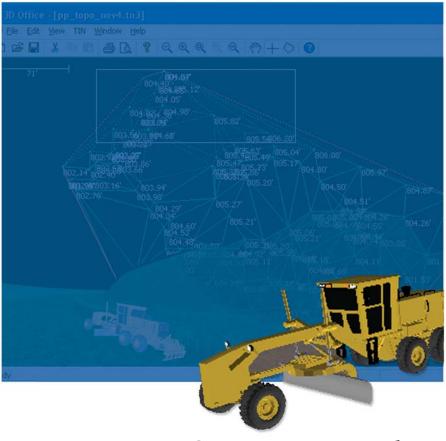


3D-Office

Office Software



Reference Guide



3D-Office[™] Reference Guide

Part Number 7010-0684 Rev C

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Table of Contents

Preface	ix
Terms and Conditions	ix
Manual Conventions	xii
What's New with 3D-Office	xiii
Chapter 1	
Introduction	
Installing 3D-Office	
Uninstalling 3D-Office	
Starting 3D-Office	
Getting Acquainted	
Main Screen	1-5
Menu Bar	
Standard Toolbar	
3D-view and Profile View Menu Bars	
3D-view and Profile View Toolbars	1-16
File Operations	1-18
Opening a File	1-18
Saving a File	1-19
Printing the Display	1-20
Help Topics	1-22
Help Topic Toolbar	
About 3D-Office	1-25
Chapter 2	
Project Files	2-1
Importing Control Points	2-2
Importing Control Points from a Text File	2-3
Opening a Control Point File	2-4
Opening a Pocket-3D File	2-5
Viewing Selected Control Point Information	2-6

Managing Control Points	2-8
Adding Control Points	2-9
Editing Control Points	
Deleting Control Points	2-12
Creating Custom Import/Export Formats for Text Files	
Managing Layers	
Adding a Layer	2-17
Deleting a Layer	2-18
Setting Layer Color	2-19
Displaying Point Labels	2-19
Using Coordinate System Data	2-20
Applying a Projection	
Creating a Custom Projection or Datum	2-21
Applying a Geoid	2-22
Viewing GPS Localization Information	
Principles of GPS Localization	2-26
Viewing and Adding mmGPS Transmitter Information	2-27
Adding a mmGPS Transmitter	
Downloading mmGPS Transmitter Calibration Data	2-29
Calculating Coordinates	2-30
Geodetic/Grid Coordinate Calculations	2-30
Creating a Custom Projection	2-33
Setting Project Units	2-35
Chapter 3	
Point Files	3-1
Importing and Opening Point Files	
Importing into a 3D Project or 3D Point File	3-1
Importing Points from Pocket-3D	3-2
Importing Points from an AutoCAD File	
Importing Points from a Text File	3-4
Opening a Points File	3-5
Opening a Pocket-3D Point File	
Opening an AutoCAD File	3-6
Viewing Information	3-6
Point List View	3-7
Text File View	3-8
Managing Point Layers	3-9

Working with Points	3-11
Adding Points	3-11
Editing Points	
Deleting Points	3-12
Adjusting Point Elevations	3-12
Converting Coordinates to Feet or Meters	3-13
Translating Point Coordinates	
Exporting Points	3-16
Exporting Points to a 3D Point File	3-16
Exporting Points to a Pocket-3D Controller	3-17
Exporting Points to a Text File	3-18
Chapter 4	
Linework Files	4-1
Importing and Opening Linework	
Importing Linework into a 3D Project File	
Importing Linework from Pocket-3D	
Importing Linework from an AutoCAD File	
Opening a Linework File	
Opening a Pocket-3D Linework File	
Creating Linework	4-5
Draping Polylines onto TIN	4-6
Deleting Polylines	4-7
Viewing Linework Information	4-7
Managing Linework Layers	4-8
Setting Unit Options	4-8
Exporting Linework	4-8
Exporting Linework to a File	4-8
Exporting Linework to a Pocket-3D Controller	4-9
Exporting Linework to an AutoCAD File	4-10
Chapter 5	
TIN Files	5-1
Importing and Opening a TIN Surface	5-1
Importing a TIN Surface	
Importing from Pocket-3D	5-2
Importing from an AutoCAD File	
Importing an REB Triangle File	5-4

Opening a TIN Surface File	5-4
Opening a Pocket-3D TIN File	
Creating a TIN Surface File	
Creating a TIN Surface File from a 3D Alignment	
Creating a TIN Surface From Selected	
Points/Linework	5-7
Creating a TIN Surface From Selected Triangles	5-7
Creating a TIN Surface Clipped to the	
Selection Polygon	5-8
Merging TIN Surfaces	
Viewing Triangle Information	
Viewing and Editing TIN Surfaces	
Editing a TIN Surface	
Copying a TIN Surface	5-12
Deleting a TIN Surface	
Working with TIN Surfaces	
Deleting Triangles with Long Sides	5-13
Deleting Triangles	
Consolidating Duplicate TIN Points	
Viewing a 3D Simulation of the TIN Surface	5-16
Viewing a Profile of the TIN Surface	5-18
Comparing Surfaces	5-20
Comparing Surfaces in 3D Project Files	5-20
Comparing 3D Surface Files	
Setting TIN Surface View Options	
Setting Unit Options	5-23
Exporting a TIN Surface	
Exporting a TIN Surface to a TIN Surface File	5-24
Exporting a TIN Surface to Pocket-3D	5-25

Chapter 6

Alignment Files	6-1
Opening an Alignment File in 3D-Office	6-1
Tools Menu Options	6-1
Measuring the Distance/Area of the Alignment	6-2
Showing Surface Elevations	6-3
Comparing Alignment Surfaces	6-3
Importing and Opening an Alignment	6-4

	6-5
Importing from Pocket-3D	6-6
Importing a LandXML Alignment File	6-6
Importing Alignment Features	6-8
Opening an Alignment in 3D-Office	6-9
Opening a Pocket-3D Alignment File	6-9
Creating and Editing an Alignment in a 3D Project File .	6-10
Creating a Polyline	6-10
Placing a Road Template	6-13
Editing Templates	
Viewing and Editing Alignments	
Copying an Alignment	
	6-17
Horizontal Elements	6-18
Adding a Horizontal Element	6-19
Editing a Horizontal Element	
Deleting a Horizontal Element	
Printing Horizontal Elements	6-22
Saving the Horizontal Alignment Table as a	
Text File	6-22
Vertical Profile Elements	6-23
Adding a Profile Element	6-24
-	
-	6-27
	6-27
Templates	6-28
Adding a Template	6-28
Editing a Template	
Deleting an Element	6-32
Deleting a Template	6-33
Placing a Road Template	
Adding a Road Template Placement	
Editing a Road Template Placement	6-36

Deleting a Road Template Placement	6-36
Viewing a 3D Simulation of the Alignment	
Viewing a Profile of the Alignment	
Setting View Options	
Exporting an Alignment	
Exporting to an Alignment File	
Exporting to a Pocket-3D Controller	
Setting Unit Options	6-45
Chapter 7	
Plane Files	7-1
Importing and Opening a Plane Surface	
Importing a Plane Surface	
Importing from Pocket-3D	
Opening a Plane Surface in 3D-Office	
Opening a Pocket-3D Plane File	
Calculating a Plane Surface	
Working with Plane Surfaces	
Viewing Plane Surfaces	
Viewing a 3D Simulation of the Plane Surface	
Copy a Plane Surface	
Create a New Plane Surface	
Editing a Plane's Boundary	7-9
Define a Boundary Using the Selection Polygon	
Define a Boundary by Selecting an Existing Polygon	
Deleting a Plane Surface	7-13
Comparing Surfaces	
Comparing Surfaces in Different Files	
Setting Plane Options	7-17
Exporting a Plane Surface	7-18
Exporting to a Plane File	7-18
Exporting to a Pocket-3D Controller	7-19
Chapter 8	
Grid Files	8-1
Opening a Grid Surface in 3D-Office	8-1
Opening a Grid File	8-1
Grid Properties	8-2

Tools Menu Options	8-2
Computing the Distance Between Points/Polygons	8-2
Displaying Surface Elevation	8-5
Comparing Grid Surfaces	
Importing a Grid	8-6
Creating a Grid Surface	8-7
Viewing Grid Information	8-10
Editing a Grid Surface	
Copying a Grid Surface	
Deleting a Grid Surface	8-14
Loading a Grid Surface from a TIN Surface	
Exporting a Grid Surface	8-17
Chapter 9 Cut/Fill Files	9-1
Opening a Cut/fill File	9-1
Cut/Fill Main Screen	
Viewing Plot Properties	9-2
Saving Plot Properties	9-3
Printing Plot Properties	
Creating a Cut/fill File	
Comparing Surfaces in Different Files	
Setting Plot Options	9-8
Appendix A Connecting a Computer to a Controller	A-1
Appendix B Hot Keys	B-1
Index	

Notes:

Preface

Thank you for purchasing your Topcon receiver, survey product or accessory (the "Product"). The materials available in this manual (the "Manual") have been prepared by Topcon Positioning Systems, Inc. ("TPS") for owners of Topcon products. This Manual is designed to assist owners with the use of software (the "Software") to be used with the Product and its use is subject to these terms and conditions (the "Terms and Conditions").



