

AutoCAD Civil 3D 2008

Best Practices for Working with Large Data Sets

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Working with Large Data Sets

This paper offers practical advice on how to organize large and complex design projects and their related data so you can work most efficiently with AutoCAD® Civil 3D® software.

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- [Project Setup](#)
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Overview

Any large project requires good planning to make progress and to prevent—or at least minimize—unpleasant surprises. An AutoCAD Civil 3D project with large data sets is no different. In this case, the project team should set up its data files and configure AutoCAD Civil 3D for optimum efficiency of operations. Generating screen displays and propagating updates through a network of related objects can be very time consuming with large data sets, but there are many ways to reduce the processing time.

What Do We Call Large?

For the purpose of this discussion, a large project includes one or more of the following data sets:

- A surface with more than a million points
- A subdivision with more than 200 lots
- A corridor longer than 15 km

But these are approximate sizes. If your projects use smaller data sets, you can still benefit from most of the advice in this document to improve your work processes and your computer system performance. Implementing some of these recommendations will also equip your team to take on larger projects if the opportunity arises.

Data Management Strategy

The tips and guidelines presented in this document are based on four general principles:

- Groom the data so it can be processed faster. In the case of input data such as points and surfaces, groom the data at the time of input, or before you start using it in the design process.
- Use data references to distribute the engineering model across multiple drawings, and to separate the production drawings from the engineering model.

- Minimize the display and update of objects not required in current design tasks.
- Reduce the frequency of automated operations such as surface rebuild, drawing save, and virus scanning, or turn off these operations.

These principles are applied at several levels of an engineering project, including the drawing settings, object styles, project management, and working with objects. Because some of the best practices involve decisions to make at the beginning of a project, it is important to read this entire document and consider how to apply the recommendations to your projects.

Data Management in AutoCAD Civil 3D

This section details a number of best practices to retain optimum data processing efficiency as you build up the content of a Civil 3D model.

Data Tiling

Tiling refers to segregating a model into manageable work zones. This process facilitates working with large amounts of data, and enables better data collaboration of the design team.

For example, the existing ground surface model of a large corridor region can be created in tiles, with one tile per drawing. The combination of tiles represents the entire project. If adjacent surface regions need to be used together for plotting or analysis, data references can be used to bring them in. For alignment design, the existing ground (EG) profiles from each of the surface tiles can be combined in a single profile view to display a contiguous view of the EG profile.

The concept of tiling a model is equally effective in dealing with a large subdivision. In that case, the lots and corridor models can be tiled so that designers can work simultaneously on multiple tiles, or phases of the project.

Points and Surfaces

Surfaces are essential to most design tasks in AutoCAD Civil 3D, and because of their size, it is quite important to structure them for efficient processing.

The following sections describe some best practices for using point files and surfaces.

Adding Point Files

Unless you need to edit points and point groups, add a point file reference to the surface definition rather than importing the point file into the drawing. Doing this keeps the drawing smaller and easier to process. If your surface is composed from several point files, merge them into one larger point file for improved performance.

With large surfaces, it is recommended that you do not create a surface snapshot, but instead retain the active links to point files, XML files, or other input data. The drawback with a snapshot is that it occupies system memory, so it can double the amount of memory required for the surface. The use of snapshots is more viable with small surfaces. The presence of a snapshot results in faster surface rebuilds because the system references the snapshot rather than redoing the operations that created it.

Filtering Point Files

Ensure that your point file does not contain many more points than what is required for your surface. Excessive points can mean a coverage area that is too large, or a point density that is unnecessarily high. In either case, it means extra processing every time the surface is saved or regenerated. If you know that your point file includes more points than necessary, you can filter the file at the time of import, limiting the number of points imported, or sampling a fraction of the points. To do this, configure the point file format in advance. On the Toolspace Settings tab, click Point ► Point File Formats, and then select the type of file you want to import. As shown in figure 1, settings exist on the lower right for reducing the size of the imported file.

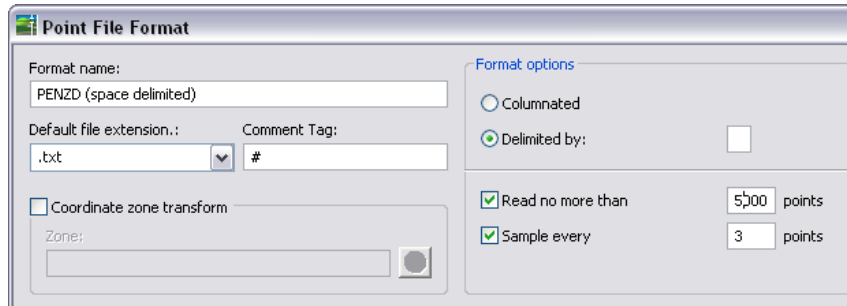


Figure 1: Settings for point file filtering

This type of filtering often makes sense when using LIDAR data, which contains points in a very small grid.

The Grid Surface Advantage

If you have a choice of source data for your existing ground surfaces, create grid surfaces rather than TIN (triangulated irregular network) surfaces whenever possible. The difference in system memory requirements is quite significant for large surfaces. As a general rule, a grid surface requires about one-sixth (17%) of the memory space required by the same surface in TIN format.

