

Civil Synopsis

Groundbreakers Civil 3D User Group

June 4, 2008

First, thanks to all for attending! We had a great turnout and hope you all enjoyed it as much as we did. The following people attended...

| | | |
|--|----------|-----------|
| AMEC Infrastructure | Brenda | Mattingly |
| AMEC Infrastructure | John | Fingerhut |
| Arch Coal | Don | Soper |
| Bax Engineering | Mark | Collins |
| BIS Fru-Con Engineering | Dan | Hull |
| CDG Engineers Architects Planners Inc. | Andy | Worfler |
| CDG Engineers Architects Planners Inc. | Terry | Entwistle |
| Civil & Environmental Consultants Inc. | Cynthia | Colthorp |
| Civil & Environmental Consultants Inc. | Lee | Palmer |
| Cole & Associates | Bob | Genta |
| Hoelscher Engineering | Bob | Watson |
| Missouri American Water | Lance | Thompson |
| Missouri American Water | Terrence | Green |
| Oates Associates Inc. | Mike | Busch |
| Oates Associates Inc. | Sam | Wrigley |
| Sheppard Morgan & Schwaab Inc | Carleson | Pruitt |

The meeting started off by introducing the new co-chairs of the Civil 3D Groundbreakers User Group (GBUG)...

Groundbreakers Civil 3D User Group Co-Chairs



Daniel Hull

Civil CAD Technician

[BIS Fru-Con Engineering](#)
[bio](#)



Cynthia Colthorp

CAD Manager

[Civil & Environmental](#)
[Consultants Inc.](#)
[bio](#)

We want to thank them for providing such great leadership and ideas to the group!

New Features – General Design

Session Overview This session covers workflows related to Grading, Corridor/Grading Interaction, and the design of Catchment Areas in AutoCAD® Civil 3D® 2009.

Session Objectives At the conclusion of this session, you should be able to:

- Identify the new Grading Feature Line enhancements.
- Demonstrate surface model feature line projections and merge proposed surface additions.
- Illustrate how to establish and reorder design priorities (what's added when).
- Demonstrate how to create a catch basin.

4.1. Grading Projections

Civil 3D 2009 improves grading stability and offers new grading options.

4.1.1. Grading Intersection Clean-up

Civil 3D 2009 simplifies the process for:

- Adding two or more grading objects in a site.
- Cleaning areas with overlapping grading objects.

In past releases of Civil 3D you may have seen the following message, “Grading failed because the solution overlapped an existing grading.” Figures 1 to 3 show how Civil 3D 2009 resolves this issue.

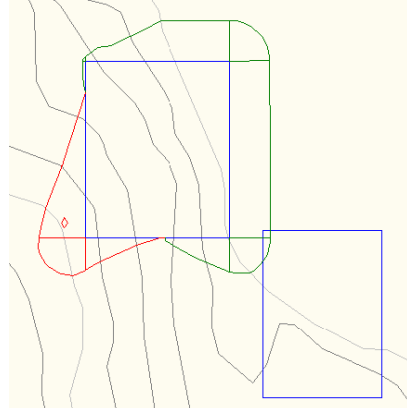


Figure 4.1 – Grading one pad

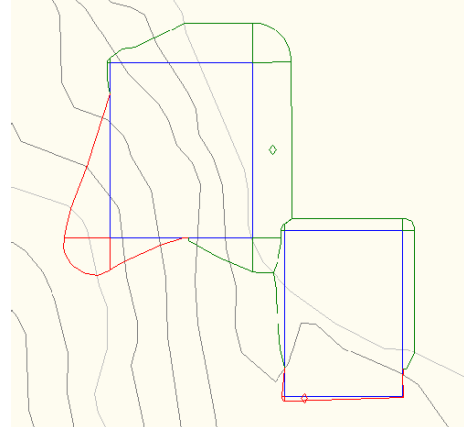


Figure 4.2 – Grading two pads

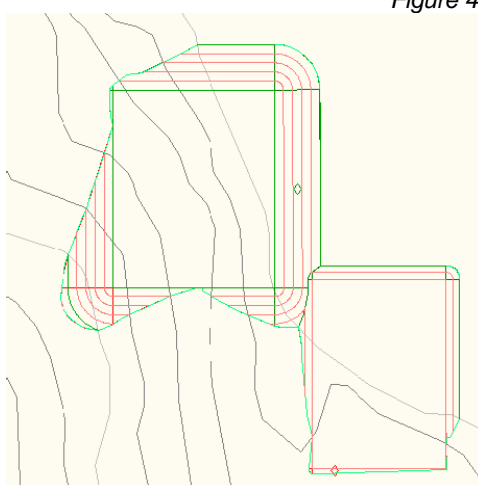


Figure 4.3 – Final grading with contours

4.1.2. Edit Feature Lines

Civil 3D 2009 offers improvements in this area with two Edit Feature Line menus:

- Edit Feature Line Elevations
- Edit Feature Line Geometry

Edit Feature Line Elevations

The Edit Feature Line Elevations menu displays commands used to edit the elevations of a feature line. The new Edit Feature Line Elevations commands are:

- Raise/Lower
- Set Elevation by Reference
- Raise/Lower by Reference
- Adjacent Elevations by Reference
- Grade Extension by Reference

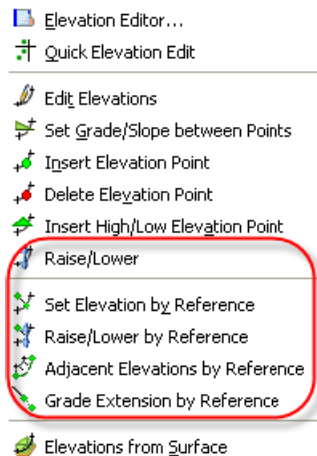


Figure 4.4 – New commands on the Edit Feature Line Elevations menu

Edit Feature Line Geometry

The Edit Feature Line Geometry menu includes commands that are used to edit the geometry of a feature line. The new Edit Feature Line Geometry commands are:

- Reverse
- Edit Curve

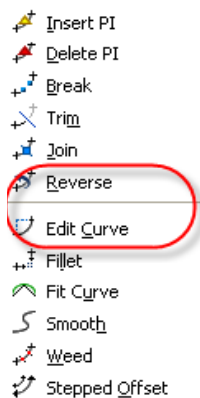


Figure 4.5 – New commands on the Edit Feature Line Geometry menu

4.1.3. Surface Operations

When creating complex surfaces, such as parking lots, you usually perform many surface operations, including paste. In previous Civil 3D releases planning was required to keep track of the order in which surface operations had to be pasted. Civil 3D 2009 simplifies the process. You no longer have to memorize the order in which surface operations must be pasted, and you can easily re-order surface operations. If you paste a surface incorrectly into another, you can now click an arrow to re-arrange the order of surface operations.