Please read these Terms and Conditions carefully.

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Manual Conventions

This manual uses the following conventions:

Example	Description
File ▶ Exit	Click the File menu and click Exit .
Enter	Click the button labeled Enter.
Торо	Indicates the name of a dialog box or screen.
Notes	Indicates a field on a dialog box or screen, or a tab within a dialog box or screen.



Further information to note about the configuration, maintenance, or setup of a system.



Supplementary information that can help you configure, maintain, or set up a system.



Supplementary information that can have an affect on system operation, system performance, measurements, or personal safety.



Notification that an action has the potential to adversely affect system operation, system performance, data integrity, or personal health.

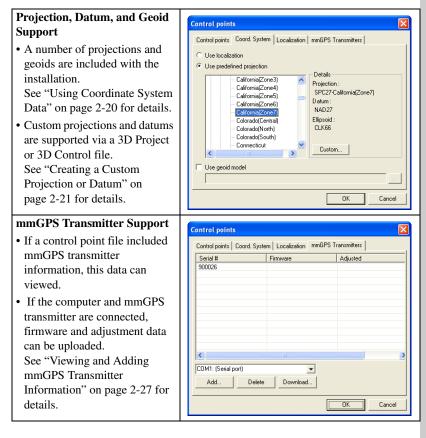


Notification that an action *will* result in system damage, loss of data, loss of warranty, or personal injury.

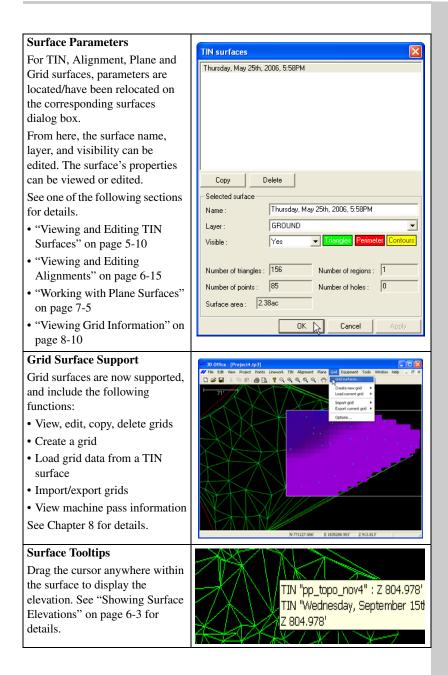
What's New

What's New with 3D-Office

The following list briefly describes new features and functions for the latest version of 3D-Office.



Template Placement Function		
Moved	Road templates	
Moved For alignments, the template placement function is now included as a tab on the Road templates dialog box.	B81-50.000* B8150F F 881-50.000* 88150F F 882-00.001* 88200F F 882-00.001* 88200F F 882-00.001* 88200F F 882-00.001* 88500L L 885-00.001* 88500L L 887-00.001* 88200L L 882-00.001* 88200L L 882-00.001* 88200L L 883-00.001* 88300L L 883-00.001* 8930L L 883-00.001* 8930L L 883-00.001* 8930D B 883-00.001* 8930D F 883-00.001* 89300F F 883-00.001* 89300F F 883-00.001* 89300F F 883-00.001* 89400F F 884-00.001* 89400F F 884-00.001* 89400F F	pplied
		Cancel
Merge TIN Surfaces	l	
A new function that merges all visible TIN surfaces into one. See "Merging TIN Surfaces" on page 5-8 for details.	Delete triangles From selected	ction boundary
Alignment Profile		
A profile of the alignment can be viewed. See "Viewing a Profile of the Alignment" on page 6-39 for details.	✓ww Q Q (Q) (Q)	
Alignment Elements Import	Alignments	
In a 3D Project file, horizontal centerlines, vertical profiles, and x-sections can be imported from various file formats. See "Importing Alignment Features" on page 6-8 for details.	Horizontal centerline Vertical profile Templates Reverse alignment stationing Generate TIN from 3D alignment View 3D simulation View profile Import alignment Export current alignment From 3D alignment From 3D alignment From 3D alignment	
	Options Options Horizontal centerlin Vertical profile X-Sections	



Update Authorization Codes

Occasionally, authorization codes can be purchased to upgrade or update a current copy of 3D-Office. See "About 3D-Office" on page 1-25 for details.

Copyright (C) 2002-2006 Device identification : [55555555 Registered user name : [Topcon Authorization code (1) : [000000000000000 Authorization code (2) :	
5555555 Registered user name : Topcon Authorization code [1] : [000000000000000	
Registered user name : Topcon Authorization code (1) : [00000000000000	
Topcon Authorization code (1) : 0000000000000000	
Authorization code (1) : 0000000000000000	
00000000000000	
,	
Authorization code [2] :	
00000000000000	
00000000000000	

Introduction

Welcome to 3D-OfficeTM, Topcon's fully featured 3DMC software for machine control applications.

With 3D-Office, you can create, edit, import/export, design, and prepare files for any jobsite. Many of these files can be exported to the System Five-3D control box and Pocket-3D for immediate use in the field. 3D-Office imports files from the System Five-3D control box and Pocket-3D for office evaluation.

Installing 3D-Office

3D-Office comes on a CD to install on a computer. Table 1-1 lists the system requirements needed to properly use this software on a computer; optional accessories include CF card access to transfer files between the computer and System Five-3D control box.

Microsoft® Windows 98/NT/ 2000/XP	• 2MB of available hard-disk space (3MB recommended)
• 128MB of RAM	• CD-ROM drive

- 1. Insert the 3DMC Software CD into the CD-ROM drive of the computer.
- 2. Navigate to the CD-ROM drive's folder and double-click the **3D-Office folder** to open it.
- 3. Double-click the **Setup.exe icon** (Figure 1-1) to begin the installation process.



Figure 1-1. 3D-Office Setup.exe Icon

- 4. Select a new destination folder or keep the default folder in which to install 3D-Office, and press **Next** (Figure 1-2).
- 5. After reading the License Agreement, press "I accept..." and press **Next**. The installation process begins (Figure 1-2).

Choose Destination Local Select folder where setup vil			
	Setup mill instal 30 Office in the fullo To instal to this folder, click Next. To folder		avera and select another
		3D Office	8
		License Agreement Please read the following lic	erue agreement cavaluly
Installight	Destrution Folder C-Vinge an Fair-Vingeon 3D Office C Back		Togene Pacifissing Systems, Inc. 3D Office Software SOFTWARE LICENSE AGREEMENT READ THES BETORE USE That you for purchange your Topens recorres, survey product or accessery (the "Product", The material is arguing to surd or purch with the use of adverse of the product to hance and surge to surd or more with the use of adverse of the conditions (the "Tense and Conditions"). PLEASE READ THESE TREAM AND CONDITIONS CARPULLY.
			I accept the lems of the loanse agreement
Installing C:\\Top	con\3D-Office\msvcp71.dll		I do not accept the terms of the forense agreement
			Cancel
	Cancel		

Figure 1-2. Install 3D-Office

6. Press **Finish** to exit the installation wizard. The wizard also creates a shortcut to 3D-Office (Figure 1-3), placing it on the computer's Desktop.



Figure 1-3. 3D-Office Shortcut

Uninstalling 3D-Office

- Navigate to the computer's *add/remove programs* dialog box (press the Start button ▶ Settings ▶ Control Panel ▶ Add or Remove Programs) and remove the Topcon 3D-Office program.
- 2. Press **Yes** at the confirmation (Figure 1-4).

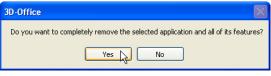


Figure 1-4. Remove 3D-Office?

The *Setup Status* dialog box briefly displays, showing the uninstall progress.

3. Press OK to acknowledge the removal of 3D-Office (Figure 1-5).

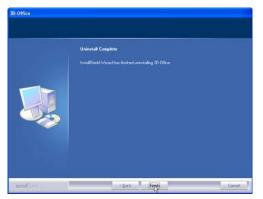


Figure 1-5. 3D-Office Successfully Removed

Starting 3D-Office

To start 3D-Office, click one of the following:

• Start • Programs • Topcon • 3D-Office

• Topcon 3D-Office shortcut

Upon initial startup, 3D-Office requires authorization codes to start (Figure 1-6). Record the device identification number and contact your Topcon Dealer with the following information to receive authorization codes:

- Device identification
- Contact phone number

- Company name
- Contact name

- Contact email address
- Software Type (3D-Office)

• Company address

Once you receive the authorization codes, enter them and press **OK** to open 3D-Office (Figure 1-6). When opening 3D_Office for the first time, a new project file displays. See "File Operations" on page 1-18 for details on creating, opening, and saving projects.

Topcon 3D-Office			
Device identification :	55555555	Topcon 3D-Office	
Registered user name :		Device identification :	55555555
Authorization code (1) :		Registered user name :	Topcon
Authorization code (2) :		Authorization code (1) :	000000000000000000000000000000000000000
	Ok	Authorization code (2) :	000000000000000000000000000000000000000
			Ok 🔊 (Cancel)

Figure 1-6. Enter Access Code

Once entered, the authorization codes can be located and changed on the *About 3D-Office* screen. See "About 3D-Office" on page 1-25 for more details on viewing/changing authorization codes.