A new feature for AutoCAD Civil 3D 2008 enables you to export DEM (digital elevation model) files from a surface. At the time of export, you can expand the grid spacing to make the file smaller. Figure 2 shows the menu selection used to start the export process.

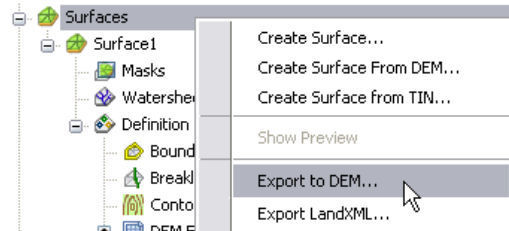


Figure 2: DEM file export

Figure 3 shows the Export Surface to DEM dialog box, where you can set the grid spacing in the exported DEM file. A grid spacing of 2 covers a given area with one quarter the number of points required by a grid spacing of 1. Use a

higher numeric setting here to create a DEM file that is smaller in size, and less accurate.

Another important export setting is the method for determining elevation at each point. You can choose to either sample the surface elevation at the grid point, or compute the average elevation from surrounding points. The latter method (averaging) is very time consuming. For greater efficiency, use the surface sampling option, as shown in figure 3.

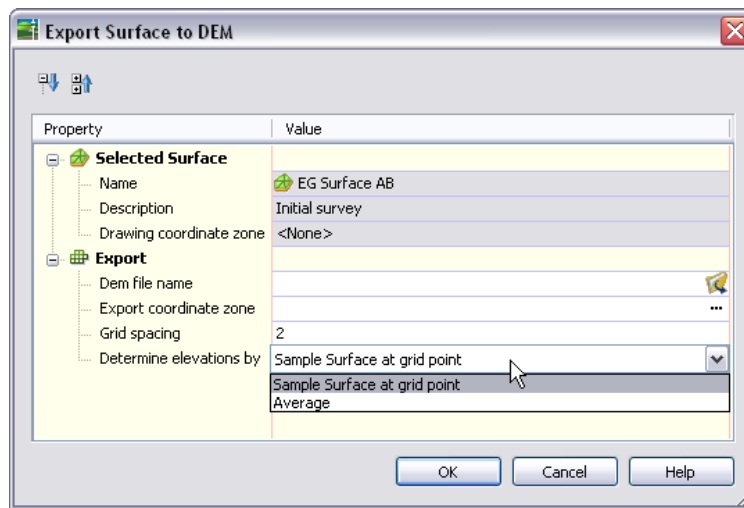


Figure 3: Optimizing settings for an exported DEM file

Editing Contour Data

Before you add contour polyline data to a surface, consider whether it includes some terrain that is not needed for design purposes. If so, you can use the AEC modify tools to crop unwanted portions of the contours. As shown in figure 4, these tools are available on the right-click menu when no objects are selected.



Figure 4: Location of AEC modify tools

Grooming LandXML Files

Before importing LandXML data to build a surface, check the LandXML settings for surface import, as shown in figure 5.

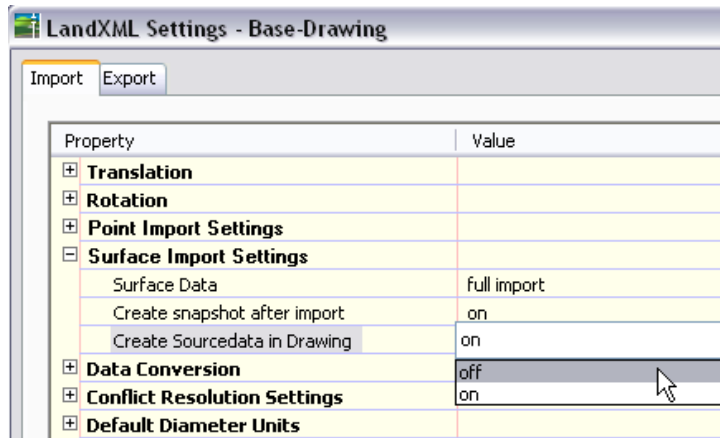


Figure 5: LandXML surface import settings

Note that you can choose to not create the source data (breaklines and contours) as 3D polylines in the drawing. This data is often not required for

your design work with the surface. By turning this option off, you can make the surface file smaller, and by a significant amount if the source data includes a lot of contours.

Reducing the Displayed Surface Area

If your original surface extends beyond the region affected by your design, you can use a mask or boundary to suppress extraneous data from the surface display. Each option is described more fully in the following sections.

Applying a Mask

Use a mask to display a subset of a surface with the active style settings. The mask boundary can be of any polygonal shape, and you can easily edit the shape or move the mask around like a viewing window. Surface redrawing is faster because areas outside the mask are not displayed. The entire surface remains in the drawing for reference in surface volume calculations, and operations such as surface rebuilds continue to process the entire surface.

Creating a Boundary

To reduce the processed surface area, create a smaller outer boundary around the region of your design. Areas outside the boundary are not drawn or included in calculations, but they remain in the file, available for future use. If you later need to enlarge the boundary and restore deleted portions, simply rebuild the surface. This operation requires a valid reference to the surface definition data, so you should ensure that this link remains intact.