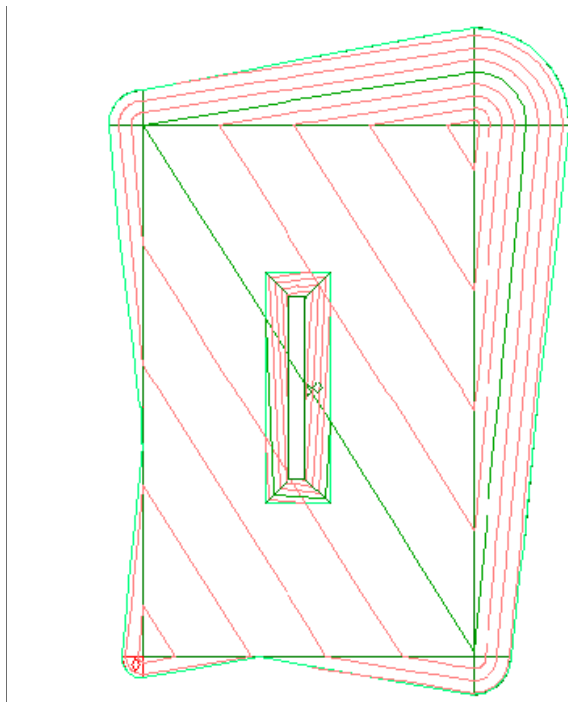


Figure 4.6 – Two individual surfaces

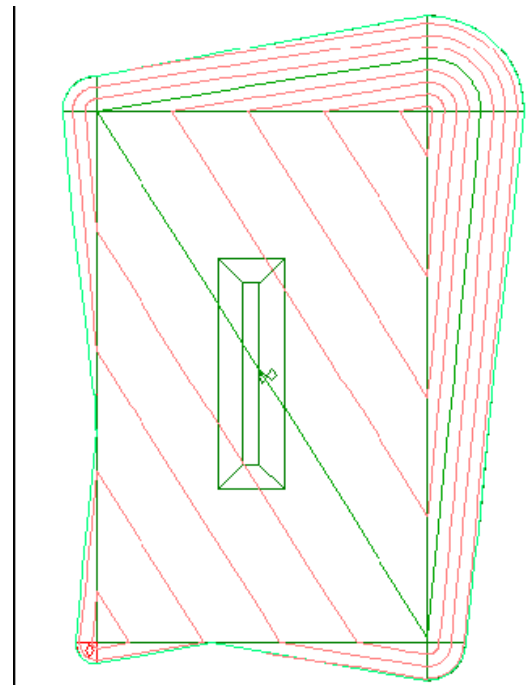


Figure 4.7 – Two surfaces combined. Island is removed because it was added before the pad.

In Figure 4.7 the Grading Pad surface has been pasted over the top of the Island surface. As a result, the Island surface has disappeared. The Island surface should have been pasted into the Grading Pad surface.

- In the Surface Properties dialog box, click the **Definition** tab.
- In the Operation Type section, click one of the Paste Operation Types.
- Click the appropriate blue arrow to move the highlighted operation up or down in the list so that the pad surface is pasted before the island surface.

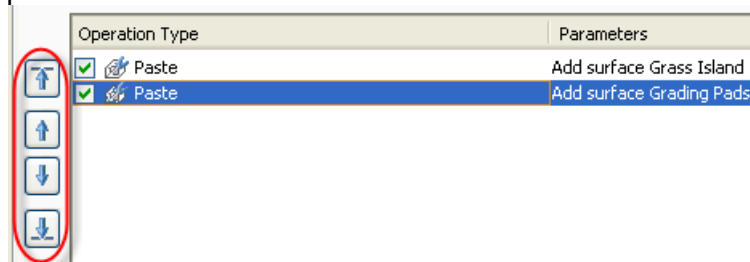


Figure 4.8 – Reorder operation arrows

- Click **OK**.
- Click **Rebuild the surface** or **Mark the surface as out of date**.

- ➔ **Rebuild the surface**
The surface will be rebuilt and the modifications will become permanent.
- ➔ **Mark the surface as out-of-date**
The modifications will be preserved, but the surface will not reflect them and will need to be rebuilt at a later time.

Figure 4.9 – Two surface options

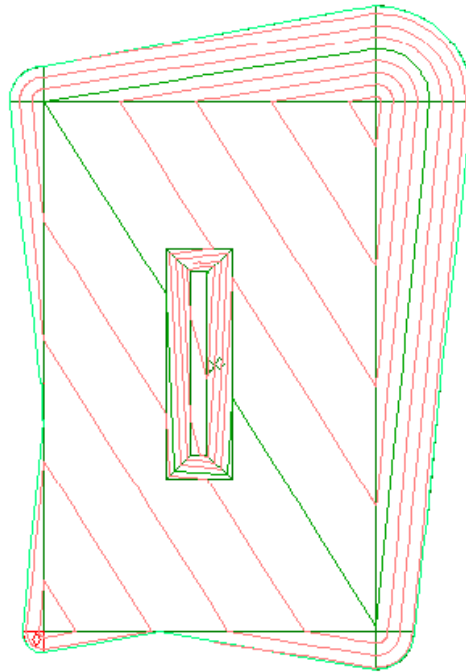


Figure 4.10 – Completed Surface

Figure 4.10 shows the result of the reorder operation.

4.1.4. Surface Volumes

After you have completed grading a surface, you usually want to know the volume of the surface to check its cut and fill quantities. The volumes produced using the Grading Volumes tool are straight cut-and-fill volumes with no expansion or compaction factors. In response to user feedback, Civil 3D 2009 has added fields where you can input expansion or compaction factors to perform volume comparisons between two surfaces. These fields can be found in the **Surfaces** menu > **Utilities** > **Volumes**.

| Surface Pair | | Volume | | | | | | |
|-----------------|--------------------|-----------------|------------------|------------|-------------|-----------------|------------------|--------------------|
| Base Surface | Comparison Surface | Cut | Fill | Cut Factor | Fill Factor | Cut (adjusted) | Fill (adjusted) | Net |
| Existing Ground | Road Surface | 58749.93 Cu. M. | 850346.69 Cu. M. | 1.000 | 1.000 | 58749.93 Cu. M. | 850346.69 Cu. M. | 791596.76 Cu. M... |

Figure 4.11 – Cut and fill factors

4.2. Designing a Catch Basin

In past Civil 3D releases, you would create watersheds and/or use the Water Drop utility to determine where to locate a catch basin. Civil 3D 2009 simplifies the process of designing a catch basin.

4.2.1. Creating a Catch Basin

To create a catch basin in Civil 3D 2009:

- Click **Surface** menu > **Utilities**.
- Click **Create Catch Basin**.
- Click a surface.
- In the Catchment Area dialog box, type values for Catchment Area properties.

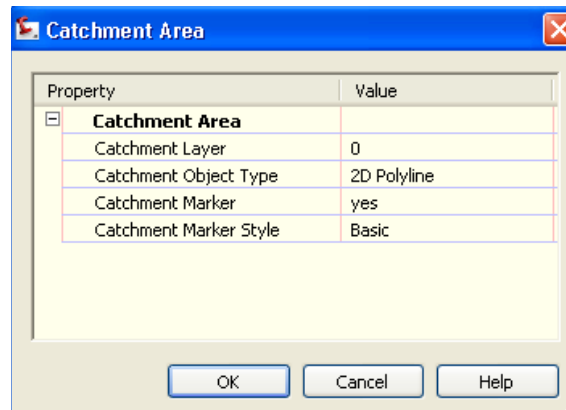


Figure 4.12 – Catchment Area dialog box

- Click a point on the surface.

If there is a catchment area at that point, Civil 3D 2009 draws a polyline and a marker. The marker represents the lowest point of the catchment area, which is where the catch basin should be located.

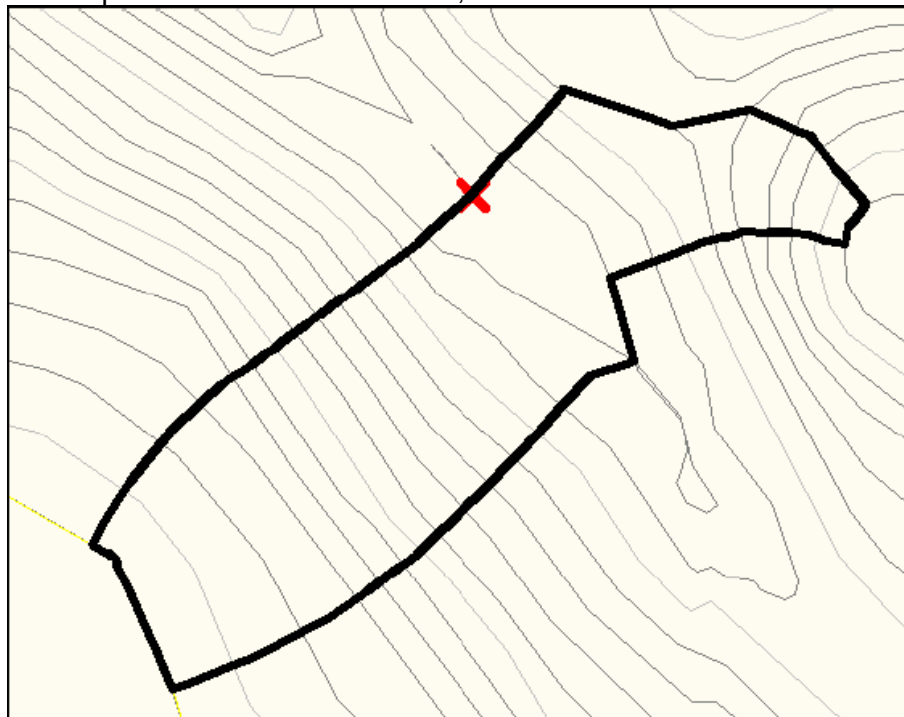


Figure 4.13 – Catch basin marker in a catchment area

4.3. Designing a Pipe Network

After completing the grading and creating a catch basin, the next step is to design a Pipe Network. Civil 3D 2009 introduces a few new Pipe Network commands.