Getting Acquainted

This section introduces the various menus, buttons, and windows used for viewing, managing, and editing project files.

Main Screen

The 3D-Office main screen (Figure 1-7) has the following components:

- Title bar displays the name of the file
- Menu bar contains drop-down menus for the various functions, and depends on type of file being displayed
- Toolbar contains shortcut buttons to frequently used functions
- System buttons minimizes, maximizes, and closes windows and dialog boxes
- Status bar displays informative messages about the program's status, as well as cursor/selection-tool coordinates
- Plan View shows a graphical representation of the data available in the current file

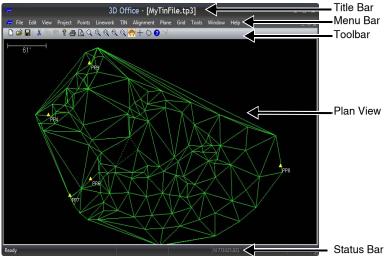


Figure 1-7. 3D-Office Main Screen

Menu Bar

Depending on the type of file open in 3D-Office, the menu bar displays different menus. Figure 1-8 describes the menu bar for 3D-Office file types.

Figure 1-8. Menu Bar for Project Files

Table 1-2 The following table lists the menu bar for other file types.

File Type	Toolbar Type	
3D Office file (*.tp3)	See Figure 1-8 above.	
Control file (*.gc3)	🗭 File Edit View Project Window Help	
TIN surface (*.tn3)	🧭 File Edit View TIN Tools Window Help	
Alignment (*.rd3)	File Edit View Alignment Tools Window Help	
Points (*.pt3)	📮 File Edit View Points Window Help	
Linework (*.ln3)	🚆 File Edit View Linework Window Help	
Plane surface (*.pl3)	💏 File Edit View Plane Tools Window Help	
Cut/fill plot (*.cf3)	💏 File Edit View Cut/Fill Window Help	
Grid surface (*.gd3)	File Edit View Grid Tools Window Help	

Table 1-2. Types of Menus

Table 1-3 describes the menu options available in each menu. Some menu options change, depending upon the file type open.

	Mer	nu	Functions
File	_		Available for all file types, in general the File menu provides the following functions:
	New Qpen Close Save Save As Open Pocket-3D i Open Autocad dr Export to Pocket- Export to Autocad Print Preview Print Preview Print Setup 1 MyTinFile.tp3 2 Simpson TopoN 3 Subdivision.tp3 4 PP_topo_Nov20 Exit	awing file 3D controller d drawing file Ctrl+P ov13_02.tp3	 opens, saves, and closes a 3D-Office file opens a file from a Pocket-3D controller or another program's file type closes the active file prints the contents of the current plan view defines variables for printing active Project or Cut/Fill files provides fast access to recently opened files exits and closes 3D-Office
Edit Edit	<u>U</u> ndo add linework <u>Redo</u> Cu <u>t</u>	Ctrl+Z Ctrl+Y Ctrl+X Ctrl+C Ctrl+V	 Available for all file types, in general the Edit menu provides the following functions: allows a redo or undo of the last operation cuts, copies, or pastes information inverts selected/un-selected data in TIN surface files

Table 1-3. 3D-Office Menu Options

Menu	Functions	
View	Available for all file types, in general the View menu provides the following functions:	
 Zoom in Zoom out Zoom out Zoom vindow Zoom revious Zoom extents Pan Select polygon Select all Ctri+A Select all Ctri+A Status Bar Scale Bar Options In 3D simulation view, the View menu has specific functions for controlling the simulation. See "3D-view and Profile View Menu Bars" on page 1-14 for details.	 zooms in by 200% and zooms out by 50% on the display screen zooms to a part of the design area indicated with a drawn window displays the previous view magnification displays the entire extents of the design area sets the selection cursor to <i>Select</i> or <i>Pan</i> mode selects points and lines or triangles for some file types sets the view status for the Toolbar, Scale bar, and Status bar sets unit options for some file types 	
Project Layer selection & management Control points Import control points	Available for 3D Project (*.tp3), the Project menu provides the following functions. For Control (*.gc3) files, only the "Control points" menu option is available.	
Export control points Utilities Options	 sets and manages layer properties displays control point and GPS localization information 	
	 imports and exports control points calculates map-projection coordinates defines a custom projection sets unit options for Project files 	

Table 1-3. 3D-Office Menu Options (Continued)

Menu	Functions
Points Points New point Edit point Delete points Point list view	 Available for 3D Project (*.tp3) and Points (*.pt3) files, the Points menu provides the following: sets layer properties adds, edits, and deletes points
Import points Export selected points Transform selected points	 displays the point list imports and exports control points transforms coordinates sets unit options for Project files
Linework (.tp3) Linework Layers Delete polyline Join polylines Import linework Layers (.ln3) Layers Delete polyline Delete polyline Join polylines Import linework Explode polyline Layers Delete polyline Layer	 Available for 3D Project (*.tp3) and Linework files (*.ln3) files, the Linework menu provides the following functions. For Linework (*.ln3) files, this menu also views and edits layers. creates a new polyline drapes selected polyline entities to the TIN deletes selected polylines converts polylines to a new alignment imports linework files exports selected linework

Table 1-3. 3D-Office Menu Options (Continued)

Menu	Functions
TIN TIN urfaces	Available for 3D Project (*.tp3) and TIN surface (*.tn3) files, the TIN menu provides the following functions:
Generate new TIN surface Delete triangles	displays TIN surface information
Transform current TIN surface Consolidate duplicate TIN points	• generates new TIN surfaces
View 3D simulation	deletes triangles
View profile	• transforms the current TIN surface
Import TIN Export current TIN surface	consolidates duplicate TIN points
Compare current TIN surface	 displays a 3D representation of the TIN surface
Options	 displays a profile through the TIN surface
	• imports and exports TIN surfaces
	compares the current TIN surface with another surface
	sets TIN unit options
Alignment (.tp3) Alignment Alignments Horizontal centerline Vertical profile Templates	 Available for 3D Project (*.tp3) and Alignment (*.rd3) files, the Alignment menu provides the following functions. (Only some menu items are available for *.rd3 files).
Reverse alignment stationing Generate TIN from 3D alignment	displays alignment information
Generate poyline(s) View 3D simulation View profile	• configures horizontal elements, vertical curves, and template placement
Import alignment Export current alignment	• creates, edits, and places templates
Options	reverses alignment stationing
Alignment Horizontal centerline Vertical profile	• generates a TIN surface from alignment information
.rd3 Templates	displays a 3D representation of the alignment
Reverse alignment station View 3D simulation	displays a profile of the alignment surface
View profile Export alignment	 imports alignment information, horizontal centerlines, vertical profiles, and cross-sections
Options	exports alignment information
	• sets alignment profile and plan view options

Menu	Functions
Plane (.tp3) Plane Planes Planes Planes Obfine plane boundary View 30 simulation Import plane Compare current plane surface Options Plane Plane parameters View 3D simulation Export plane surface Options Grid menu Grid Grid surfaces Create new arid	 Available for 3D Project (*.tp3) and Plane surface (*.pl3) files, the Plane menu provides the following functions: displays plane information sets plane parameters calculates new plane surfaces defines plane boundaries imports and exports plane surfaces compares a plane surface with another surface type sets plane options Available for 3D Project (*.tp3) and Grid surface (*.gd3) files, the Grid menu provides the following functions:
Grid properties	 displays grid surface information creates a new grid removes all grid data loads a current grid surface imports and exports a grid surface sets grid surface options
Tools menu Tools Measure distance/area Show surface elevations Compare Surfaes	 Available for 3D Project (*.tp3) files, 3D TIN (*.tn3), 3D Alignment (*.rd3), 3D Plane (*.pl3), and 3D Grid (*.gd3) files, the Tools menu provides the following functions: computes the distance between points and areas of polygons
Tools Measure distance/area Show surface/alignment tooltips	 shows surface elevations (depending on the view) shows surface/alignment tool tips (depending on the view) compares surfaces (depending on the view)



Menu	Functions
Window menu Window	Available for all file types, the Window menu provides the following functions:
 <u>C</u> ascade <u>A</u> rrange Icons	 opens the current file in a new window any changes made in the new window are made in all windows of the same file
✓ <u>1</u> MyTinFile.tp3	 arranges open files in cascade (stacked) view and arranges icons
	 arranges open files in tile (adjacent) view and arranges icons
	lists all open files
	the active file is marked with a check mark
Help menu	Available for all file types, the Help provides the following functions:
Help Topics F1	opens on-line help topics
About 3D-Office	• gives 3D-Office version and copyright date information.

Table 1-3. 3D-Office Menu Options (Continued)

Standard Toolbar

The standard toolbar for 3D-Office (Figure 1-9) contains buttons for frequently used functions.



Figure 1-9. 3D-Office Toolbar

Upon start-up, the toolbar displays beneath the menu bar.

- To display or hide the Toolbar, click **View • Toolbar**.
- To move the Toolbar, press and hold the "grab bar" on the left of the Toolbar, then drag the Toolbar to a new location and release the mouse button.

