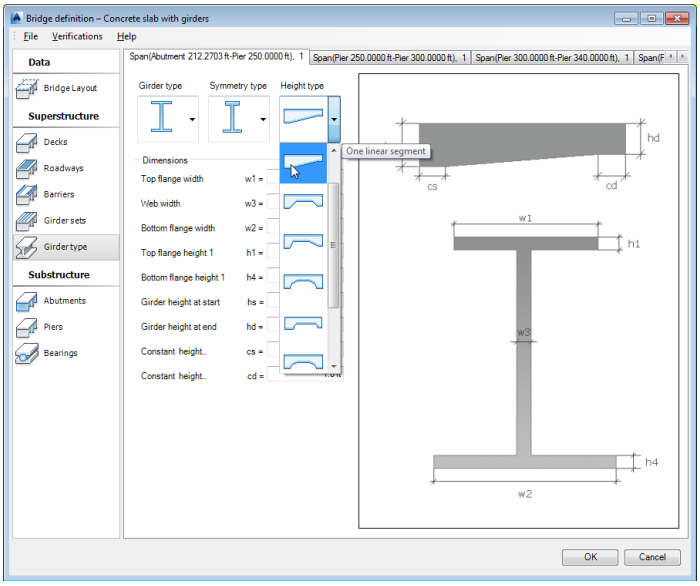
Corridor Definition Dialog Box

Once you have defined the corridor parameters, the Bridge Definition dialog box appears. In this dialog box you can add/remove piers and abutments.



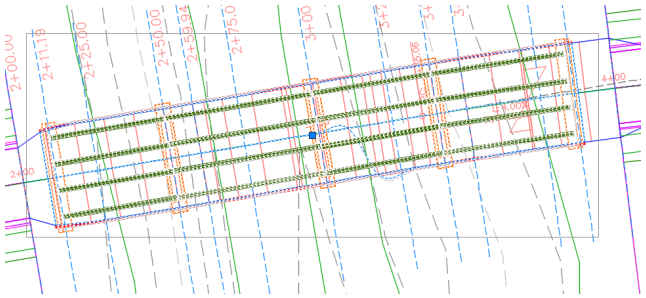
The Bridge Definition Dialog Box

By selecting the different sections, you can also edit/pick the deck, roadway, barrier, and girder parameters and types.

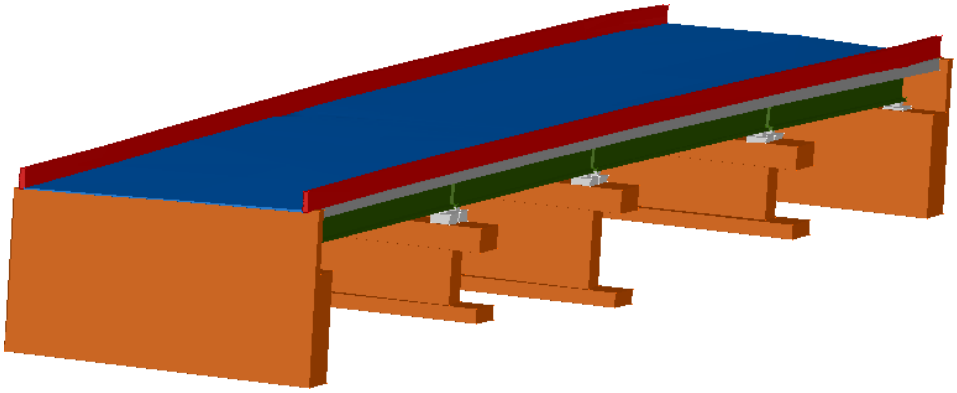


The Bridge Definition Dialog Box Displaying Girder Type Parameters and Types

When you are done setting up your bridge, click OK. AutoCAD will create AutoCAD 3D Solids of all the different parts of the bridge. The Bridge Modeler tool also makes a group of the solids as well for easy manipulation.