4.3.1. Rename Network Parts

After you have created and drawn a Pipe Network, you can rename the pipes or structures globally. Previously in Civil 3D, you renamed the pipes and structures one at a time. Civil 3D 2009 introduces a new command called Rename Network Parts. To use the Rename Network Parts command:

- Click **Pipes** menu > **Utilities** > **Rename Network Parts**.
- Click a Network Part.
- In the Rename Pipe Network Parts dialog box, enter new names for the structures and/or pipes you want to rename.

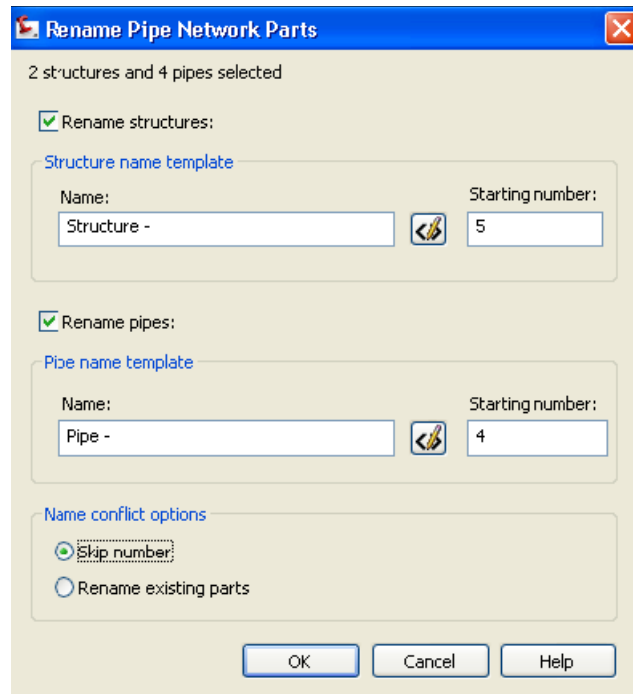


Figure 4.14 – Rename Pipe Network Parts dialog box

You can also specify the starting number used in the name of each structure or pipe. If Civil 3D finds an existing structure or pipe with the same name, it gives you two options to resolve the conflict. You can either skip the number or you can rename the existing part.

4.3.2. Convert Pipe and Structure Rules to Microsoft .NET

Civil 3D 2009 uses rules to control the design of Pipe Networks. In prior releases of Civil 3D, these rules were written in Microsoft Visual Basic (VBA). Civil 3D 2008 enabled you to convert subassemblies into Microsoft .NET, which could generate corridors much faster than when the rules were written in VBA. Civil 3D 2009 expands this functionality to Pipe rules. Specifically, you can convert your VBA Pipe Network rules into .NET to more quickly generate Pipe Networks. To use the Convert Pipe and Structure Rules to .NET command:

- Click **Pipes** menu > **Utilities** > **Convert Pipe and Structure Rules to .NET**.
- If applicable, when prompted click **YES** to convert the rules to .NET.

When the conversion is complete, Civil 3D 2009 displays a success message in the Event Viewer.

New Features – Transportation

Session Overview This session covers workflows that use new features in AutoCAD® Civil 3D® 2009 related to speed-based design, corridor targets, and subassemblies.

Session Objectives At the conclusion of this session, you should be able to:

- Demonstrate how alignments, corridors, profiles, sections, assemblies, and subassemblies interact in the Civil 3D 2009 dynamic model.
- Describe how the Civil 3D 2009 dynamic model extends from the initial survey to the design of feature lines throughout the entire corridor modeling process.
- Show how modeling flexibility, performance enhancements, and ease-of-use improvements are used to solve simple to complex design scenarios.
- Explain to customers how the new transportation features in Civil 3D 2009 fit together and fit into workflows and how these features benefit their businesses.

2.1. Survey Figures

Almost every job begins with some kind of a survey. Creating an accurate survey is possibly the most critical process of any job because you use survey data to build the existing surface. If the original survey is incorrect, the survey data are translated into an incorrect design. In many cases, surveyors download their point data and then manually draw polylines, or lines through the data points, to represent features that were picked up in the field. Survey figures enable surveyors to download their point data and then automatically generate linework between the points. In previous releases of Civil 3D, survey figures had limitations. In Civil 3D 2009, new Survey Figures commands overcome many limitations you previously experienced and improve your output.

2.1.1. Editing

Previously, to edit survey figures you used the Edit Feature Line commands. Some Edit Feature Line commands worked for survey figures, and some did not. In Civil 3D 2009, the new Survey Figures editing commands are in the Survey menu. There are two options when editing survey figures:

- Edit Figure Elevations
- Edit Figure Geometry

The Edit Figure Elevations commands enable you to easily edit elevations of a figure.

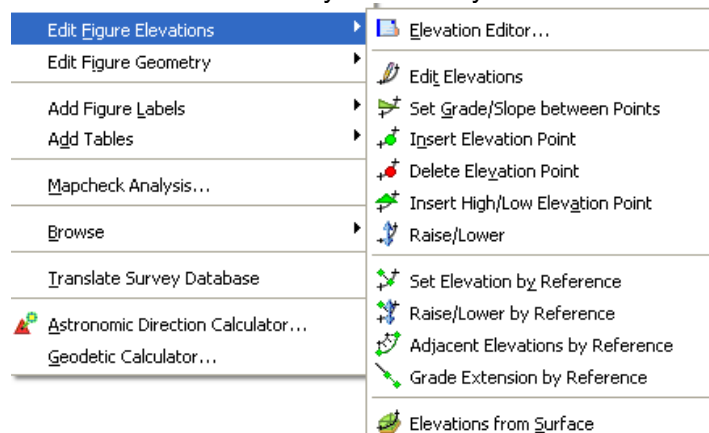


Figure 2.1 – Edit Figure Elevations menu

The Edit Figure Geometry commands enable you to easily edit the horizontal geometry of a figure.

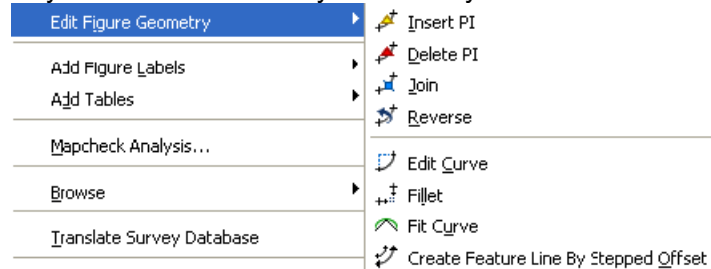


Figure 2.2 – Edit Figure Geometry menu

2.1.2. Corridor Targets

In previous releases of Civil 3D, survey figures were mainly used by surveyors and anyone needing a breakline in a surface. Designers couldn't use these survey figures when trying to create a design. In Civil 3D 2009 survey figure enhancements also benefit designers. In road re-construction, surveyors would typically survey the existing edge of pavement. That edge of pavement is required in the design process, but designers would have to explode the figures, turn them into a 2D polyline, and then create an alignment out of the 2D polyline. In Civil 3D 2009, users can now use the survey figures directly in the corridor. They can attach a survey figure two different ways.