Controlling Surface Data Resolution

The AutoCAD Map 3D software tools included with Civil 3D can be used to prepare a low-resolution surface with higher resolution in a specific area of interest. This is particularly useful when working with a LIDAR file. The process

involves the Map 3D FDO Connect functionality, and the following general steps:

- 1 Use Microsoft Access to convert the LIDAR point file (TXT format) to an Access point database (MDB format).
- 2 Create an ODBC data source linked to the MDB file.
- 3 Create a point-filtered surface in AutoCAD Civil 3D, reducing the point density of the LIDAR data, as shown in figure 1.
- 4 In Civil 3D, change your workspace to Map 3D for Geospatial, and use the Display Manager to establish an ODBC connection to the MDB file.
- 5 Inside a rectangular boundary area, add the points from the MDB file (exploded to AutoCAD points with three dimensions), then add the points to the surface definition as drawing objects.

For more information, see the Help for AutoCAD Map 3D.

Minimizing Flat Areas

When you add contour data to a surface, it is important to understand how to use the settings for minimizing flat areas. Otherwise, the minimizing operation can run very slowly, and the resulting surface can be inaccurate. By way of background, as surface triangles are created around contour data, erroneous flat triangles can appear in regions where contour lines follow tight curves, creating a condition where all three points of a triangle can be on the same contour.

If you add all your contour data in a single operation, AutoCAD Civil 3D corrects flat areas very well by checking the surrounding elevations and interpolating new points. After you right-click Contours ► Add in the surface definition on the Toolspace Prospector tab, the Add Contour Data dialog box includes default settings to minimize flat areas, as shown in figure 6.

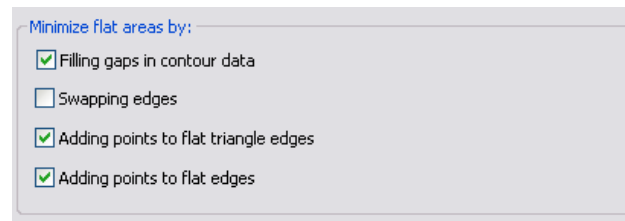


Figure 6: Default settings when adding contour data

If you add contour data in two or more batches, you should clear the check boxes so that the minimizing of flat areas operation occurs only once, after the last batch has been added. When it is time to minimize the flat areas, you can use either the settings in the Add Contour Data dialog box, or you can click Surfaces menu ► Edit Surface ► Minimize Flat Faces.

Alignments and Corridors

With long corridors or corridor networks, create multiple regions for modeling purposes. Normally, corridor regions are used to mark the use of different assemblies, with a region boundary occurring where the use of one assembly ends and another begins. But you can also add regions without changing assemblies. The value of additional regions is control—you can use the Corridor Properties dialog box to turn off the modeling of regions not required for current operations, as shown in figure 7. Doing this improves the speed of corridor rebuilding.

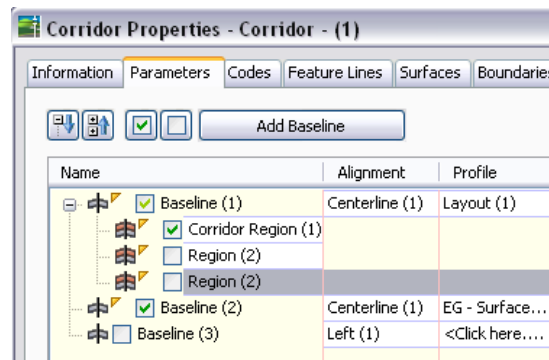


Figure 7: Turning off corridor regions and baselines

If your corridor includes some regions with few changes in the surface or the assembly, consider reducing the frequency of the corridor modeling in these regions to improve processing speed.

Profile and Section Views

To minimize processing time, design your profile and section views on grids that use styles without excess detail. Some examples are as follows:

- Turn off the minor grid lines and ticks
- Expand the scale of the major grid
- Avoid using clipped grid options
- Keep label text very short

Where necessary, include any of these elements in more detailed styles that you apply to the profile and section views for final production, but minimal display styles can serve you well through many iterations in the design phase.

Section View Production

A large project often involves the need to display many section views. AutoCAD Civil 3D 2008 includes a major new feature for separating the corridor model from the display of section views in a production drawing. In brief, the process is as follows:

- 1 In the corridor drawing, create a data reference for each alignment that is used as a baseline for the corridor.
- 2 In a new section view drawing, insert the alignment references, and attach the corridor drawing as an xref.
- 3 Create sample lines in the section view drawing, and generate the section views.

Accessing More Windows RAM

The Windows XP operating system typically does not allow an application to use more than 2 GB of system RAM. To facilitate working with large data sets, you can increase this limit to 3 GB if your computer has 4 GB or more of physical RAM installed. This change has not been tested on all system configurations, so it is not supported by Autodesk. However, you can test it with your system, and if you encounter problems, switch back to the 2 GB

limit. For more information, see the document “The 3 GB Switch and AutoCAD Civil 3D” at the AutoCAD Civil 3D Services and Support website.

Project Setup

This section explains several ways to plan your project from the beginning for better handling of large data sets.

