AutoCAD®
Civil 3D®
2008

# LandXML Drawing Support

## Contents



## Introduction

LandXML interoperability is the preferred method of sharing civil engineering and survey data between users, software applications, and government agencies around the world. AutoCAD® Civil 3D® 2008 provides the highest level of support for the entire LandXML-1.1 data model. AutoCAD Civil 3D 2008 supports LandXML import/export directly into project drawings and as a separate command into the Survey feature.

This document details the drawing based LandXML import/export functionality in AutoCAD Civil 3D 2008 software, as well as changes from previous versions of Civil 3D. Highlights include the following:

- Improved interoperability with all registered LandXML applications (for more information, visit **www.LandXML.org/LandXMLApps.htm**)
- Support for all LandXML-1.1 data
- Support for new high-definition 3D road model
- Support for survey data import/export

## LandXML Schema Versions Supported

AutoCAD Civil 3D 2008 supports the following LandXML schema versions:

- LandXML-1.1
- LandXML-1.0
- LandXML-0.88

# General Data Handling

AutoCAD Civil 3D 2008 uses the following rules for interpreting LandXML data during import and export operations:

- All coordinate locations are always treated as Northing, Easting, Elevation (or Y,X,Z).
- All station values are treated as the actual measured distance along the alignment or geometry.
- Point references to pointType-derived locations are supported, <CgPoint pntRef="100"/>, including CgPoint, Start, Center, End, Monument, P, and CrossSectPnt elements.

# Import Functionality

The following notes and details list apply to Civil 3D 2008 LandXML import capabilities.

- Provides control over importing data that may already exist in the drawing (skip, update, or append)
- Supports LandXML-1.1, 1.0, and 0.88 data files
- Handles unspecified pipe diameter units
- Imports surface source data such as breaklines, contours, and data points as 3D polylines and coordinate geometry (COGO) points
- Imports breakline and contour surface source data directly into surface TIN (triangulated irregular network) definition
- Imports a surface from breakline, contour, or data points source data and no TIN definition
- Imports nested parcels as union parcels
- Imports alignments based on PI (point of intersection)
- Supports clothoid, bloss, halfSineWave, and Japanese cubic types through alignment spiral import
- Imports plan features as 2D or 3D polylines
- Imports survey data such as monuments, survey monuments, and reduced observations directly into drawing as COGO points in specially named point groups
- Supports extended survey data import into Survey feature: equipment details, instrument and target setup details, monuments, survey monuments, observation groups, raw observations, and reduced observation
- Imports curved pipes

# Export Functionality

The following notes and details list apply to Civil 3D 2008 LandXML export capabilities.

- Provides much faster performance
- Exports corridor model as roadway with alignments, profiles, reference surfaces, and design cross sections
- Exports union parcels as nested parcel elements
- Exports additional parcel statistic attributes
- Exports breakline and contour source data for TIN surfaces
- Exports volume surfaces with statistics
- Exports curved pipes
- Provides option to export sampled cross sections
- Supports clothoid, bloss, halfSineWave, and Japanese cubic types through alignment spiral export
- Stores author/user identification data at the system level, no longer requiring entry for each drawing export

# Import Details

AutoCAD Civil 3D 2008 supports the import of data from LandXML-0.88, 1.0, and 1.1, as detailed in the following table:

| LandXML Element Supported | Notes |
|---|---|
| Alignments | |
| AlignPI | |
| Application | |
| Author | |
| Breaklines | Imported as 3D polylines on layer “<surfacename>_ Breaklines”. |
| CgPoint | Imports a COGO point, using name and description or code attributes. Number is auto-assigned if name is alphanumeric, but name is maintained. |
| CgPoints | Supports multiple elements. If <CgPoints> is named, a corresponding point group is created and COGO points are added. |
| Contours | Imported as 3D polylines on layer “<surfacename>_Contours”. |
| CoordGeom | Line, curve, IrregularLine, chain, and spiral (clothoid, bloss, halfSineWave, and Japanese cubic). |
| CoordGeom | Line, curve, spiral, IrregularLine, and chain. |
| CoordGeom | Imported as 3D polylines to current layer. |
| CoordinateSystem | |
| DataPnts | Imported as COGO point group named “<surfacename>_DataPoints” on layer “<surfacename>_DataPoints”. |
| Definition | |
| DesignSpeeds | All design speed station ranges imported. |
| InstrumentDetails | |
| Monuments | Creates COGO points in a specially named monuments points group. |
| ObservationGroup | Setups, raw and reduced observations. |
| Parcels | Creates parcels from data, and supports nested parcels. |
| PipeNetworks | Each <PipeNetwork> is imported as a Civil 3D pipe network. |
| Pipes | Supports curved pipe. |
| PlanFeatures | |
| ProfAlign | A design vertical alignment (PVI, vertical curves: circular, parabolic, and asymmetric parabolic). |
| Profiles | |
| ProfSurf | Imported as static sampled ground surface. |
| ReducedObservations | Creates COGO points in an observations point group. |
| SourceData | |
| StaEq | Station equations. |
| Structs | |
| Superelevation | All superelevation transitions. |
| Surfaces | |
| Survey | |

| LandXML Element Supported | Notes |
|---|---|
| Survey | Survey element. |
| SurveyHeader | Units, CoordinateSystem. |
| SurveyMonuments | Creates COGO points in a monuments point group. |
| TIN | Option to import faces only, and then retriangulate “quick” or maintain the triangulation in the file (slower). Supports face edge visibility and face neighbor optimization attributes. |
| Units | Used for unit conversion if required. |
| Units.diameterUnit | |
| Units.diameterUnit | |

# Export Details

AutoCAD Civil 3D 2008 supports the export of data from LandXML-1.1, as detailed in the following table:

| LandXML Element Supported | Notes |
|---|---|
| Alignments | |
| Application | Always exported. |
| Author | |
| Breaklines | All exported. |
| CgPoints | Each point group exports as <CgPoints> with matching name and all contained points exported. |
| Contours | All exported. |
| CoordGeom | Line, curve, spiral (clothoid, bloss, halfSineWave, and Japanese cubic). |
| CoordGeom | Union parcels exported as nested parcels. |
| CoordinateSystem | Exports Map Zone name/**European Petroleum Survey Group (EPSG)** name/Open Geospatial Consortium’s Well Known Name. |
| CrossSects | |
| CrossSectSurf | Sample lines exported as CrossSectSurfs. |
| DataPnts | All exported. |
| Definition | |
| DesignCrossSectSurf | Corridor assemblies exported as DesignCrossSectSurfs. |
| DesignSpeeds | All design speed station ranges exported with corridor model to roadway element. |
| GRID | Not supported. |
| Parcels | |
| PipeNetworks | |
| Pipes | |
| ProfAlign | Design profiles (PVI, vertical curves: circular, parabolic, and asymmetric parabolic). |
| Profiles | |
| ProfSurf | Surface sampled profile data. |
| Roadways | Corridors exported as <Roadways> with references to <Alignments> with Profiles and Cross Sections (both sampled ground and design sections) and to 1 or more reference surfaces. |

| LandXML Element Supported | Notes |
|---|---|
| | |
| SourceData | |
| StaEq | Station equations. |
| Structs | |
| Superelevation | All superelevation transitions. |
| Surfaces | |
| TIN | Complete TIN with optional watershed. |
| Units | Always exported. |
| Units.diameterUnit | |
| Units.diameterUnit | |

# Conclusion

LandXML is an open, comprehensive data format that encompasses information created during the civil engineering design and analysis process. Authoring applications such as AutoCAD Civil 3D are able to import and export LandXML files that are essentially equivalent to land development and transportation project files. Exporting this project data into LandXML makes it more accessible to other applications. For instance, other complementary or even competitive applications can now share data through LandXML. The reliability and accessibility of LandXML make it an excellent solution for short-term or long-term archival of project data. AutoCAD Civil 3D 2008 enables users to share LandXML data with more software than in previous releases.