- Width or offset targets
- Slope or elevation targets

Width or Offset Targets

The width or offset targets control the corridor horizontally.

Slope or Elevation Targets

The slope or elevation targets control the corridor vertically.

2.2. Alignment and Profile Layout – Road Design

Creating alignments and profiles is the foundation to any good road design. Civil 3D Alignment by Layout and Profiles by Layout commands have always enabled you to create almost any design imaginable. The new Best Fit and Spiral commands in Civil 3D 2009 further enhance your ability to create road designs.

2.2.1. Best Fit – Alignments and Profiles

Creating curves and tangents is standard practice when creating alignments and profiles. Sometimes it is difficult to find a command that will produce the results you want. For instance, suppose you want to put a curve between two tangents but you want the curve to pass through a few particular points. In the previous release, your best option probably would have been to use a pass-through point. This did the trick in most cases, but what if you wanted to try to pass the line through more than one point? Civil 3D 2009 solves this problem. It includes Best Fit layout commands for alignments and profiles. The Best Fit layout commands are found on the layout toolbars.

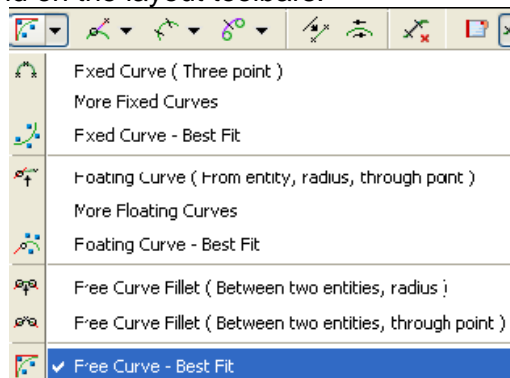


Figure 2.3 – Best Fit layout commands

The Best Fit layout commands enable you to create an alignment or profile entity from Civil 3D points, AutoCAD points, existing entities, or clicks or points on the screen.

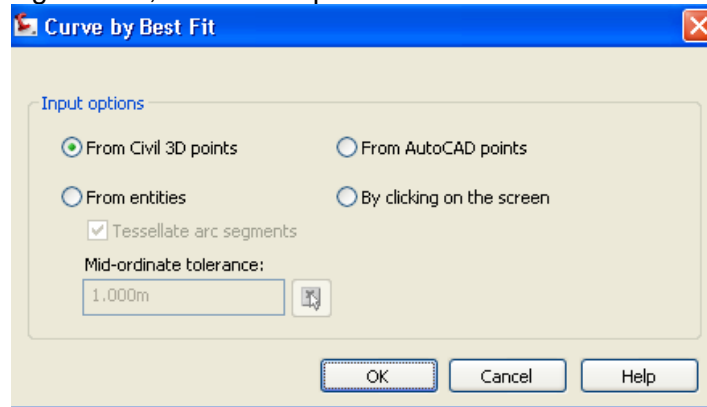


Figure 2.4 – Curve by Best Fit input options

The regression analysis for the best fit remains dynamically linked to the alignment or profile entity. You can gain access to the regression data from the Alignment Grid View or the new Edit Best Fit Data icon on the toolbar. The Regression Data Vista enables you to remove a point or vertex from your original data using the Exclude option. An Out-of-Sync icon is displayed when you have modified the entity (for example, by grip editing) from its Best Fit layout. Click this icon to revert to the parameters calculated for the best fit. The following Best Fit alignment layout tools are new in Civil 3D 2009:

- Fixed Line – Best Fit.
- Floating Line – Best Fit.
- Fixed Curve – Best Fit.
- Floating Curve – Best Fit.
- Free Curve – Best Fit.

The following Best Fit profile layout tools are new in Civil 3D 2009:

- Fixed Tangent – Best Fit.
- Floating Tangent – Best Fit.
- Fixed Vertical Curve – Best Fit.
- Floating Vertical Curve – Best Fit.
- Free Vertical Curve – Best Fit.

2.2.2. Spiral Methods

There are a few new ways to create spirals in Civil 3D 2009. These commands are located on the Alignment Layout toolbar. The following are new types of curves with spirals:

- Free Compound Spiral-Curve-Spiral-Curve-Spiral (Between two tangents).
- Free Reverse Spiral-Curve-Spiral-Spiral-Curve-Spiral (Between two tangents).

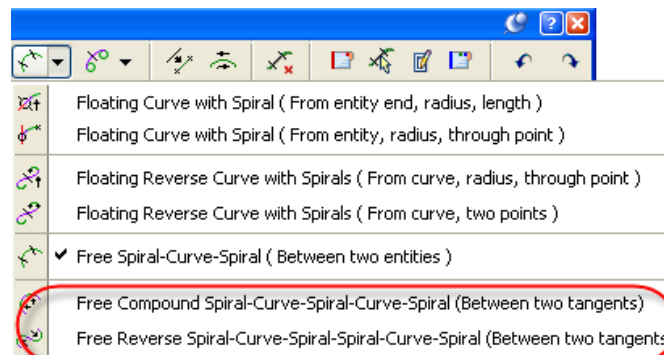


Figure 2.5 – New Curve with Spiral tools

There is also a new type of spiral:

- Free Compound Spiral-Spiral (Between two tangents).

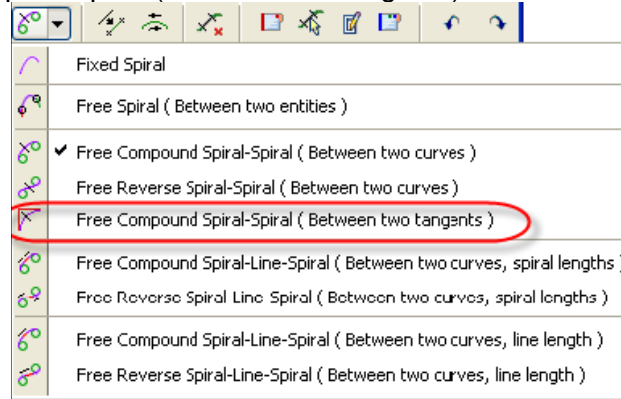


Figure 2.6 – Free Compound Spiral-Spiral tool

2.3. Criteria-Based Design – Road Design

Creating many types of road design requires more than just creating an alignment and profile. Designers must consider many other requirements, such as, passing site distance, headlight sight distance, and stopping sight distance. In Civil 3D 2009, you can apply criteria-based design and analysis to alignments and profiles. Using the Design Criteria Editor, you can edit or create design standards that are stored in criteria files. The Design Criteria Editor enables you to specify design parameters to which the alignment and profile must adhere. In Civil 3D 2009, when you create an alignment or profile from the Design Criteria tab in the Create Alignment – Layout dialog box, you can identify the design criteria file you want to use for the alignment, the profile, or both. For alignments specifically, in the Create Alignment – Layout dialog box, Design Criteria tab, there is a new speed attribute.

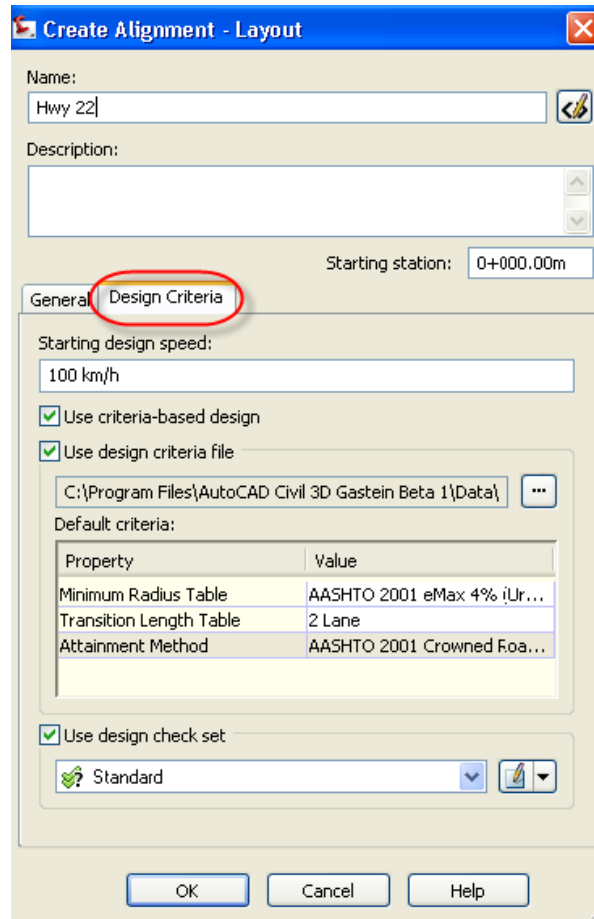


Figure 2.7 – Create Alignment – Layout dialog box

2.3.1. User-Defined Criteria

There are two ways to define the design criteria for an alignment or profile. You can specify a design criteria file by:

- Using AASHTO design criteria.
- Applying a Design Check Set.