Data Resolution

Review the requirements for data precision and coverage in the final drawings and other project deliverables. Compare these with the resolution of input surface data, especially if it comes from a DEM (digital elevation model) or LIDAR (light detection and ranging) source. Ensure that your project is not saddled with overly detailed surfaces that require long processing time at every step. You can either purchase a lower resolution file from the vendor, or filter the file on input to reduce data density. Details of this operation are discussed in [Points and Surfaces](#) (page 3).

Look for ways to reduce the data density in non-critical regions of the project. For example, your project may span a wide geographic area, but the design activity is focused along a few narrow corridors. Can you use surface data of lower resolution in the undeveloped regions? In some cases, the project area may include large flat areas with little topographic relief. These areas too could be represented with data of lower resolution.

Project Management

Another aspect of initial planning is to determine a strategy for managing project design objects, drawings, and other documents. The key considerations here are to ensure that

- Design data is safely stored, backed up, and protected from accidental changes or corruption.
- Team members can use read-only reference versions of surfaces, alignments, and other objects in multiple drawings.

The use of Autodesk Vault for managing your project data is recommended for large projects and teams in which more than 10 people work with the

engineering data, especially if they are spread across multiple geographic locations. Smaller teams may prefer a less formal management system that does not involve a database, but they will need some form of standard work process to promote data integrity.

Data references are essential when working with large data sets. In general, data references offer the following benefits:

- A referenced object consumes very little space in its host drawing.
- Each data reference is automatically updated when the source object changes.
- The data reference is a read-only copy, so the source object is protected from corruption or unintentional changes.
- Engineering data of the source object is available for analysis in the data reference. For example, you can reference a surface, then create a profile based on that surface in the host drawing.

Reference objects are a standard feature of Vault, but they can also be created using data shortcuts between drawings. AutoCAD external references (xrefs) are also useful for inserting the contents of one drawing into another.

Before planning a referencing strategy, you need to understand the advantages and limitations of data shortcuts, Vault references, and xrefs. The key points of comparison are summarized in the following sections. For a more detailed discussion, see AutoCAD Civil 3D Help, “Managing Projects” section, and especially the topic “Understanding Project Management”.

The Case for Vault

Autodesk Vault provides a robust database in which to safely manage your project data. It includes a whole framework of user access permissions, drawing checkin/checkout, project templates, automated backups, data versioning, object sharing between drawings, and support for multiple geographic sites. In exchange for these benefits, you need to invest some time in system administration and database management. If your team often uses large data sets, or is preparing to take on large projects, you probably need the security and efficiency of Autodesk Vault.

The Use of Data Shortcuts

If you're not regularly working with large data sets and don't feel that you need Vault, you can use a simpler structure of drawings in standard folders with data shortcuts for object sharing. The data shortcuts for surfaces, alignments, or other objects are manually exported from their source drawing, then imported into a host drawing. The integrity of the system depends on all drawings and data shortcut files retaining their names and folder locations. If you move or rename a drawing, you also need to rebuild the data shortcut, which is a simple procedure.

When you use shortcuts, your data security depends on all team members communicating with each other and respecting some rules of engagement with all of the project files. This type of discipline is feasible with a small project team in the same office, especially if none of the drawings are edited by more than a single user. But it gets increasingly difficult as the team grows. If people are not careful, they can make some costly mistakes.

The Value of External References

AutoCAD external references (xrefs) are compatible with any project management system, using Vault or not. Moreover, if you start using data shortcuts and later implement Vault, you can add to Vault projects any drawings that contain xrefs and the xrefs are maintained within Vault.

Project Data Structure

As you gain experience with large projects, you can develop your own standard ways of using data references. At the beginning, it is enough to understand the general concepts and to start thinking about how to use data references to support lightweight drawings and an efficient design process.

Figure 8 shows an example of the data structure in Vault for a large project. Four of the folders on the lower left side (Existing Ground Drawings, Survey Points, Sheet Set, and Parcel Drawings) have unidirectional arrows to indicate that these drawings supply data to the database, but do not reference any other data from the database. The other folders have bidirectional arrows, indicating that these drawings both provide source data and reference other data.