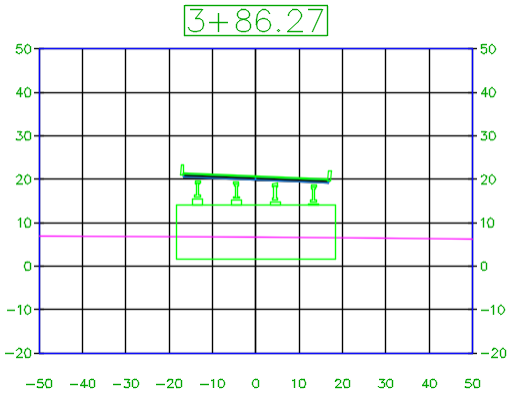


Bridge Created from Bridge Modeler Tool



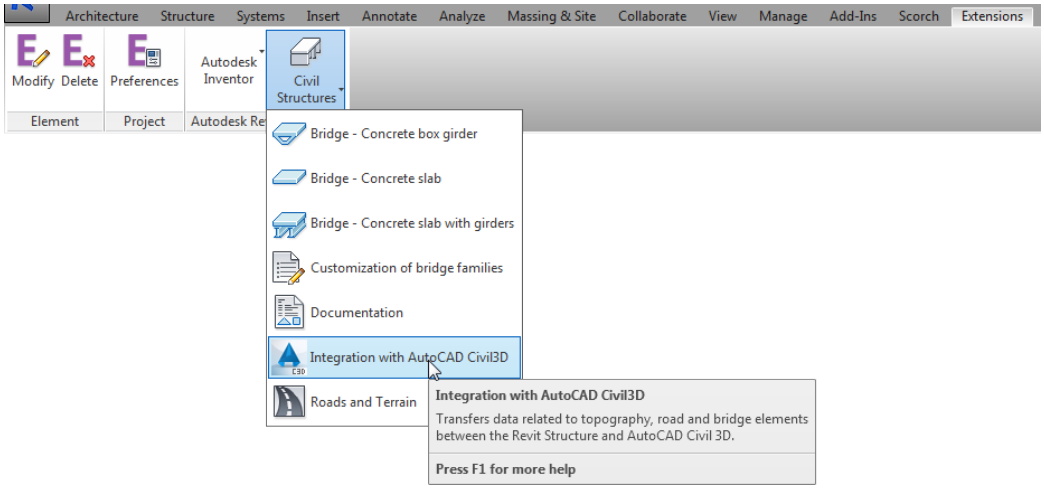
3D View of Bridge

Once you have the solids in your drawing, you can project these objects to either your section views or profile views, from the **Ribbon: Home Tab > Profile &Section Views Panel >Section/Profile View drop-down > Project Objects To View**.



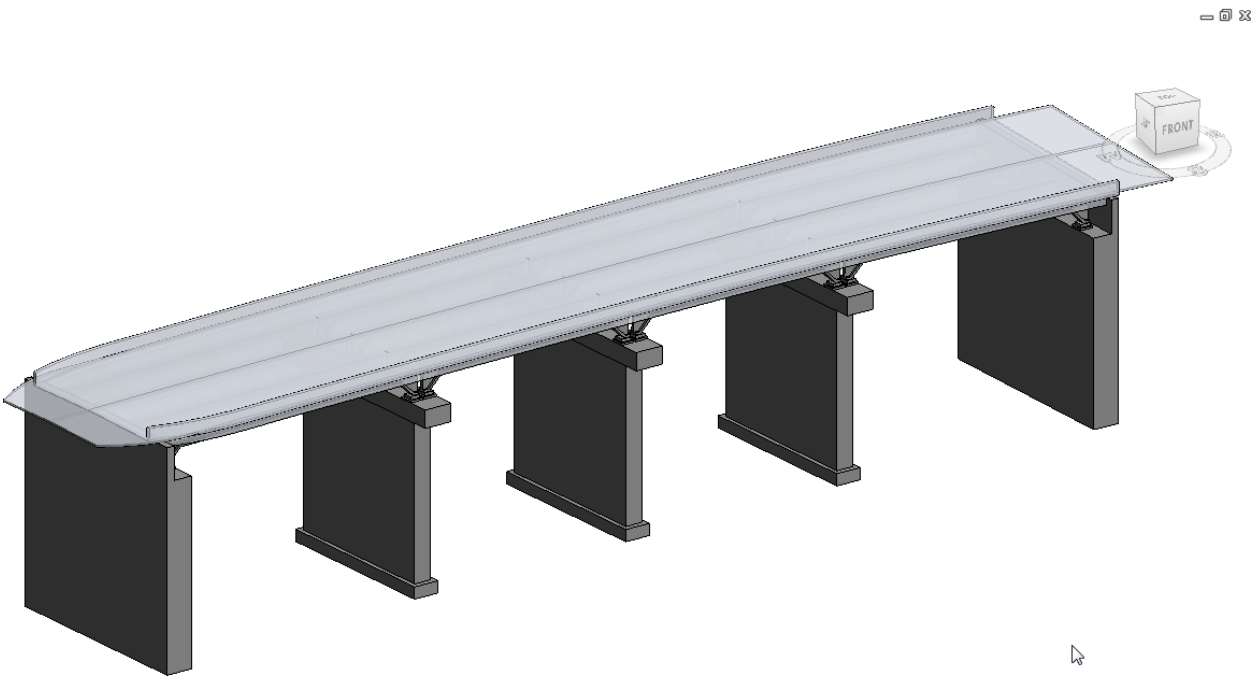
3D Solids Projected in a Cross Section View