AASHTO Design Criteria

You can edit data in the AASHTO design criteria in the Design Criteria Editor.

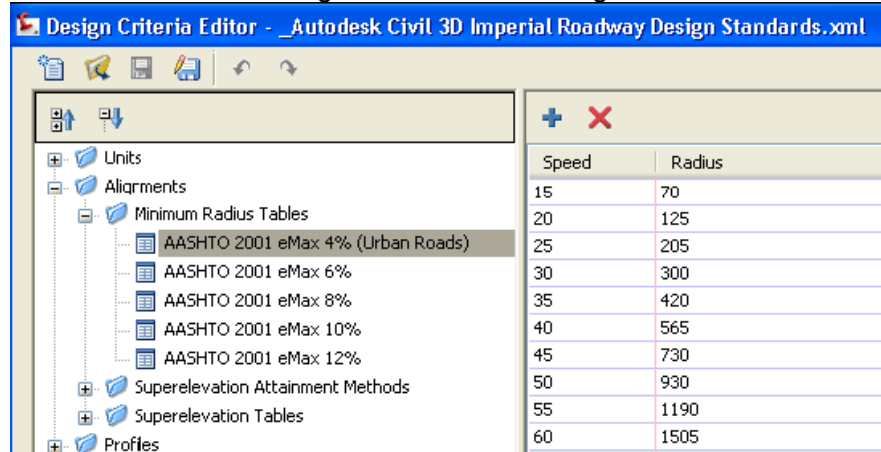


Figure 2.8 – Design Criteria Editor

Design Check Set

The new Design Check settings in Civil 3D 2009 enable you to create, edit, and manage formula-based design criteria. You enable a Design Check Set when you:

- Create design checks for a specific type of entity (line, curve, spiral, or tangent intersection).
- Apply the checks to an alignment or profile as a set.
- Include a Design Check Set as part of the design criteria when creating an alignment or profile.

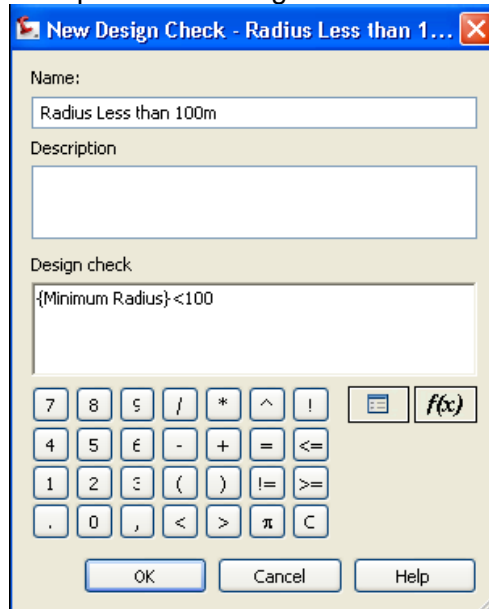


Figure 2.9 – Design Check properties

A Design Check Set can consist of multiple formulas grouped together.

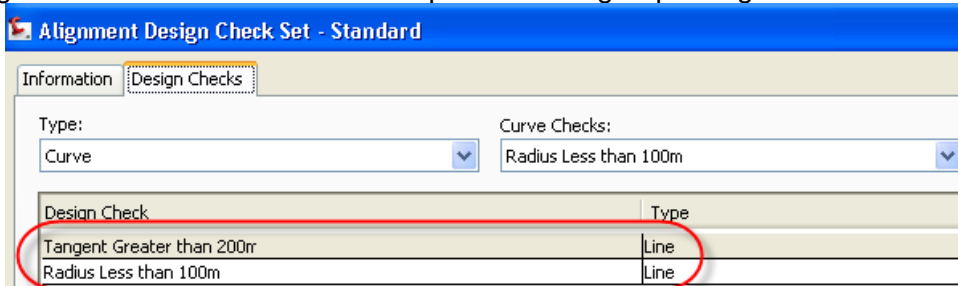


Figure 2.10 – Design Check formulas

In Civil 3D 2009, when criteria-based design is enabled, the formulas, or Design Check Set included in the criteria, automatically indicate when the design does not meet the specified criteria. Civil 3D 2009 displays a warning marker, and you can move your cursor over the warning marker to see which criteria the entity violates.

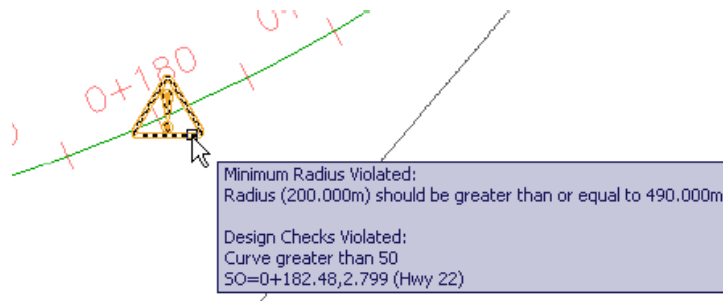


Figure 2.11 – Design criteria violation display

A warning marker is also displayed in the sub-entity and grid view editors for alignments and profiles. After you enter a new value for a parameter, it is checked against the appropriate criteria. The warning marker is removed if the value meets the required criteria.

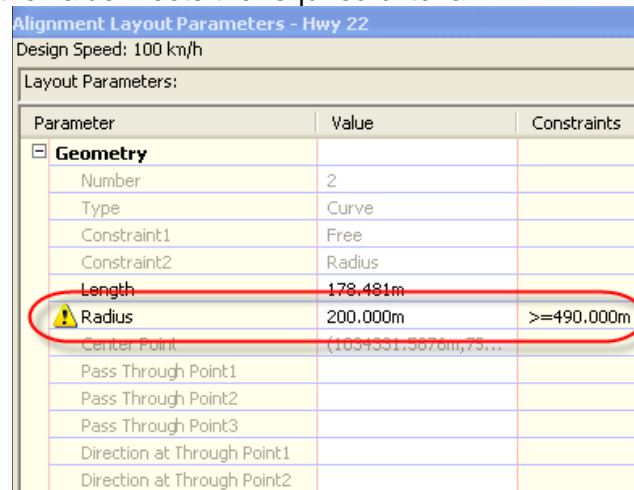


Figure 2.12 – Warning marker display in grid view editor

2.3.2. Passing, Stopping, and Headlight Distance

Designing vertical geometry requires different criteria than does a horizontal alignment. To produce a good vertical design, designers must verify that the curves they create meet the Passing Sight, Stopping Sight, and Headlight Sight Distance criteria. As with alignments, designers can apply design criteria to profiles. The same two methods apply for profiles. You can use a design criteria file and a Design Check Set. When a curve -entity and grid view editors.

Profile Layout Parameters - fg

Design Speed: 100 km/h

Design Criteria:

| Property | Value |
|--|----------------------|
| Minimum K Table | AASHTO 2001 Standard |
| Minimum K For Headlight Sight Distance | 45.000 |

Layout Parameters:

| Parameter | Value | Constraints |
|------------------------|-----------|-------------|
| PVI Elevation | 65.954m | |
| Grade In | -10.81% | |
| Grade Out | -2.59% | |
| A (Grade Change) | 8.22% | |
| K Value | 18.239 | >=45.000 |
| Curve Radius | 1823.882m | |
| Length | 150.000m | |
| High/Low Point Station | 1+009.42m | |

Figure 2.13 – Warning marker for headlight sight distance

After you enter a new value for a parameter, it is checked against the appropriate criteria. The warning marker is removed when the value meets the required criteria.