Table 1-4 describes the function of the various buttons on the Toolbar. Table 1-4. Standard Toolbar Button Functions

Button	Description	Button	Description
D	New – Creates a new 3D Project file.	ď	Zoom Out – Zooms out from the map by 50%.
à	Open – Opens an existing 3D project file.	Ð	Zoom In – Zooms in on the map by 200%.
	Save – Saves the active project or file to current folder.	Ø	Zoom window – Zooms to a rectangular area drawn in the Plan View.
*	Cut – Removes the selected information from the page or window, placing it on the Windows® clipboard.	đ	Zoom previous – Displays the last magnification of the Plan View.
	Copy – Copies selected information from the page or window, placing it on the Windows clipboard.	ď	Zoom extents – Displays the entire design area.
(Paste points – Places selected information from the Windows clipboard (points only) to the current cursor position.	\$	Pan – Changes the cursor to a "hand" to "grab" and manipulate the map.
8	About – Displays the <i>About 3D-Office</i> dialog box.	Ŧ	Select – Changes the cursor to a crosshairs with which to click and select individual entities, or to click and drag over an area, creating a rectangle that selects enclosed entities.
5	Print – Prints the Plan View.	\Diamond	Select polygon – Changes the cursor to a crosshairs with which to draw a polygon around the entities to select.
<u>a</u>	Print preview – Displays how the Plan View will look when printed.	•	Entity Information – Displays a text editor window containing information about selected entities.

Button	Description	Button	Description
Q	Zoom Out – Zooms out from the map by 50%.	*	Site Link – allows you to transfer files, project, data, and messages to other 3D-Office, 3DMC, and Pocket-3D users on the jobsite. NOTE: You must be connected to a Site-Link service (provided directly by Topcon or through a Site-Link server hosted on the job). Other features include remote desktop support for 3DMC machine operators, the transfer of RTK corrections across the Site-Link connection, and real-time collaborative as- build mapping. NOTE: The availability of this machine configuration is controlled by OAF.

Table 1-4. Standard Toolbar Button Functions (Continued)

3D-view and Profile View Menu Bars

The 3D-view and Profile view menu bars for 3D-Office (Figure 1-10) include menus for controlling the view and the machine. The available menus depend on the type of view selected.



Figure 1-10. 3D-view and Profile View Menu Bars

The menu bar for solid model simulations (TIN and alignment) has the following menu selections:

• File and Edit menus - have standard menu selections

- View menu zooms in and out, selects topography information to display, selects the view in relation to the cab, applies grid and contour interval options
- Theme menu changes the look of the "ground" in the simulation
- Machine menu changes the machine displayed in the simulation
- Motion menu plays log files, follows the road alignment during movement, monitors machine movement during real time
- Window and Help menus have standard menu selections

The menu bar for Profile views shows only the View menu selection for zooming in/out, using the pan or select pointer, and exaggerating/decreasing the vertical view.

The menu bar for basic wireframe simulations (alignment) has the following menu selections:

- File and Edit menus have standard menu selections
- View menu zooms in/out, rotates the view left/right, decreases/ increases the viewing angle, provides machine image controls
- Alignment menu has plan, profile, and 3D simulation view options
- Window and Help menus have standard menu selections

3D-view and Profile View Toolbars

The 3D-view toolbars for 3D-Office (Figure 1-11) includes buttons for controlling the view and machine. The available buttons depend on the type of 3D simulation, either solid model or wireframe.



Figure 1-11. 3D-view Toolbars

Upon start-up, the toolbar displays beneath the menu bar.

- To display or hide the Toolbar, click View > Toolbar.
- To move the Toolbar, click and hold the "grab bar" on the left of the Toolbar, then drag the Toolbar to a new location and release the mouse button.

Table 1-5 The following table describes the various buttons on the 3D-view toolbars.

Button	Description	Button	Description
⊕ _	Zoom In – zooms in on the 3D-view by 200%	Ø	Zoom Out – zooms out on the 3D-view by 50%
Solid Model Simulation		Wireframe Simulation	
44	Rewind – during logfile playback, rewinds the logfile	▼	Slow down – slows down the movement of the machine
••	Fast forward – during logfile playback, speeds up the logfile		Speed up – starts and speeds up the movement of the machine
•	Play – during logfile playback, plays the logfile	•	Rotate view left

Table 1-5. 3D-View Toolbar Button Functions

Button	Description	Button	Description
11	Pause – during logfile playback, pauses the logfile	•	Rotate view right
	Stop – stops the logfile playback	T	Lowers the viewing angle
•	Record – during real- time monitoring, creates a logfile for the machine		Raises the viewing angle
		Ø	Stop – in a wireframe simulation, stops the movement of the machine
	Pro	file View	
س ې	Pan – changes the cursor to a "hand" with which to "grab" and move the map	‡	Exaggerates the vertical scale
+	Select – at the location of the crosshairs, Point, TIN, and Grade information display in a tip box.	I	Decreases the vertical scale
***	Snap to Station – rotates the profile line perpendicular to the center line, positioning it up the alignment	14	Rewind – during logfile playback, rewinds the logfile
M	Fast forward – during logfile playback, speeds up the logfile	•	Play – during logfile playback, plays the logfile
	Pause – during logfile playback, pauses the logfile		Stop – stops the logfile playback

Table 1-5. 3D-View Toolbar Button Functions (Continued)

File Operations

From the File menu, you can create, open, and save project files. You can also preview and print the display window, as well as enter title block information for any printed material.

The following sections describe opening and saving files, printing the display, and using the Print Setup feature.

Opening a File

3D-Office opens the following types of files:

- 3D Project (*.tp3)
- Control file (*.gc3)
- TIN surface (*.tn3)
- Alignment surface (*.rd3)
- Linework (*.ln3)
- REB Triangle file (*.REB)

- Points file (*.pt3)
- Plane surface (*.pl3)
- Cut/fill plot (*.cf3)
- Grid surface (*.gd3)
- AutoCAD (*.dwg/*.dxf)

By default, these files are saved to the last selected folder on the computer's hard drive. However, files can be saved to and opened from any selected folder.

- 1. To open a file, do one of the following:
 - click File > Open
 - press File then a recently opened file
 - press the **Open** button on the toolbar
 - press Ctrl+O

2. On the *Open* dialog box, navigate to the location of the file, select the file type, select the desired file, and press **Open** (Figure 1-12).

Open			? 🛛
Look in: 🔎	PP_topo	- + 🗈	r 🖬 🕈
<pre>% NealSite_F % PP_topo_N % SimpsonTo</pre>			
File <u>n</u> ame:	PP_topo_Nov20.tp3		<u>O</u> pen
Files of <u>t</u> ype:	3D Project (*.tp3)	 •	Cancel

Figure 1-12. Select File to Open

Saving a File

To save a file, do one of the following:

- Click File > Save
- Press the Save button on the toolbar
- Press Ctrl+S

When closing a file or closing 3D-Office after making changes to the current file, a *Save changes* confirmation displays.

Press **Yes**, to save the changes and complete the operation (Figure 1-13).



Figure 1-13. Save Changes

To save the file under a different name or to a different location,

press **File** ► **Save As**. Navigate to the location in which to save the file, enter a name for the file, then press **Save** (Figure 1-14).

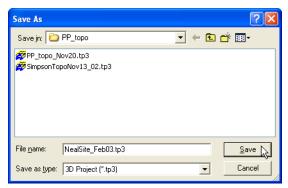


Figure 1-14. Save File with a Different Name or in Another Location



Save the file as a variant of the original file to keep a backup copy or to track progress.

Printing the Display



Before printing, view the display using Print Preview (see "Print Preview" on page 1-21 for details).

To print the Plan View, do one of the following:

- click File > Print
- press the **Print** button on the toolbar
- press Ctrl+P

The current view prints, along with a title block (see "Print Preview of the Plan View" on page 1-21 for setting title block information).

Print Preview Use the Print Preview function to see how printed information will look on paper. Use this preview to check orientation, font size, etc.



Depending on the parameters previously set in the Print dialog box, the Print Preview will be in either portrait or landscape orientation.

To view the print preview, click **File** \triangleright **Print Preview** or press the **Print Preview** button \square , on the toolbar.

The *print preview* dialog box displays the graphic/information that will be printed (Figure 1-15).

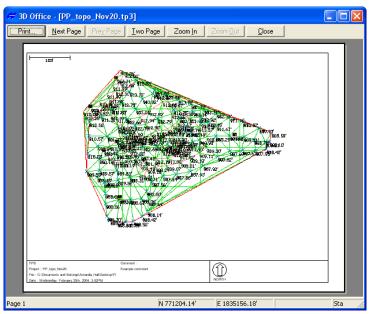


Figure 1-15. Print Preview of the Plan View

Print Setup The Print Setup feature sets title block information and the size for text and map fonts. The title block information applied here is a global field and will be applied to all printed information.

Click **File** > **Print Setup** to change title block information printed with display views.

Use the *Print setup* dialog box (Figure 1-16) to set the following:

- Company name enter owner/user information to include in the title block
- Comment enter desired information to include in the Comment area of the title block, such as the jobsite or location
- Text font sets the text size in reports and title blocks
- Map font sets the text size for entities viewed in the plan view, such as point names, coordinates, etc.