If you would like to do further design in Revit or Revit Structure, you can download the Civil Structures Extension from the Autodesk App Store, and install the extension. To import the bridge solids into Revit, open both AutoCAD Civil 3D and Revit, and within Revit, navigate to the Extensions tab. In the Civil Structures drop-down, choose the Integration with AutoCAD Civil 3D tool.



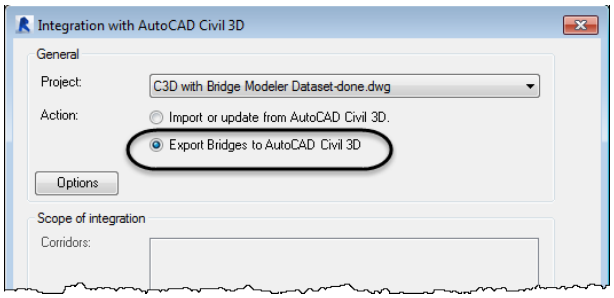
Civil Structures Tool in Revit

Once you start the tool, Revit will look into the .DWG file, and find the bridges placed in the .DWG file, and import the bridge deck into Revit. You will then need to run the Bridge Creation tool in Revit to have Revit create families of the bridge components. Once in Revit, you can then add additional components such as rebar, and do analysis



The Bridge Model in Revit.

To update the bridge from Revit into Civil 3D, follow the same process listed above, except choose the Export Bridges to AutoCAD Civil 3D action.



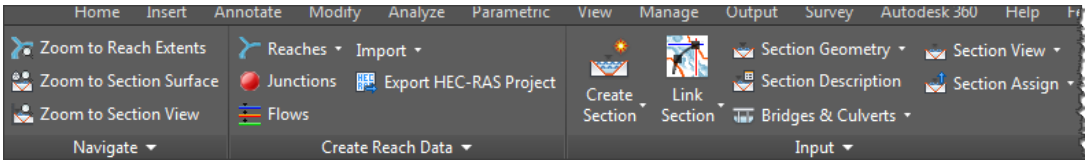
Exporting Bridge from Revit to AutoCAD

Autodesk River & Flood Analysis Module

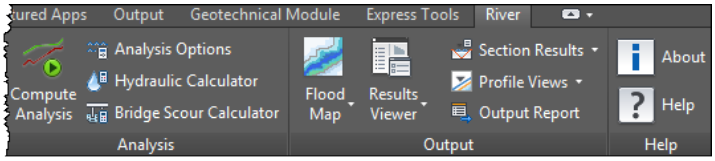
The Autodesk River and Flood Analysis module helps users perform HEC-RAS calculations and modeling to analyze the hydraulics of water flow through natural rivers and other channels directly within the AutoCAD Civil 3D. The module automates HEC-RAS cross-section cutting, water surface analysis, flood plain mapping, and related modeling tasks. Using the module, users can utilize numerous automation mapping tools for extracting cross-sections from various digital terrain; perform sophisticated bridge and culvert analysis; automate the process of designing and analyzing roadway crossings; perform automated bridge scour computations for FHWA and state Department of Transportation roadway studies; and automatically generate floodplain and floodway maps for FEMA and other agency submittals.