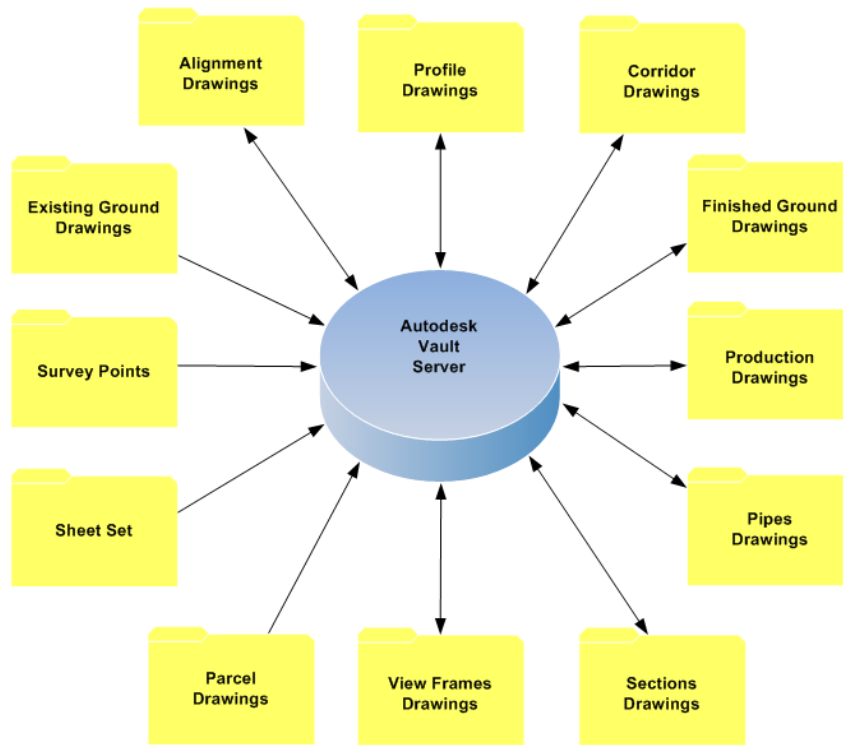


Figure 8: Sample folder structure in a large project

The following table provides sample details on the use of referenced objects and drawings within the project shown in figure 8. Your project data structure may differ from this, but should demonstrate the same principles: distribute the engineering model across different drawings, and separate the production drawings from the design drawings.

Sample Project Data Structure		
Drawing Type	Included Data References	Included Xrefs
Alignment		Parcel drawing, Existing ground drawing
Corridor	Existing ground, Alignment, Existing ground profile, Finished ground profile	

Sample Project Data Structure

Drawing Type	Included Data References	Included Xrefs
Finished ground surface	Existing ground, Corridor surface	
Pipes	Alignment, Finished ground surface, Finished ground profile	Parcel drawing
Production	Existing ground surface, Alignment, Existing ground profile, Finished ground profile, Finished ground surface, Pipe network	Corridor drawing
Profile	Existing ground	
Sections	Alignment	Corridor drawing
View frames	Alignment	Parcel drawing

The use of references as shown in this example creates a framework of data integrity and drawings of a manageable size. In fact, some drawings with multiple references, such as a production drawing, can be reliably created for a large data set only if references are used; otherwise, the drawing would be very slow to open or update, and generally too large to work with.

Optimizing Drawing Templates

The drawing templates used to standardize your project drawings can be configured in several ways to support large data sets. In particular, you need a range of object and label styles for different project phases and drawing types. For most efficient processing, use styles that have very little or no displayed elements. These are useful in conceptual designs, the early stages of a project, and whenever you want to suppress the display of a surface or other large object from the display.

The following templates supplied with AutoCAD Civil 3D include styles with minimal displayed elements:

- `_AutoCAD Civil 3D (Imperial) NCS Extended.dwt`
- `_AutoCAD Civil 3D (Metric) NCS Extended.dwt`

For example, see the surface styles “_No Display” and “Border Only”, and the profile view style “First View”. These are useful as is, and as a basis for developing minimal styles for other objects.

Object Styles

Minimal display styles are especially relevant for large objects, such as surfaces, point groups, and corridors. They can also apply to other objects, subject to the nature of your drawings. Minimal styles for objects such as surfaces and corridors should be configured in both 2D and 3D display modes for efficient use.

In the case of corridor design, you can create more efficient subassemblies by ensuring that the shape style for each one is defined with no fill, or at least a solid fill rather than hatch patterns.

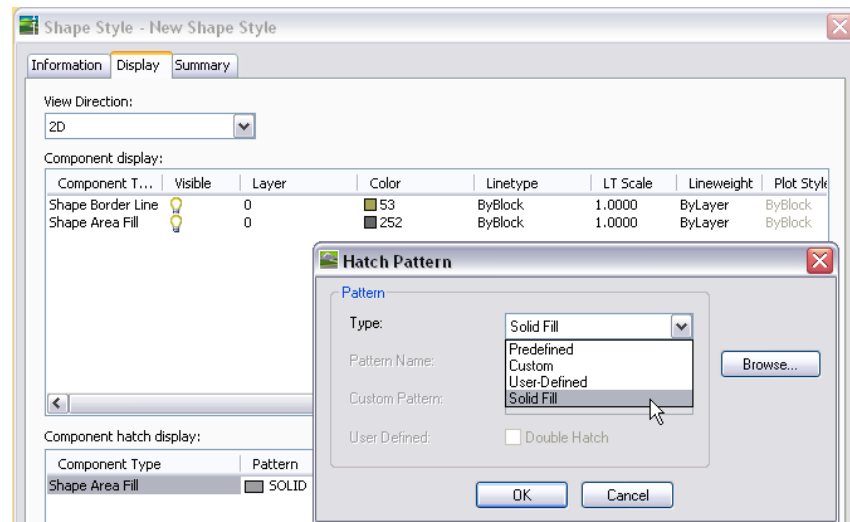


Figure 9: Editing a subassembly shape style

Label Styles

As with object styles, you can design separate label styles for use at different project stages, and for different audiences. An empty “No Label” style is useful, especially for alignments, profile views, and other objects with label sets. You can easily switch off all labels for an object by applying this style.

A convenient way to turn off all labels for a feature is to right-click the feature node on the Toolspace Settings tab, and then click Edit Label Style Defaults. Doing this opens a dialog box where you can set label visibility to false, as shown in figure 10.