2.4. Corridor Modeling – Usability and Flexibility

Corridors have always been one of the most powerful features in Civil 3D. Civil 3D 2009 improves corridor functionality with target enhancements. In the past, an assembly could only be stretched in and out if it were attached to an alignment. Civil 3D 2009 enables you to stretch assemblies to a survey figure, feature line, or polyline.

2.4.1. Corridor Targets from Design

In previous versions of Civil 3D, one of the biggest drawbacks with corridor modeling was targets. This was because targets could only be attached to alignments horizontally and profiles vertically. This limitation caused data management problems for some users trying to keep track of all the alignment and profile names. Civil 3D 2009 has greatly improved corridor modeling by enabling you to attach survey figures, feature lines, 3D polylines, and polylines, along with alignments and profiles, to a corridor. You can also attach more than one survey figure, feature line, 3D polyline, polyline, or alignment to a single target. This enhanced functionality in Civil 3D 2009 eliminates the need for unnecessary regions. For example, in Civil 3D 2009, you can add multiple polylines by completing the following procedure:

- In the Corridor Properties dialog box, click **Set All Targets**.
- In the Target Mapping dialog box, next to one of the Width or Offset Targets, click the Object Name **<None>**.

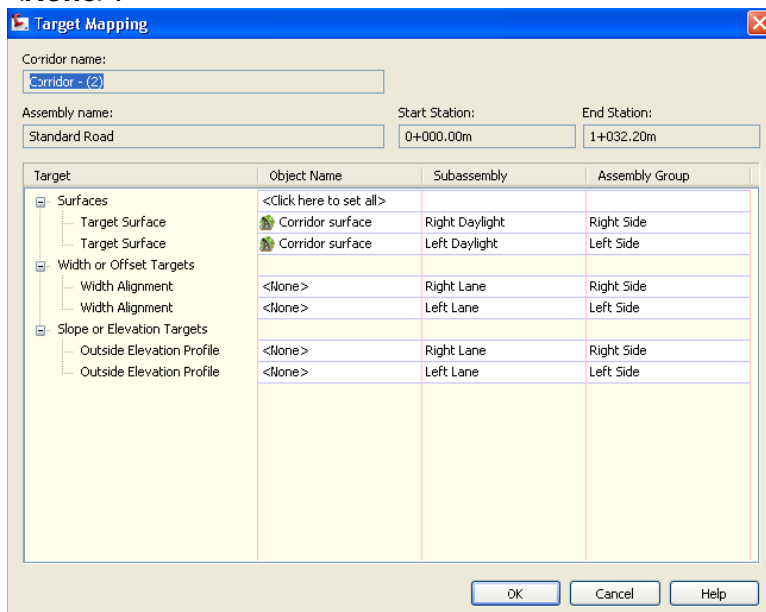


Figure 2.14 – Target Mapping dialog box

- In the Set Width or Offset Target dialog box, from the Select object type to target list, select feature lines, survey figures, and polylines.
- Click **Select from drawing** or **Select by layer** to select the appropriate feature lines, survey figures, and polylines as targets.

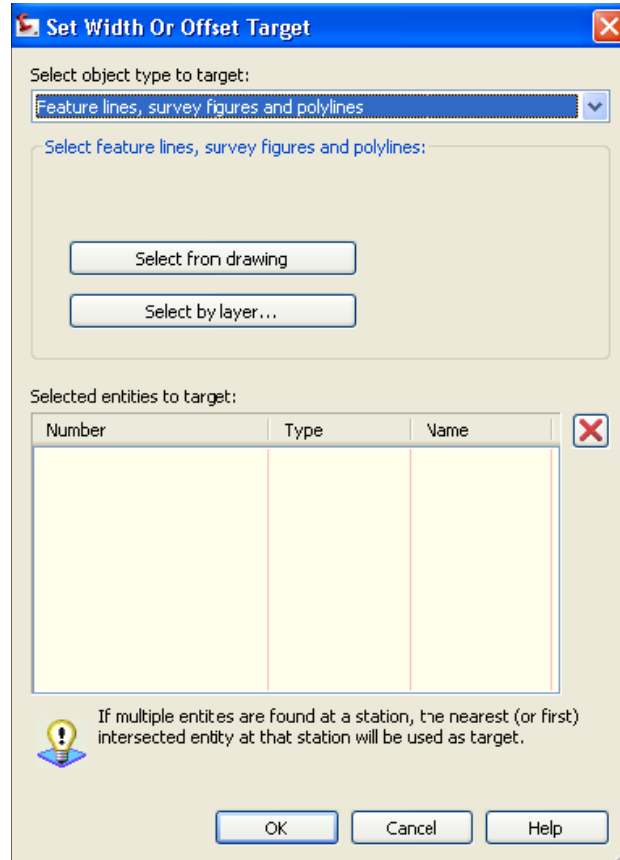


Figure 2.15 – Set Width or Offset Target dialog box

When you click **Select from drawing**, you can select entities, such as feature lines, survey figures, or polylines, to target from the drawing. You can also select more than one entity for each target.

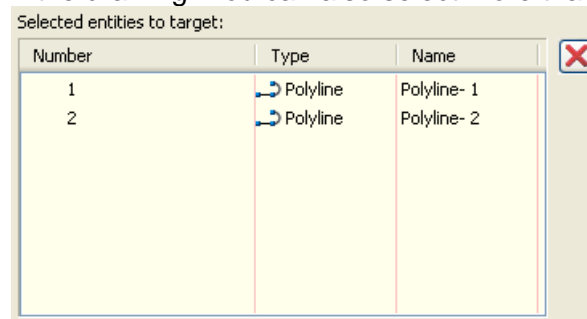


Figure 2.16 – Target entities

When you click **Select by layer**, only the feature line, survey figure, and polyline entities on the selected layer are listed. Once you select the entities to target for a specific layer, the drawing will stretch to each of these entities.

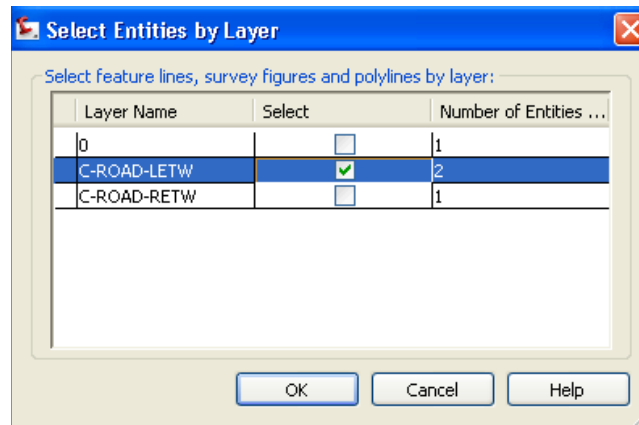


Figure 2.17 – Select Entities by Layer dialog box

2.4.2. Extract Corridor Lines into Grading Features

Civil 3D 2009 improves the process of extracting grading feature lines. The enhancements to the Create Feature Line from a Corridor dialog box include the following new fields:

- **Name.** Enables you to name the feature line.
- **Layer.** Enables you to use the current layer.
- **Smoothing.** Enables you to remove extra vertices that are created from the corridor.
- **Create dynamic link to the corridor.** Enables you to indicate whether the feature line should be updated when the corridor is updated.