Print setu	р	X
Company name	TPS	
Comment	Example of a TIN file	
Text font	10 🗸	Map font 12 💌
		OK Cancel

Figure 1-16. Print Setup

Help Topics

Click **Help** ► **Help Topics** to get help on any menu item that requires more information (Figure 1-17 on page 1-23).

Contents Tab: On the *Contents* tab, click on the topic of your choice to display a list of topics for further research on whatever topic you need help with.

Index Tab: On the *Index* tab, enter a "keyword" in the *Type in the keyword to find* field below to find help on a specific menu item.

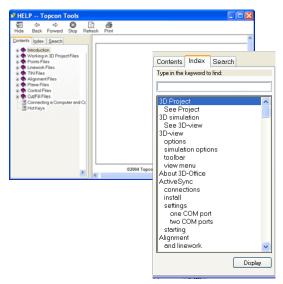


Figure 1-17. Help Topics for 3D-Office – Contents/Index Tabs

Search Tab: On the Search tab, enter a "keyword" in the *Type in the keyword to find* field below (Figure 1-18 on page 1-24).

- List Topics press to display a list of topics related to the keyword previously entered in the field above.
- Select Topic to display displays the topics related to the keyword entered above.
- Display Window (box to the right) displays detailed information on the selected topic.

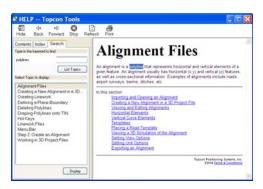


Figure 1-18. Help Menu – Search Tab

Help Topic Toolbar

Table 1-6. Help Topic Toolbar

lcon	Command	Description
	Hide	Hides the first column of information (Contents, Index, and Search tabs)
Ŷ	Back	Press to go back one level to the last item selected.
Ŷ	Forward	Press to go forward to the next topic.
⊗	Stop	Press to stop the current command.
÷,	Refresh	Press to collapse back to level one of any given topic.
4	Print	Press to print the information on display in the display window to the right.

About 3D-Office

The About 3D-Office dialog box (Help ► About 3D-Office) contains the following information:

- Software version
- Copyright date

On the *About 3D-Office* dialog box, press **Authorization**. The *Topcon 3D-Office* dialog box contains (Figure 1-19 on page 1-25) the following information:

- Device identification number
- Authorization codes

About 3D-Office	×	
3D-Office, version 9.2.001 Copyright Topcon (C) 2002	2-2010	
ОК	Authorization Topcon 3D-Office	X
	Device ID 430a102a 430a102a	
		ff211dbf5fff34333061 36369b11f570c4e1e42d
	ОК	From File Cancel

Figure 1-19. About 3D-Office.



Occasionally, upgraded or different functionality may be required for different authorization codes to become active. Contact your Topcon Dealer with the following information to receive authorization codes:

- Device identification
- Company name
- Contact name
- Company address

- Contact phone number
- Contact email address
- Software Type (3D-Office)
- 3. Click **Help ▶** About 3D-Office.
- 4. Press **Authorization** on the *About 3D-Office* dialog box and enter the new authorization codes (Figure 1-19 on page 1-25).
- 5. Press **From File** on the *Topcon 3D-Office* dialog box to copy authorization codes directly onto the GX-60 via a USB file.
- 6. Close and re-open 3D-Office to activate the updated codes.

Project Files

3D Project files provide a way to incorporate the various individual components of a jobsite into a single, cohesive file.

Proj	ject	
	Layer selection & management	
	Control points	
	Import control points	×
	Export control points	►
	Utilities	Þ
	Options	

Figure 2-1. 3D Project Menu

Much of the functionality available in 3D Project files is the same as in other respective file types. However, 3D Project files provide certain features useful to working with multiple sets of different information and 3D Project specific functions, including the following:

- selecting and managing layers
- calculating map-projection coordinates
- working with polylines
- creating, managing, and transforming TIN surfaces
- creating and managing plane surfaces
- creating machine configuration files
- setting units for the 3D Project

The following sections provide the procedures on functions specific to 3D Project files, as well as some features useful for working with multiple file types. When 3D-Office first opens, an empty 3D Project displays.

- To create a new 3D Project file, click **File ▶ New**.
- To open a current 3D Project file, click **File → Open**. Navigate to the location of the file, select a *.tp3 file, and click **Open**.

For working with data sets in a 3D Project file or with individual file types, see chapters 3 through 9.

Importing Control Points

Follow these steps to import control points from a 3D Control Point file into a 3D Project file.

- With a 3D Project file open, click Project ▶ Import control points ▶ From 3D control file (*.GC3).
- 2. On the *Open* dialog box, navigate to the location of the desired file, select it, and click **Open** (Figure 2-2). The information from the selected file is added to the 3D Project file.



Figure 2-2. Open 3D Control Point File

Importing Control Points from Pocket-3D Controller

Follow these steps to import control points from a Pocket-3D controller into a 3D Project file.

- 1. Connect the Pocket-3D controller to the computer and turn on the controller (see Appendix A for details). Run Pocket-3D on the controller.
- With a 3D Project or 3D control Points file open, click Projects > Import control points > From Pocket-3D controller.

3D-Office connects with the Pocket-3D controller and retrieves *.pt3 files.

3. On the *Pocket-3D files* dialog box, select the file to import and click **Open** (Figure 2-3). The file type is automatically selected.

Name		Size (kB)	Created			
PP_topo_No	ov20	4.9	Monday,	August 2n	d, 2004,	7:12PM
		o_Nov20			_	

Figure 2-3. Open Control Points File From a Pocket-3D Controller

Importing Control Points from a Text File

Follow these steps to import control points from a text 3D control point file into a 3D Project file.

With a 3D Project file open, click Project ▶ Import control points ▶ From text file.

 On the Select custom format dialog box, select the format type and click Next (Figure 2-4). See "Creating Custom Import/ Export Formats for Text Files" on page 2-13 for details on creating or editing import formats.

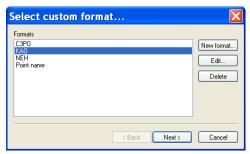


Figure 2-4. Select Format Type

- 3. On the *Import points from text file* dialog box, click **Browse**. Navigate to and select the desired *.txt file and click **Open**.
- 4. Click **Finish** to import the control points (Figure 2-5). The information from the selected file is added to the 3D Project file.

Import points from text file	X
Text file C:\PP_topo\PP_topo_Oct26_controlpoints.txt	Browse
< Back	Cancel

Figure 2-5. Open Control Point Text File

Opening a Control Point File

- 1. To open a control point file click **File ▶ Open**.
- 2. On the *Open* dialog box, navigate to the location of the file, select the file type as Control file (*.GC3), select the desired file, and click **Open** (Figure 2-6 on page 2-5).

Open		?	<
Look jn: 隘	PP_topo	• 🗧 📥 🖬 •	
PP_topo_N	lov20.gc3		
File <u>n</u> ame:	PP_topo_Nov20.gc3	pen	
Files of type:	Control file (*.gc3)	▼ Cancel	

Figure 2-6. Open Control File

Opening a Pocket-3D File

If a Pocket-3D controller and the computer are connected, 3D-Office will open control point files directly from the controller. Once opened, the file can be exported to other files or saved to the computer. See Appendix A for details on connecting a computer and controller.

- 1. Click File > Open Pocket-3D file.
- 2. On the *Pocket-3D files* dialog box, select the file type (*.GC3) and the desired file, then click **Open** (Figure 2-7).

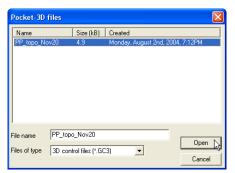


Figure 2-7. Select File and Click Open

The Pocket-3D control point file opens in 3D-Office.

Trimble File to import a Trimble proprietary control point file into a Pocket-3D file, click **Project → Import control points → From Trimble file (*.DC).**

Viewing Selected Control Point Information

The **information** button **(?)** in 3D-Office opens a text file that displays various details about the selected entity or entities.

1. Using the select tool, click on or draw a rectangle around the desired point(s), then click the activated **Information** button (Figure 2-8).

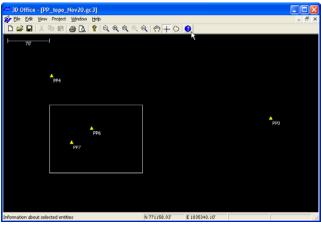


Figure 2-8. Select Control Point(s) – Press the Information Button

2. Press the activated **information** button (Figure 2-9 on page 2-7) on the toolbar.

A text file opens, to display information on the selected control points (Figure 2-9). Any modification of this text file has no affect on the values stored in the control file.

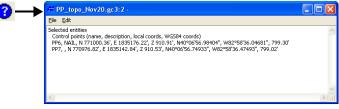


Figure 2-9. Information on Selected Entities

To save the information as a text file, click File ➤ Save as, enter a name and select a location for the file, then click Save (Figure 2-10).