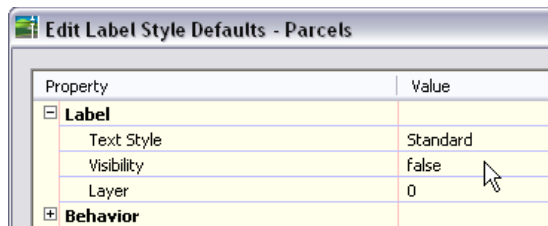


Figure 10: Turning off label visibility for a feature

In fact, you can just as easily turn off the display of labels for all features in a drawing if you right-click the Drawing node, click Edit Label Style Defaults, and then set label visibility to false.

If you want to create a label design that has just the essential data and can be drawn quickly, simplify all text and graphic elements, including the use of rotation, borders, and plan readability. Another useful tactic is to leave a style in place, but temporarily edit the style to turn off the label visibility, as shown in figure 11.

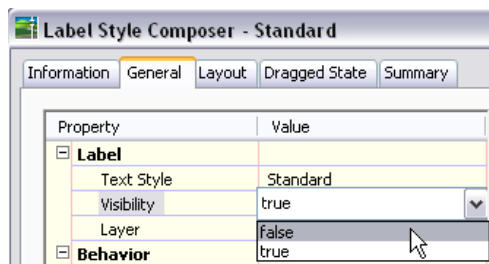
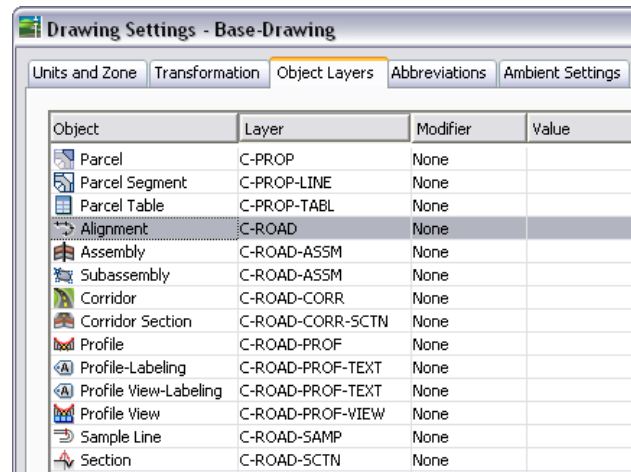


Figure 11: Turning off label visibility

Use of Layers

Drawing layers can also be used to manage the display and update of drawing objects. For faster processing, freeze or turn off the drawing layers that contain objects. By default, design objects and their labels are divided across multiple layers. For example, as shown in figure 12, alignments, profiles, and other road design objects are spread across many layers, all beginning with C-ROAD.



Object	Layer	Modifier	Value
Parcel	C-PROP	None	
Parcel Segment	C-PROP-LINE	None	
Parcel Table	C-PROP-TABL	None	
Alignment	C-ROAD	None	
Assembly	C-ROAD-ASSM	None	
Subassembly	C-ROAD-ASSM	None	
Corridor	C-ROAD-CORR	None	
Corridor Section	C-ROAD-CORR-SCTN	None	
Profile	C-ROAD-PROF	None	
Profile-Labeling	C-ROAD-PROF-TEXT	None	
Profile View-Labeling	C-ROAD-PROF-TEXT	None	
Profile View	C-ROAD-PROF-VIEW	None	
Sample Line	C-ROAD-SAMP	None	
Section	C-ROAD-SCTN	None	

Figure 12: C-ROAD layers

As part of your drawing template design, you can concentrate your objects and labels on fewer layers, making it easier to manage object display. To do this, use the Object Layers tab on the Drawing Settings dialog box to specify the layers on which objects are created.

Drawing Settings

The following settings should be configured in your drawing templates so that they apply consistently for all drawings created from the templates.

PROXYGRAPHICS

Function: Specifies whether to save proxy graphic images in the drawing. Proxy graphics require space in the drawing file and are required only for display in

applications other than AutoCAD Civil 3D. If you do not need to share drawings with users of AutoCAD or other AutoCAD-based applications, you can save space by turning off proxy graphics. If you do need to share drawings with AutoCAD users, consider using the Export to AutoCAD option, which explodes Civil 3D objects to AutoCAD primitives.

Recommended setting: 0 (off).

REGENMODE

Function: Specifies whether the REGEN (regenerate) command runs automatically (1) or manually (0). REGEN can be time consuming on a large drawing, so it is advisable to run it manually, when required.

Recommended setting: 0

VIEWRES

Function: Specifies the circle zoom percent value, which determines the smoothness of displayed curves. Valid values are integers from 1 to 20000; default is 1000. Setting a lower number causes faster system performance in REGEN operations.

Recommended setting: try 50, then adjust up or down to suit requirements

System Settings to Improve Performance

For better handling of large, detailed drawings, you can improve the performance of AutoCAD Civil 3D by configuring the settings for several system values, AutoCAD variables, and commands.

Optimizing AutoCAD System Variables

Among over 500 system variables to control AutoCAD behavior, there are several that you can use to improve the handling of large data sets. This section explains first how to access the system variable editor, then provides background information and recommended settings for particular variables.