Using the Tool

All the tools necessary are located in the River tab.



River Ribbon Tab



River Ribbon Tab

For additional information on each of the tools in the River Flood Analysis enhancement, navigate to the Ribbon: River tab > Help Panel

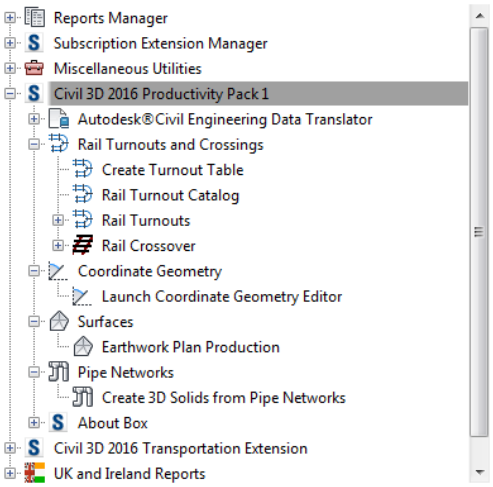
Other Autodesk Product Enhancements

Below is a listing of some of the additional enhancements available for Civil 3D.

Export KML

The Export KML utility allows users to export Civil 3D models and 3D AutoCAD elements to .KML (Keyhole Markup Language) or .KMZ (Zipped .KML files) format files for use in various GIS / Mapping systems.

Civil 3D 2016 Productivity Pack 1



Civil 3D 2016 Productivity Pack Tools in the Toolbox

Rail Turnouts and Crossings

Creates and edits rail turnouts and crossovers.

Coordinate Geometry Editor

Creates and adjusts traverses.

Earthwork Plan Production

Create a grid of labels that annotate differences in volume between surfaces.

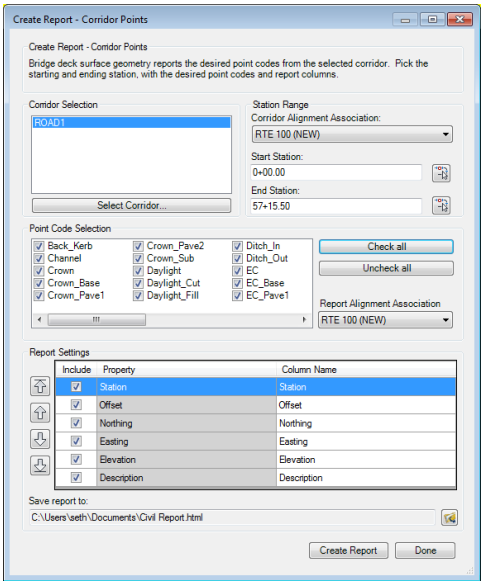
3D Solids from Pipe Networks

Create AutoCAD 3D solids from pipes and structures.

Autodesk® AutoCAD® Civil 3D® 2016 Transportation Extension

New Reporting tools

Various reports have been added to accommodate many different agencies and municipalities specific needs.