Save As	? 🛛
Save in: 🗁 PP_topo	
PP_topo_Nov20.txt	
File name: PP_topo_Nov20_NailPoints	Save
Save as type: Text Files (*.txt)	Cancel

Figure 2-10. Save Control Point Information to a Text File

4. To copy the information to the clipboard, highlight the desired information and click **Edit ► Copy**.

Managing Control Points

Control points are surveyed points on or around a job site that provide reference coordinates for the project. As a project advances and changes, the current control points may need to be added to, revised or even removed.

To view the list of control points for adding, editing or deleting, click **Project** > **Control points**. The *Control points* dialog box has the following four tabs (Figure 2-11 on page 2-9):

• The *Control points* tab lists all control points in the file and their respective information. The description is optional. The horizontal and vertical errors represent the fit between the project coordinates and the GPS coordinates. They should be within acceptable tolerances for the jobsite.

See the following sections for adding, editing, or deleting control points.

• The *Coord System* tab selects to use localization or projection data for the job, and if a geoid is used for the job. A custom projection can be created.

See "Using Coordinate System Data" on page 2-20 for details on this tab.

• The *Localization* tab displays tab displays the results of a localization computation. The fields on this tab are read-only and displays the numerical results of the localization computation.

See "Viewing GPS Localization Information" on page 2-25 for details on this tab.

• The *mmGPS Transmitters* tab displays serial number and firmware revision of transmitters loaded into 3D-Office or included with the control point file. The adjustment status of the transmitter also displays. A new transmitter can be added, and if connected to the computer, a transmitter's information can be loaded.

See "Viewing and Adding mmGPS Transmitter Information" on page 2-27 for details on this tab.

Con	trol p	oints				×			
Cont	rol points	Coord. System Localiza	ition mmGPS T	ransmitters		_			
Na	me	Description	ı – E	H.Error	V.Error				
PP PP PP PP	4 6 7	CAP NAIL NAIL		0.026' 0.028' 0.022' 0.017'	-0.038' -0.022' 0.094' -0.007'				
PP PP		CAP NAIL		Control	points				
		DI points Locelizat 1: Oblique stereographic 771017.412' 1335210.534'	Datum∶WGS84 Lat N671	Use localiz	ined projection Arkansas(S: California[Z: California[Z: California[Z: California[Z: California[Z: California[Z: rria[Z: rria[Z: rado[Ce	buth) pne1) pne2) pne3) pne4) pne6) pne6) pne7)	Details Projection SPC27-Ca Datum: NAD27 Ellipsoid : CLK66 Custom	alifornia(Zone7)	V Cancel
	Scale	1.0000000					mmGPS T	34	
	Rotatio		[S/N		Firmware	mmurs I	Adjusted	
		djustment : Inclined plane < (East) 0.00000% offset 111.510'	Incline Y (North) [TINYOC		Adjusted	
				<					>
				COM1: (Serial p			<u>~</u>		
				Add	Delete	Сору	Dow	nload	

Figure 2-11. Control Points Dialog Box Information Tabs

Adding Control Points

To add control points to the project, do the following:

- 1. Click **Project** > Control points
- 2. Press Add on the Control points tab (Figure 2-12 on page 2-10).
- 3. Enter the following parameters and press **OK** (Figure 2-12 on page 2-10):
 - Name enter a name for the control point.
 - Description describe the control point (optional).

- *North/East/Elevation* enter project coordinates (North, East, Elev) for the new control point.
- *Use this point for horizontal localization* check mark this box to enable horizontal localization.
- *Use this point for vertical localization* check mark this box to enable vertical localization.

NOTE: In general, these boxes should be enabled for each point. However, certain scenarios may require only one of the localization check boxes to be enabled. For example, the project surveyor may indicate a certain Control Point has an elevation error or find the vertical error for a Control Point to be out of the tolerance range after localizing.

• *WGS84* coordinates – enter *latitude*, *longitude*, and *height* WGS84 coordinates for the new control point.

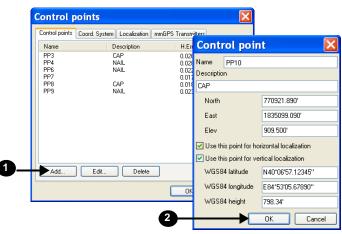


Figure 2-12. Add Control Point

The new control point is added to the control points list and a new localization is automatically computed.

4. Press **OK** to view the new control point on the Plan View (Figure 2-13 on page 2-11).

New Centrel Deint	C	Control points			X
New Control Point		Control points Coord. Syste	em Localization mmGPS 1	Fransmitters	
		Name	Description	H.Error	V.Error
/= 30 Office - [PP_tops_Nev2, igc3]		PP3	CAP	0.026'	-0.038'
DSB X BB BA P Q Q Q Q + 0 0		PP4	NAIL	0.028'	-0.022'
		PP6	NAIL	0.022'	0.094'
107 199		PP7	010	0.017	-0.007'
		PP8 PP9	CAP NAII	0.018' 0.023'	0.005'
	2	PP10	CAP	0.00'	-0.00'
•				0.00	
147 (NID)	-	Add L	Delete	ок	Cancel
PP3					
Ready N 770887.27 E 1835592	2.47				

Figure 2-13. Control Point Added to File

Click **Cancel** on the *Control points* dialog box to leave the file unchanged, without adding the new control point. Or, after closing the dialog box, click **Edit ▶ Undo edit control points** to return the file to its original state.

Editing Control Points

You can edit the name, description, coordinates, and localization for any control point. Editing coordinates will cause an automatic recomputation of the localization.

- 1. Click **Project** > Control points.
- 2. On the *Control points* tab, highlight the control point to change, and press **Edit** (Figure 2-14 on page 2-12) to edit the desired parameters.
- 3. Press **OK** (Figure 2-14 on page 2-12) to save your changes.

Control points		,		
Control points	Coord. System Localization mmGP	S Transm	Control point	
Name	Description		Name PP7	
PP3 PP4	CAP NAIL	163 125	Description	
PP6 PP7	NAIL	38.3	NAIL	
PP8 PP9	CAP NAIL	38.3 78.9 268 150	North	770976.82'
PP10	CAP	0.00	East	1835142.84'
			Elev	910.53'
' 			🔽 Use this point for h	orizontal localization
			Use this point for v	ertical localization
	Edit Delete		WGS84 latitude	N40°06'56.74933''
	v		WGS84 longitude	W82*58'36.47493''
		ОК	WGS84 height	799.02'
		_		OK Canad

Figure 2-14. Edit Control Point

To abandon edits made, either press Cancel on the *Control points* dialog box to leave the file unchanged, without applying the edits to the control point or click Edit ➤ Undo edit control points after closing the dialog box to return the file to its original state.

Deleting Control Points

Deleting a control point will remove it from the control point file and cause an automatic recomputation of the localization.

- 1. Click **Project > Control points**.
- 2. Highlight the control point to delete on the *Control points* dialog box.
- 3. Press **Delete** (Figure 2-15 on page 2-13).
- 4. Click **Yes** on the confirmation screen.

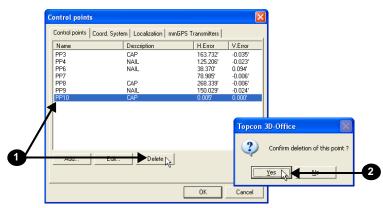


Figure 2-15. Select the Control Point to Delete and Confirm

Creating Custom Import/Export Formats for Text Files

Import/Export formats for text files provide the information needed to identify specific elements so that the import/export process runs as intended. Text files (*.txt) provide a simple format for exchanging point information between software and platforms. Import/export formats are independent of project files and can be created or accessed when importing/exporting text files.

- 1. Click **Project** → **Export control points** → **To text file**. The *Select custom format* dialog box displays (Figure 2-16 on page 2-14).
- 2. Press New format.

(

3. On the *Custom format definition* dialog box, type a name for the new format and an extension of the file, then press **Add** on the *Line items* tab (Figure 2-16 on page 2-14).

Custom format definition	New format
Format name	Edit
Points	E dit
File extension (eg TXT)	Delete
Line items Import rules Export rules	xt > Cancel
Add	

Figure 2-16. Create New Format

- 4. Select a line item *Type* and enter the desired parameters for the new format, then press **OK**. The available parameters depend on the type of line item selected (Figure 2-17).
- 5. For each additional line item, repeat step 3 (Figure 2-17).

Line item			Custom format definition
Type Point name	•		Format name
Append Trailing	Line item		Points
🔽 Fixed width field	Type Point northing	_	File extension (eg TXT)
Justified	Append Trailing ta	Line item	Line items Import rules Export rules
Width	Fixed width field	Type Literal text string	Point name Point description
	Justified	Append Trailing tab	Point northing Point easting
ОК	Width	Fixed width field	Point elevation
	Precision	Justified Left	
		Width 12	Add Edit Delete
	<u> </u>	Text Low point	Cancel
		Canc	el

Figure 2-17. Add Line Items to Format

6. Press the *Import rules* tab, then press **Add**. Select the desired *Rule* and enter the applicable *Number of header/prefixed lines* to skip (Figure 2-18 on page 2-15).