To access the AutoCAD system variable settings, ensure that you are in the Civil 3D Complete Workspace, and then click Express menu ► Tools ► System Variable Editor. The following dialog box is displayed, providing a convenient interface for reviewing system variable descriptions and changing their settings.

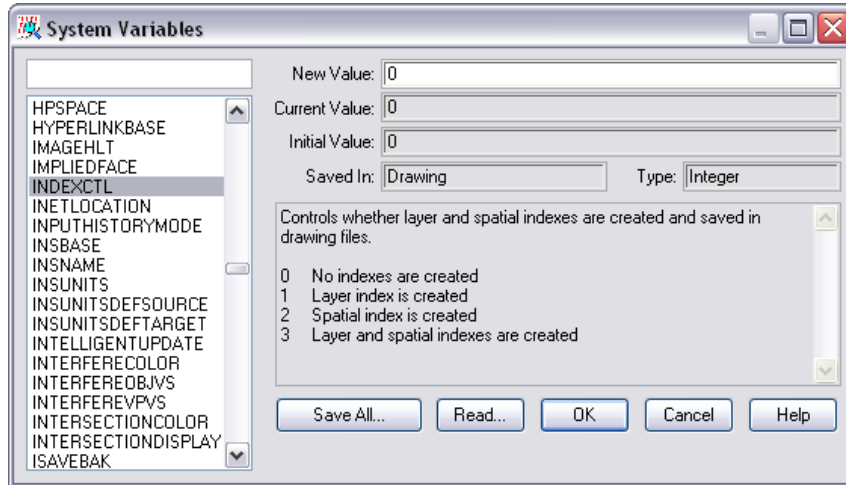


Figure 13: Setting system variables

If you have a large work group, you can create a script to run on each computer and standardize the AutoCAD settings. To do this, configure the variables on one computer, then click Save All in the System Variables dialog box. The settings are saved in an SVF file or an SCR file, each of which can be run on another computer to update settings. For more information, click Help on the System Variables dialog box.

3D Display Configuration

The display of a complex surface in 3D is very memory intensive, especially if the surface includes graphic detail such as material rendering or a draped image. You can improve performance of 3D display at the expense of graphic detail, a trade-off that may be quite acceptable during the design process. In the final project phase, you can revise these settings to get more detailed images for presentation purposes.

The main settings for 3D display are accessible when you enter the AutoCAD command 3DCONFIG. The Adaptive Degradation and Performance Tuning dialog box is displayed, as shown in figure 14.

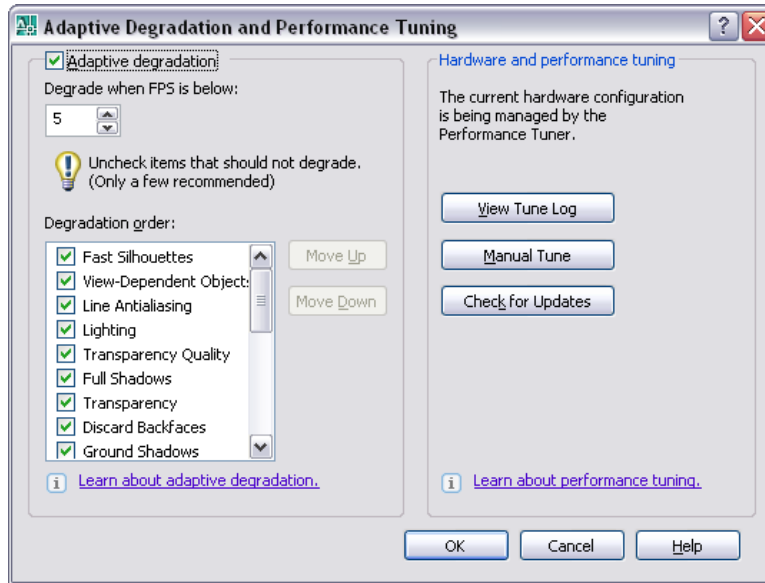


Figure 14: Adaptive degradation settings

The adaptive degradation settings shown in figure 14 indicate that if the display speed drops below five frames per second, the system starts to degrade the display quality of fast silhouettes, view-dependent objects, and other items selected in the Degradation Order list. Depending on the data you are displaying and the graphics card in your computer, you may get better performance by turning off adaptive degradation.

Another useful setting in the Adaptive Degradation and Performance Tuning dialog box is accessible when you click the Manual Tune button, which opens the Manual Performance Tuning dialog box. If you clear the check box for Dynamic Tessellation, shown in figure 15, you can significantly improve the display speed of pipe networks as 3D solids. With dynamic tessellation turned off, system resources are not used to store surface tessellations in memory for different zoom levels. To compensate for this setting, after you have set your 3D display to the desired zoom level, regenerate the display (REGEN) to synchronize the tessellation level.

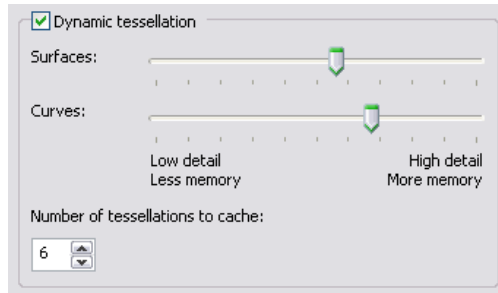


Figure 15: Dynamic tessellation settings

Specific Variable Settings

The following variables are especially relevant for system performance.