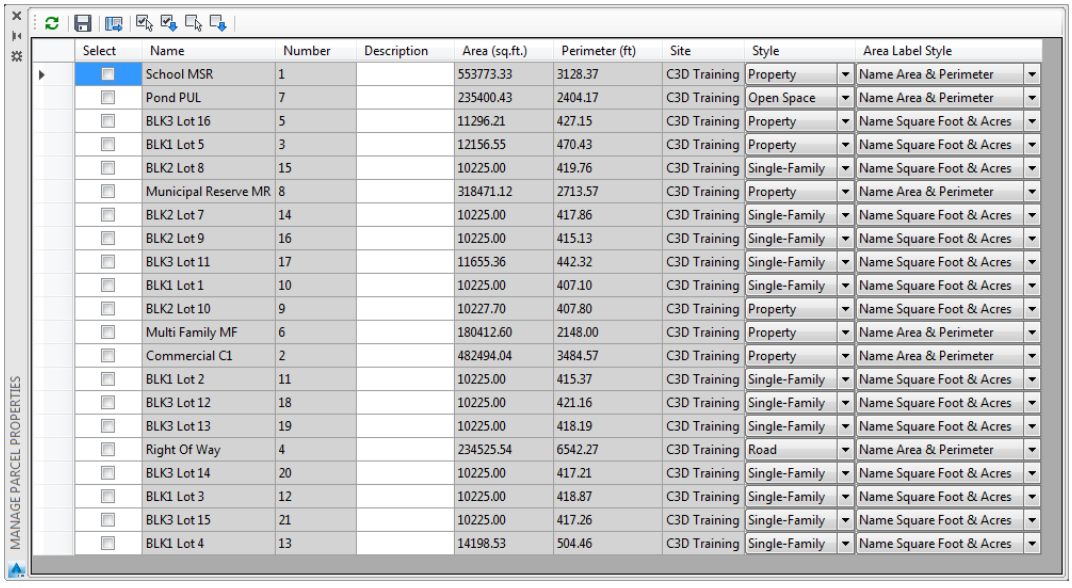
Corridor Points Report Dialog box

Line by Direction and Distance

Draws AutoCAD LINE segments by referencing bearings and distances, locations selected in the drawing, or COGO points

Parcel Properties Manager

Manages parcel properties.