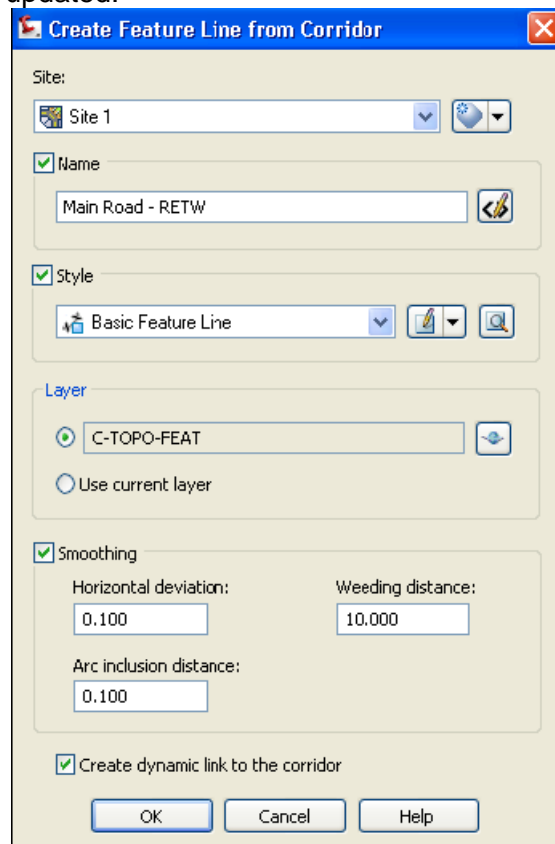


Figure 2.18 – Create Feature Line from Corridor dialog box

2.4.3. How Changes Ripple through Dynamic Design Models

In earlier releases of Civil 3D, you could use feature lines as grading elements. However, when you moved the corridor, the grading became outdated because the grading did not change when you moved the corridor. With Civil 3D 2009, you can create dynamic links to the corridor. Using dynamic links, you can shift a corridor while maintaining a feature line's relationship. In addition, any grading elements that exist are automatically updated. One of the main benefits of using feature lines with corridors is seen when an alignment has tight curves. It is difficult to clean up the inside of the curve. Using feature lines as grading elements enables you to turn off daylighting on the inside edge of the curve and use the Grading Object to grade to the existing surface. The Grading Object can handle the tight curve, and if the corridor is later shifted, the inside curve updates dynamically.

2.4.4. View/Edit Corridor Section

Viewing a corridor model in plan view shows you many things, but often that is not enough. To really understand what is happening with the model, you need to see the section views. Civil 3D 2009 improves section views by enhancing the View/Edit Corridor Section Options. With Civil 3D 2009, you no longer have to rely on a Section View style to display the sections. From the View/Edit Corridor Section Options dialog box, you can control the display of the horizontal and vertical grids. The generated grid will display the grid labels on all sides, regardless of the zoom level you are using, and the grid automatically updates when you make changes.

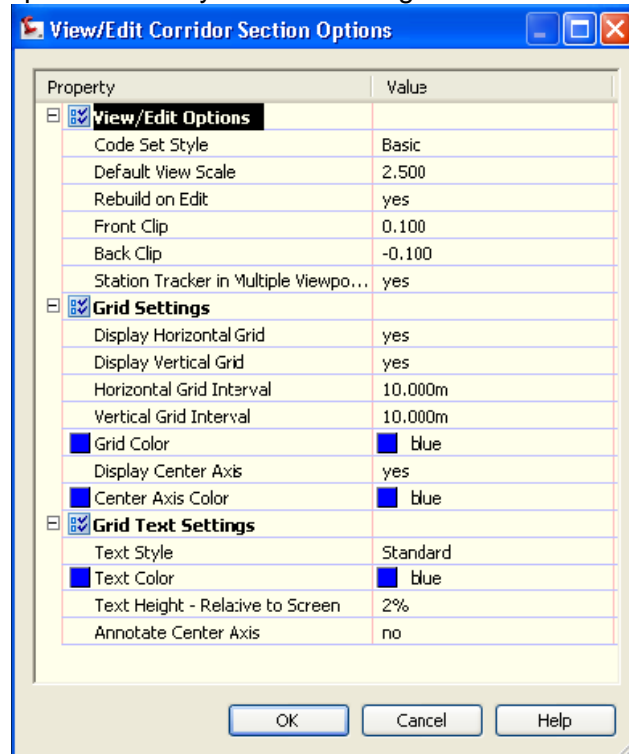


Figure 2.19 – View/Edit Corridor Section Options dialog box

View/Edit Corridor Section Tools Toolbar and Zoom Modes

There are three new zoom icons on the View/Edit Corridor Section Tools toolbar:

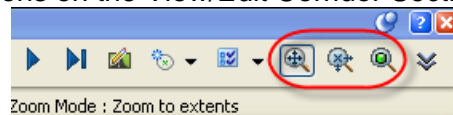


Figure 2.20 – View/Edit Corridor Section Tools toolbar

- Zoom to extents.
- Zoom to an offset and elevation.
- Zoom to a subassembly.

Each of these new icons corresponds to a different zoom mode that you work in when editing corridor sections. The three zoom modes are:

- Normal.
- Locked to Elevation/Offset.
- Locked to Object.

Normal Zoom Mode

In Normal zoom mode, when you navigate to another station after a zoom, the zoom level returns to the extents of the assembly.

Locked to Elevation/Offset Zoom Mode

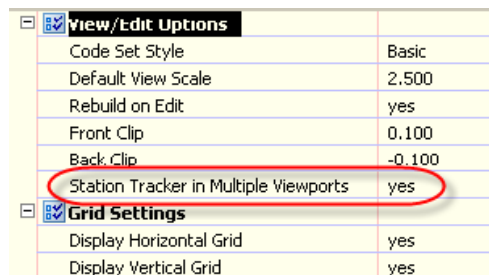
In Locked to Elevation/Offset zoom mode, when you navigate to another station after a zoom, the zoom level remains unchanged.

Locked to Object Zoom Mode

In Locked to Object zoom mode, the system pans to a subassembly that you select. When you navigate to another station, the subassembly you selected earlier remains at the center of the view and the zoom level is unchanged.

2.4.5. Station Tracking

It can be convenient to know where you are in plan view while looking at corridor sections. Civil 3D 2009 has a new option in the View/Edit Corridor Section Options dialog box that enables you to see the location in plan view as you walk through the cross sections. This new option works only when there are multiple viewports.



| View/Edit Options | |
|---------------------------------------|--------|
| Code Set Style | Basic |
| Default View Scale | 2.500 |
| Rebuild on Edit | yes |
| Front Clip | 0.100 |
| Back Clip | -0.100 |
| Station Tracker in Multiple Viewports | yes |
| Grid Settings | |
| Display Horizontal Grid | yes |
| Display Vertical Grid | yes |

Figure 2.21 – Station Tracker in Multiple Viewports option

2.5. Feature Lines – Streamlined Editing

Here are a few facts about Civil 3D 2009 feature lines:

- Feature lines are lines that grading commands recognize and use as footprints.
- Feature lines are lines that surfaces can use as breaklines.
- Feature lines can be drawn.
- Existing objects can be converted into feature lines.
- Feature lines have their own editing commands.
- Feature lines show AutoCAD line types correctly, unlike three-dimensional polylines.

There are many new commands for editing feature lines.

2.5.1. Naming

In Civil 3D 2009, you can now name a feature line when it is created. Once you create and name a feature line on the Prospector tab, it is added to the Names list. This helps you manage the feature lines more efficiently. When you right-click a feature line on the Prospector tab, you will see a shortcut menu with a variety of commands.

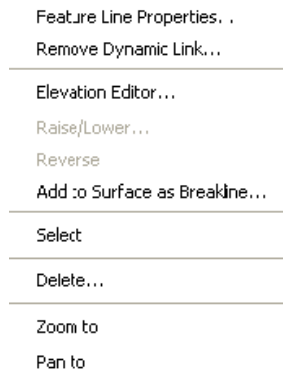


Figure 2.22 – Feature Line shortcut menu

2.5.2. Grading Elevation Editor

Civil 3D 2009 offers a few new commands in the Grading Elevation Editor. The new commands enable you to:

- Specify the elevations from a surface.
- Reverse the direction of a feature line.