GRIPOBJLIMIT

Function: Specifies the maximum number of selected objects that can display editing grips. Default setting is 100.

Recommended setting: 2

HIGHLIGHT

Function: Specifies whether objects you select in the drawing are redrawn with dashed lines for easier visibility. Default setting is 1 (on), but you can set it to 0 (off) for faster selection of large, detailed objects. The 0 setting is especially effective for working with surfaces that include many contours or other lines.

Recommended setting: 0

ISAVEPERCENT

Function: Controls the amount of unused space in a drawing, measured in percent. Default setting is 50. With a setting of 0 the drawing size is minimized, but every save operation is a full save.

Recommended setting: 0

SAVETIME

Function: Specifies the time interval in minutes between automatic save (Autosave) operations. Default setting is 10 minutes.

Recommended setting: 30 or more

Maintaining Clean Drawings

As part of the project team's work process, you can use a number of standard AutoCAD operations to eliminate redundant data from project drawings.

Audit

This command checks for errors in an open, active drawing. To run the command, click File menu ► Drawing Utilities ► Audit.

Purge

Two purge commands are available to remove unused data from your drawings.

- The main command removes nested, unused features. To run the command, click File menu ► Drawing Utilities ► Purge.
- A secondary command removes unused registered applications (regapps) from a drawing. To run this command, enter **-purge** on the command line, then enter the command option "r" to remove regapps.

Quick Select

This AutoCAD command (QSELECT) is handy for finding stray objects in a drawing, as long as you have some idea of what to look for. For example, if you have been creating alignments and know that your drawing contains four

actual alignments, you could use QSELECT to select all alignments. Then if the list includes more than four, you can delete the extra ones.

Recover

This command looks for, and repairs damaged data in a drawing. The command is intended to be run when you open a drawing. Click File menu ► Drawing Utilities ► Recover, select the drawing, then click Open.

Map 3D Cleanup

A powerful utility developed for AutoCAD Map 3D is also included with Civil 3D. It enables you to delete duplicate objects, weed polylines, and do many other cleanup actions. You can set several parameters to control each action. To access the tools click Map menu ► Tools ► Drawing Cleanup, or enter `_mapclean` on the command line.

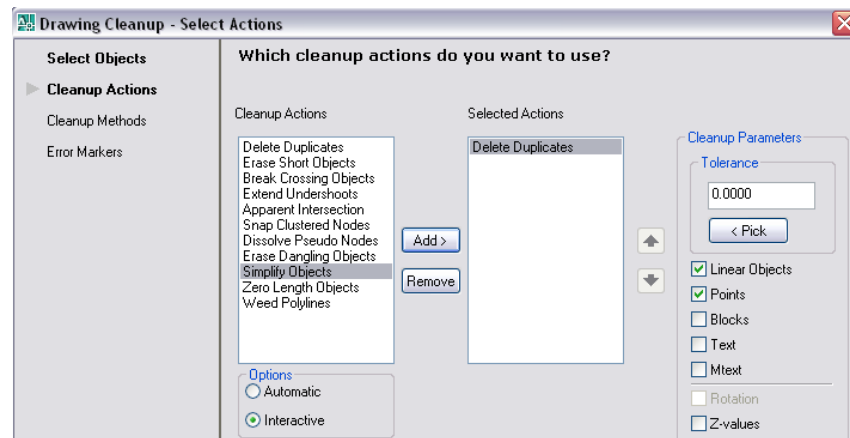


Figure 16: Map 3D drawing cleanup actions

While you can run several actions together, it is recommended that you do them one at a time for better monitoring and control.

WBlock

If you have a drawing that is corrupted and cannot be fixed by other means, you can use the Write Block (WBlock) command to write all drawing objects to a new drawing file. This can eliminate the corrupt data, and reduce the file size.

Several precautions apply when using WBlock with AutoCAD Civil 3D data:

- Do not specify an insertion point, as doing that would change all the coordinate positions.
- If the drawing contains many Civil 3D object or large objects, you may need to use alternative methods: export the data to LandXML, and then import it into a new drawing, or Export to AutoCAD, which explodes the Civil 3D objects. If the objects are exploded and you want to re-create them, you may be able to use the exploded polylines or other simple entities as a starting point, or you may need to start from scratch.
- If you also want to copy sheet layouts from the drawing, use the AutoCAD DesignCenter tool to drag-and-drop them to the new drawing.

Zoom Extents

Running this command allows you to see whether the drawing contains any unwanted objects outside the main design area. If so, you can delete them and reduce the drawing size.

Conclusion

Working on a project with large data sets requires a certain understanding of data management, output requirements, drawing templates, object styles, and AutoCAD settings. You can think of these as additional parts of the whole design process. The payoff for learning how to use these standards and settings is that your team can work more efficiently. As a result, you may find more time to explore ‘what-if’ scenarios and otherwise improve your design process. You can also reuse this knowledge of settings and standards from one project to another, refining the recommendations for your type of projects to increase your productivity with AutoCAD Civil 3D software.