7. Click **OK** (Figure 2-18).

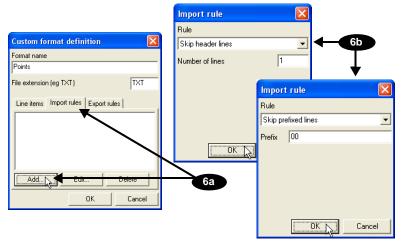


Figure 2-18. Add Import Rules

- 8. Repeat step 6 for each import rule.
- 9. Press the *Export rules* tab, then press **Add**. Select the desired *Rule* and type a number to start at for points with no number. Click **OK** (Figure 2-19).

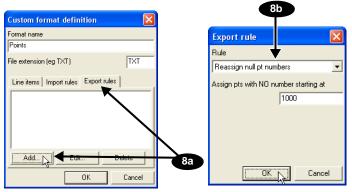


Figure 2-19. Enter Export Rules

10. Repeat step 8 for each export rule.

11. After adding the desired *Line items, Import rules,* and *Export rules,* click **OK** to save the new format (Figure 2-20).

Custom format definition			
Format name			
Points			
File extension (eg TXT)			
Line items Import rules Export rules			
Point naming rules			
Add Edit Delete			
OK Cancel			

Figure 2-20. Save the New Format

The newly created format can be used for subsequent import/export operations.

Managing Layers

3D Project files may consist of imported data sets, such as points, linework, alignments, etc., as well as any layers associated with the data file. Each 3D Project layer is identified with a name and color.

To view, add, or edit layers, click **Project** > **Layer selection &** management. The *View layers* dialog box lists each layer in the 3D Project file (Figure 2-21 on page 2-17).

The enable/disable box next to each layer name indicates whether or not the layer's contents display on the Plan View.

See the following sections for details on adding a layer, deleting a layer, setting layer colors, or setting point labels.

View layers	K
Layers GRADE BREAKS NOV13 CL ER TRAILOR TOP SLOPE TOE SLOPE TOP BLUFF GROUND	
New layer Delete Set color Point labels Show all Show none	
OK Cancel	5

Figure 2-21. View Linework Layers

Adding a Layer

Multiple layers are useful for distinguishing between various land and project features.

- 1. On the *View layers* dialog box (Figure 2-22 on page 2-18), press New layer.
- 2. Type a name for the layer and press **Enter**. A new layer entry appears in the layer list.

	View layers 🛛 🔀
2	Layers GRADE BREAKS NOV13 CL FR TRAILOR TOP SLOPE TOP SLOPE TOP BLUFF GROUND Level2
0	New layer Delete Set color Point labels Show all Show none OK Cancel

Figure 2-22. Add New Layer to 3D Project

When added, the new layer is "empty" until entities are manually added or imported. Use the following procedures below to edit a layer's color or point attributes.

Deleting a Layer

Only delete a layer when the data it contains will never be needed again. If needed, save a backup copy of the file before deleting layers.



Deleting a layer will also delete all of its contents.

1. On the *View layers* dialog box (Figure 2-24 on page 2-20), click the desired layer, then press **Delete**.

Click **OK** at the confirmation.

Setting Layer Color

Setting a unique color to individual layers in a 3D Project file helps to quickly differentiate between layers.

- 1. On the *View layers* dialog box, click the desired layer, then press **Set color**.
- Select a color from the *Color* dialog box and press OK (Figure 2-23 on page 2-19).

The color of the layer's name changes to the selected color and the layer's information will appear in this color on the Plan View.

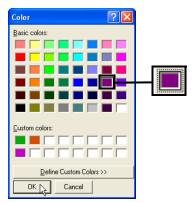


Figure 2-23. Select Layer's Color

 To select a color not shown in the *Basic colors* grid, press Define Custom Colors. Define the custom color, then press Add to Custom Colors to save for future projects.

Displaying Point Labels

Displaying point labels can help to identify points in the plan view.

1. On the *View layers* dialog box (Figure 2-22 on page 2-18), click the desired layer, then press **Point labels**.

2. On the *Point labels* dialog box (Figure 2-24), check the desired label settings for the layer(s) and press **OK**.



Figure 2-24. Select Point Labeling Parameters for Layer

- Show all press to enable to display all layers on the Plan View.
- Show none press to disable all layers from being shown on the Plan View.

Using Coordinate System Data

Coordinate system data represents the relationship between local positions and real-world global positions. The project can use coordinate data from either a projection or a localization.

Applying a Projection

3D-Office comes loaded with a number of projections from around the world. A projection contains the pre-defined transformation data that is used for the conversions between local and global positions.

- 1. Click **Project** > Control points.
- 2. On the *Coordinate System* tab, enable "Use predefined projection".
- 3. Navigate through the projection tree to select the projection for the applicable geographical area.

There will be a listing of *projection*, *datum*, and *elevation* information (Figure 2-25 on page 2-21).

4. If applying a geoid, check mark the Use geoid model box.

- 5. Press the **browse** button. See "Applying a Geoid" on page 2-22 for details.
- 6. Press **OK** to save the setting(s) and apply them to the project (Figure 2-25).

 Use localization ● Use predefined projection ● Arkansas(South) California[Zone1] California[Zone2] California[Zone3] California[Zone4] California[Zone6] California[Zone6] California[Zone6] California[Zone6] California[Zone7] California[Zone7] California[Zone7] California[Zone7] California[Zone7] California[Zone7] California[Zone7] California[Zone7] California[Zone7] California[Zone7] California[Zone7] California[Zone7] California[Zone7] California[Zone7] California[Zone7] California[Zone7] California[Zone7] California[Zone7] California[Zone7] California[Zone6] California[Zone7] California[Zone7] California[Zone7] California[Zone6] California[Zone7] California[Zone7] California[Zone7] California[Zone7] California[Zone6] California[Zone7]
Colorado(Central)

Figure 2-25. Select Projection

Creating a Custom Projection or Datum

A custom projection or datum can be created if no suitable predefined projections exists in the list.

- 1. Click **Project** > Control points.
- 2. On the *Custom Projection Definition* dialog box (Figure 2-26 on page 2-22), enter the following parameters to define the custom projection:
 - Name enter a name for the projection
 - Projection type select a projection type from the drop-down list.
 - Central meridian enter a value for the meridian
 - Scale enter a value for the scale
 - Origin latitude enter a parameter for latitude

- Origin easting/northing enter easting/northing parameters NOTE: You can enter new parameters or keep the default values.
- Region enter a description of the region (optional)
- Note enter and notes (optional) about the custom projection
- Datum select a datum from the drop-down list or press the **Browse** button _____ to create a custom datum (see "Creating a Custom Datum" below).

Custom Projection	on Definitiion					
Name :	My projection					
Projection type :	Transverse Me	rcator		•		
Name		Value	-			
Central meridian		E00°00'00.00	Custom L	Datum Definition		
Scale		1.50000000				
Origin latitude		N00°00'00.00	Name	CA	RY (")	1.5
Origin easting		0.000'				
Origin northing		0.000'	Ellipsoid	WG584 💌	RZ (")	1.5
			DX (m)	3	Scale	1.5
			DY (m)	3		
Region : N	ew Town		DZ (m)	3	Note	
Note :			RX (")	1.5		
				ОК		Cancel
Datum : W	'G584			▼		
		0		Cancel		

Figure 2-26. Create Custom Projection and/or Datum

Applying a Geoid

A geoid model can be used to transform the ellipsoidal heights measured by GPS (purely geometrical) to heights that are based on a physical reference surface, such as mean sea level. Over small regions there is little difference between the two reference surfaces, but for large projects the differences may be unacceptable. Working with a geoid model when surveying with GPS will ensure proper point measurements. Geoid models for the United States have been developed by the National Geodetic Survey (NGS). The most recent model is called Geoid 2003. To keep the file size smaller, the continental United States is divided into a grid with eight zones; each zone has a geoid. Use the following grid (click the image to view a larger version) to help you determine the geoid file to use for your project (Chapter 2). For Geoid 2003, the files are numbered "g2003u01" to "g2003u08" to correspond to grids 1 to 8. Contact your local representative or Topcon Support with questions.

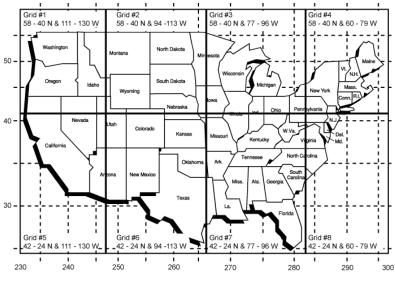


Figure 2-27. Geoid Grid for US

Before applying geoid files, you must do the following:

- Only new projects can be assigned geoid files. If the file already has data (other than the master benchmark), the geoid function will be disabled.
- If the geoid file cannot be found when opening a project, a warning displays.
- 1. Press **OK** (Figure 2-26 on page 2-22), then browse to the location of the geoid to update the folder where 3D-Office will find the geoid file.

- 2. Press **Cancel** (Figure 2-26 on page 2-22) to open the file without the geoid. Note that the warning will continue to display each time the project is opened.
 - Once a project contains data, the geoid cannot be changed.
 - Geoid files must be in the Topcon proprietary format (*.gff or *.jff). The latest files for the US and Australia are included on the software CD. Files from other sources can be converted to a *gff* format using the Topcon Tools (or Topcon Link) program.
- 1. Click **Project** > **Control points**.