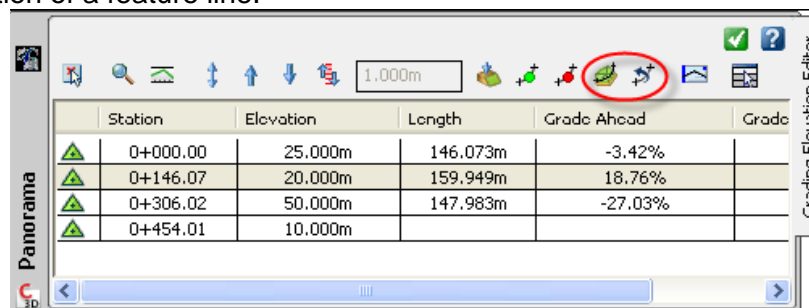


Figure 2.23 – New commands in Grading Elevation Editor

2.5.3. Raise/Lower

In the past, you would normally raise and lower a feature in the Grading Elevation Editor or use the AutoCAD Move command. Civil 3D 2009 has two new commands to raise and lower a feature line. The commands are Raise/Lower and Raise/Lower by Reference.

Raise/Lower

The Raise/Lower command prompts you to specify a height to move the feature line.

Raise/Lower by Reference

The Raise/Lower by Reference command prompts you to specify a reference point and then a grade, slope, or elevation difference from that reference point.

2.5.4. Reverse

There are times when a feature line has been drawn in the wrong direction. With the Reverse command, you can change the direction of the feature line either by selecting the feature line on screen or by specifying the name of a feature line.

2.5.5. Advanced Elevation and Grade Control

Civil 3D 2009 introduces a number of commands to control the elevations and grades of feature lines. You can gain access to these commands from the Grading menu. They include:

- Set Elevation by Reference.
- Adjacent Elevations by Reference.
- Grade Extension by Reference.

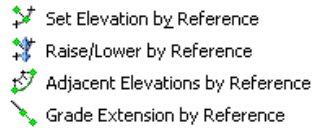


Figure 2.24 – New elevation and grade control commands

Set Elevation by Reference

The Set Elevation by Reference command enables you to set the elevation of a point on a feature line based on a grade, slope, or relative elevation from a reference point.

Adjacent Elevations by Reference

The Adjacent Elevations by Reference command enables you to set the elevations along a feature line based on a grade, slope, or elevation difference from points along another feature line.

Grade Extension by Reference

The Grade Extension by Reference command enables you to edit an elevation by extending the grade of a segment on another feature.

2.5.6. Edit Curve

The feature line editing commands have been broken into two categories in this release: Edit Feature Line Elevations and Edit Feature Line Geometry. The new command under Edit Feature Line Geometry is Edit Curve. The Edit Curve command enables you to change a radius and validate that the curve is tangential.

2.6. Assemblies

An assembly represents a typical section of a corridor and is normally comprised of one or more subassemblies. The subassemblies represent the geometry of the corridor section. For example, there are subassemblies for pavement, curbs, shoulders, and daylighting. Subassemblies are attached to the assembly to create a typical section that can be applied to a station range of a corridor.

2.6.1. Assembly Creation

Creating assemblies has never been difficult with Civil 3D, but there has always been room for improvement. AutoCAD® Land Desktop users have always liked that they only had to design one side of a template and then mirror it on the other side. Civil 3D 2009 has made this possible with assemblies. With Civil 3D 2009, you can design one half of an assembly and highlight the subassemblies you want mirrored on the other side. To mirror an assembly, right-click the highlighted assemblies and click **Mirror**.

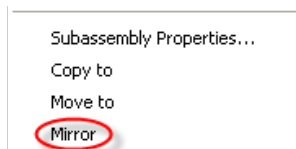


Figure 2.25 – Mirror command on Subassembly Properties submenu

Additional new commands on the Subassembly Properties submenu include:

- Copy to
- Move to

2.6.2. Add Assemblies to Tool Palettes

Civil 3D has never provided a location to store assemblies that are repeatedly used for multiple projects. As a result, you would have to re-create assemblies for different projects. There were workarounds to store assemblies; however, some users didn't know how to gain access to an assembly that was created for another project. Civil 3D 2009 fixes this problem! You can now use the Tool Palettes to store assemblies. Once you create an assembly, just drag and drop it onto the Tool Palette. On the Tool Palette, you can edit the assembly's name and image.

The meeting continued with Brett Settles, one of Hagerman's Solution Engineers, presenting a few of the new features of Civil 3D 2009. He covered the following topics...

- Corridor Modeling – Usability and Flexibility, specifically how to use a polyline to create a feature line (Section 2.4 on the attached document-New Features – Transportation)
- Designing a Catch Basin (Section 4.2 on the attached document-New Features – General Design)
- Renaming pipe network parts (Section 4.3.1 on the attached document-New Features – General Design)

During open discussion, the following topics were discussed...

- Feature lines
- Using Google Earth for projects where no survey is provided
 - The closer you zoom before importing, the more accurate your surface
- Multiple driveways on a project
 - Must insert a region at the location where a cross section is taken or the section for the drive won't update
 - You can add a point within a region and cut a section
- Breaking projects into ½ mile sections seem to be most effective for optimum performance (I'm going to verify this with the Adesk technical specialist)
- Using right and left sections of the road seems to work best for cross sections
- Skewed sections
 - The only way to accomplish at this time is to cut the section, extract the top and bottom, then fill in data in between (I'm going to verify with Adesk technical specialist)
- Mirrored assemblies were added in 2009
- Hydroflow extensions
 - MSD will now accept these ilo of Haestad calculations
 - Hydraulic Grade Lines inside of structures are done incorrectly with 2009 version (I'm going to verify with Adesk technical specialist)
- Brett, Amy and I are meeting with the Adesk technical specialist for Civil 3D on Friday, June 13th. **Please email any technical questions we should address.**
- The following topics will be discussed with Brad Burgess, the Adesk Civil 3D technical specialist, when he's here...
 - Flow splitters in manholes (Terry)
 - Flared end sections (Cynthia)
 - Using old survey commands inside of Civil 3D (Terrence)
 - Curved vertical pipe for water lines (Bob W)
 - Clipping cross sections (Sam)
- The following is a list of topics that the GBUG members would like to see in the future...
 - Feature Lines
 - Grading
 - Pipe Networks
 - Styles
 - Code Set
 - Materials
 - Modeling
 - Parcel Tools
 - Drainage Tools including drainage areas
 - Importing Google Earth Surfaces
 - Survey applications including points (importing, description keys and symbols)

- Stormwater Pond Modeling
 - Roadway Profiles
 - Surface generation and any problems that occur
 - Map 3D
 - Pipe Networks
 - Complex Corridor modeling, including driveways
 - Section Views
 - Editing of cross sections
 - 3D Presentations and rendering
- The GBUG members would like to meet the following Adesk specialist/blogger...
 - James Wedding
 - Lucy Kuhn
 - Any of the people from civil3d.com or eengineering
 - The following GBUG members have agreed to present the following topics...
 - Andy Worfler-Sheet Set Manager
 - It was decided that every quarter for meetings is a good time frame for meetings

Here is info on the next meeting...

Thursday, September 4, 2008

“Improve Your Workflow by using the New Civil 3D Hydraflow Extensions”

Cynthia Colthorp, CAD Manager at Civil & Environmental Consultants Inc., will show you how to use the new extensions in AutoCAD Civil 3D 2009, including:

- Hydraflow Storm Sewers Extension - an easy-to-use, full-featured storm sewer design and analysis package.
- Hydraflow Hydrographs Extension - a comprehensive solution for watershed analysis and detention pond design, from simple sites to complex watersheds with interconnected ponds.
- Hydraflow Express Extension - a collection of powerful calculators that solve everyday hydraulics and hydrology problems for culverts, channels, inlets, hydrology, and weirs.

Please provide any additional comments regarding Groundbreakers, including items to show n share and classified ads you would like to go to all GB members. Also let us know of any future topics you are interested in or any topics you would like to present to the group.

Please let everyone know about the group. We are always happy to have anyone who would like to come and join us!