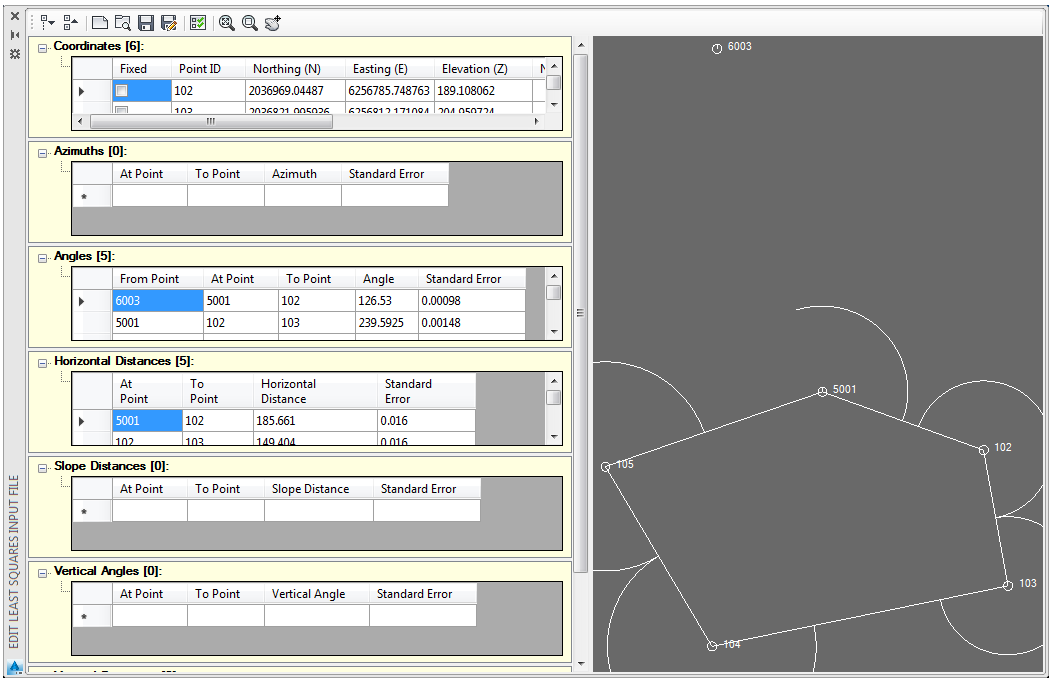


Select	Name	Number	Description	Area (sq.ft.)	Perimeter (ft)	Site	Style	Area Label Style
	School MSR	1		553773.33	3128.37	C3D Training	Property	Name Area & Perimeter
	Pond PUL	7		235400.43	2404.17	C3D Training	Open Space	Name Area & Perimeter
	BLK3 Lot 16	5		11296.21	427.15	C3D Training	Property	Name Square Foot & Acres
	BLK1 Lot 5	3		12156.55	470.43	C3D Training	Property	Name Square Foot & Acres
	BLK2 Lot 8	15		10225.00	419.76	C3D Training	Single-Family	Name Square Foot & Acres
	Municipal Reserve MR	8		318471.12	2713.57	C3D Training	Property	Name Area & Perimeter
	BLK2 Lot 7	14		10225.00	417.86	C3D Training	Single-Family	Name Square Foot & Acres
	BLK2 Lot 9	16		10225.00	415.13	C3D Training	Single-Family	Name Square Foot & Acres
	BLK3 Lot 11	17		11655.36	442.32	C3D Training	Single-Family	Name Square Foot & Acres
	BLK1 Lot 1	10		10225.00	407.10	C3D Training	Single-Family	Name Square Foot & Acres
	BLK2 Lot 10	9		10227.70	407.80	C3D Training	Property	Name Square Foot & Acres
	Multi Family MF	6		180412.60	2148.00	C3D Training	Property	Name Area & Perimeter
	Commercial C1	2		482494.04	3484.57	C3D Training	Property	Name Area & Perimeter
	BLK1 Lot 2	11		10225.00	415.37	C3D Training	Single-Family	Name Square Foot & Acres
	BLK3 Lot 12	18		10225.00	421.16	C3D Training	Single-Family	Name Square Foot & Acres
	BLK3 Lot 13	19		10225.00	418.19	C3D Training	Single-Family	Name Square Foot & Acres
	Right Of Way	4		234525.54	6542.27	C3D Training	Road	Name Area & Perimeter
	BLK3 Lot 14	20		10225.00	417.21	C3D Training	Single-Family	Name Square Foot & Acres
	BLK1 Lot 3	12		10225.00	418.87	C3D Training	Single-Family	Name Square Foot & Acres
	BLK3 Lot 15	21		10225.00	417.26	C3D Training	Single-Family	Name Square Foot & Acres
	BLK1 Lot 4	13		14198.53	504.46	C3D Training	Single-Family	Name Square Foot & Acres

Manage Parcel Properties Palette

Survey Tools

Additional tools to convert RW5 Raw, and Star*Net DAT files to .FBK, as well as an improved Least Squares editor.

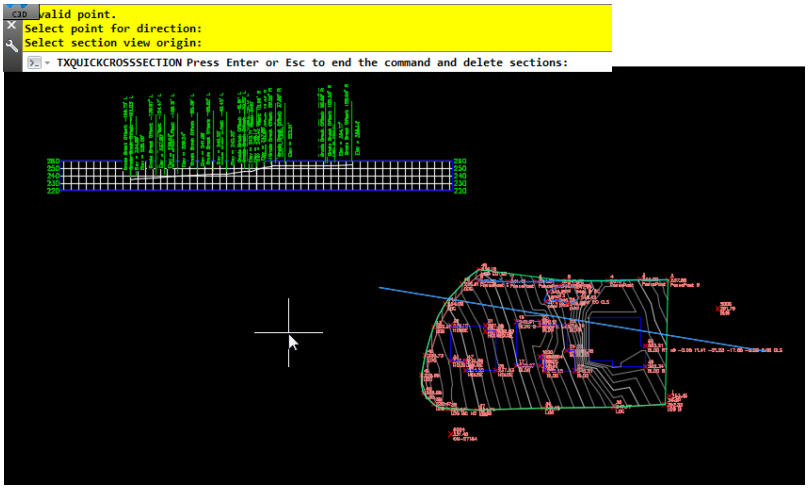


Edit Least Squares Input File Palette

Surface Tools

Quick surface cross section

Creates a *temporary* cross section of two surfaces.



Temporary Cross Section View

Surface High/Low Points

Creates COGO points at the highest and lowest points within the boundary of a specified surface

CI10267
Enhance This, Enhance That - AutoCAD Civil 3D Enhancements Explained

Thank You!

Please complete the Survey for this class for a chance to win a FREE pass to AU2016!

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