The Control points dialog box displays (Figure 2-28).

- 2. On the *Coordinate System* tab:
 - Use geoid model check mark this box to apply a geoid model.
 - browse button press to select a geoid file.

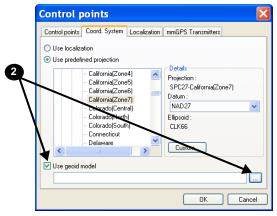


Figure 2-28. View Geoids

- 3. Navigate to the location of the geoid file.
- 4. Highlight the desired file and press **Open** (Figure 2-29 on page 2-25).
- 5. Press **OK** to save the setting(s) and apply them to the project (Figure 2-29 on page 2-25).

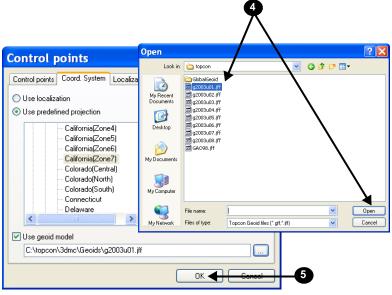


Figure 2-29. Apply Geoid File

Viewing GPS Localization Information

Localization is a mathematical transformation between global GPS coordinates and local project coordinates. If a project contains a localization, the localization information displays in the *Control points* dialog box.

1. Click **Project** > Control points.

The *Control points* dialog box displays (Figure 2-30 on page 2-26).

- 2. On the *Localization* tab, view the following localization parameters (Figure 2-30 on page 2-26):
 - The Projection and Datum used for the localization.
 - The horizontal coordinates of the *Origin* for both the project (*North/East*) and GPS (*Lat/Lon*) coordinate systems.

- The *Scale* difference (Vertical adjustment) between the project and GPS coordinate systems.
- The *Rotation* angle between the project and GPS coordinate systems.
- The inclination (in percent) of the horizontal plane with respect to the X (East) and Y (North) axis, and the Vertical offset of the two coordinate system along the vertical axis.

Control points						
Control points	Coord. System Localization	י mmGPS 1	Fransmitters			
Projection : Oblique stereographic Datum : WGS84						
Origin : North	771017.412'	Lat	N67*15'41.19990''			
East	1835210.594'	Lon	W153*55'52.83674''			
Scale Rotation	1.00000000 0°00'00''					
Vertical adjustment : Inclined plane						
Incline X (E	ast) 0.00000%	Incline Y (N	orth) 0.00000%			
Vertical offs	et 111.510'					
OK Cancel						

Figure 2-30. GPS Localization Information

Principles of GPS Localization

GPS systems are capable of precise positioning, but the positions computed are relative to a global reference system defined in terms of geographic latitude, longitude and height above a reference ellipsoid. To be useful for local site work, global GPS coordinates need to be transformed into local site coordinates, defined in terms of a distance north and east of some origin point and some distance above an elevation datum. These north, east, and elevation coordinates (NEZ) may be those of a regional coordinate system—for example, a state plane system in the United States—or they may be arbitrarily defined. NEZ coordinates must be defined in terms of the construction design data. In either case, a mathematical conversion is necessary to transform global GPS coordinates into NEZ coordinates, relative to the local coordinate system. The transformation process is commonly known as "localization". The basic approach to calculating the mathematical transformation is to provide pairs of point coordinates for each control point on the project. A point pair consists of:

- local NEZ coordinates for the point
- global latitude, longitude, and height coordinates for the point (measured as described in this section).

These pairs of points are needed to calculate a precise mathematical formula for transforming all global GPS coordinates generated in the GPS receiver to local NEZ coordinates for a particular project.

The following steps ensure a high-quality localization suitable for centimeter-level surveying.

- First, the local control points must be precisely measured. The quality of measurements directly affects the results of the localization.
- Second, the control points need to be located more or less evenly around the site. Generally, the more uniformly dispersed the control points the better. In contrast, if they are clustered together, the results will be less than ideal.

A good rule of thumb is to place control points evenly around the perimeter of the site or grading area. While not directly related to the quality of the localization, points should be placed in areas having easy access and few obstructions.

• GPS localization requires a minimum of three control points, but at least four or more well placed points should be used for better results.

Viewing and Adding mmGPS Transmitter Information

Millimeter GPS (mmGPS) combines the elevation accuracy of a laser with the horizontal and vertical accuracy of GPS+ receivers to provide millimeter accuracy while grading or surveying. The system provides multiple rover support for machine and pole mounted sensors. 3D-Office can either display transmitter information when included with a control point file or load new transmitters and respective information.

1. Click **Project** > Control points.

The Control points dialog box displays (Figure 2-31).

- 2. On the *mmGPS Transmitters* tab, view the following information loaded mmGPS transmitters (Figure 2-31):
 - *Serial number* enter up to four digits.
 - Firmware revision tells what firmware version is used.
 - *Adjusted* tells whether or not the transmitter has been calibrated.

Control points		X
Control points Coord. Syste	m Localization mmGPS	l'ransmitters
S/N	Firmware	Adjusted
90026		
G10		
<		>
COM1: (Serial port)	*	
Add Delete	Copy Dou	vnload
·		OK Cancel

Figure 2-31. mmGPS Transmitter Information

Adding a mmGPS Transmitter

1. Click **Project > Control points**.

The *Control points* dialog box displays.

- 2. On the *mmGPS Transmitters* tab, press Add.
- 3. Enter the serial number of the new transmitter and press **Enter** (Figure 2-32 on page 2-29).

	Control points		X
	Control points Coord. Syster	m Localization mmGPS T	ransmitters
	S/N	Firmware	Adjusted
3 —	90026		
- 1			
	<		>
	COM1: (Serial port)	*	
2	Add Delete	Copy Dow	nload
-	Pelete		nioda
			OK Cancel

Figure 2-32. Add New Transmitter

Downloading mmGPS Transmitter Calibration Data

Calibration data for mmGPS transmitters includes firmware revision and any adjustment (calibration) performed to fix errors in incline in the self-leveling mechanism of the transmitter. The adjustment process applies an offset to the transmitter.

- Connect a mmGPS transmitter to the computer running 3D-Office (refer to the transmitter's documentation for details). Turn on the transmitter.
- In 3D-Office, click Project ➤ Control points. The *Control points* dialog box displays (Figure 2-33 on page 2-30).
- 3. On the *mmGPS Transmitters* tab, select the same COM port of the computer that is connected to the transmitter.
- 4. Select a transmitter and press Download.
- Click Ok at the confirmation (Figure 2-33 on page 2-30).
 3D-Office connects to the mmGPS transmitters and downloads calibration data.

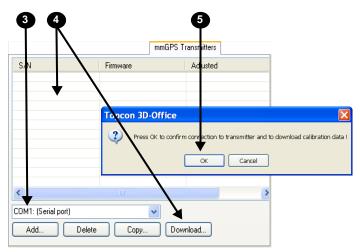


Figure 2-33. Download Transmitter Calibration Data

Calculating Coordinates

The coordinate calculator utility in 3D Project files calculates map projection (grid) coordinates if given geodetic coordinates, and vice versa. 3D-Office calculates coordinates either directly using known geodetic coordinates or inversely using a known grid system.

If applying a geoid model to the elevation computations, a geoid file (*.gff) must be available. A geoid file provides information about the separation between the purely geometric, ellipsoidal representation of the earth and the physical model of the earth that closely approximates mean sea level (the geoid). For example, use a geoid model to obtain approximate mean sea level heights from GPS measured ellipsoidal heights.

Geodetic/Grid Coordinate Calculations

There are two types of coordinate calculations: Geodetic Grid direct and Geodetic Grid reverse. A direct geodetic grid calculates geodetic coordinates based on given geodetic coordinates. A reverse geodetic grid calculates geodetic coordinates based on given grid coordinates.

1. To calculate geodetic and grid coordinate calculations, click **Project ▶ Utilities ▶ Coordinate calculator**.

On the Coordinate calculator dialog box, do the following:

- Click on a Projection from the *Coordinate system* panel. The *Projection* and *Ellipsoid* fields to the right are populated.
- 3. In the *Coordinate* field, select how you want the coordinates to appear on the *Grid coordinates* panel below, either as *North-East-Elev, East-North-Elev, X-Y-Z*, or *X-Y-Z* (*South azimuth*).
- 4. Press **Browse** to select a Geoid file to use in the calculation (optional).

Coordinate calculator outdowie gyden Adska@crefig Adska@crefig Adska@crefig Adconst[Eart] Adconst[Eart] Advonst[Fourt] Advonst[Fourt]	Coordinates: Geoid file: C:\topcon\3dmc\	Noth-East-Elev Geoids\g21939u05.gff	,		Browse Button
Centeria California Contentia California Contentia California Contentia Geodetic -> Grid (direct) Geodetic -> Grid (direct) Geodetic condentias	Condinate system Antica Autoralia and New Zealand Autoralia and New Zealand Autoralia and New Zealand Condition Autoralia Autoralia Such America USA USA C.Global		Coordinates: Geoid file: C:\topcon\3dmc\ Projection: Ellipsoid:	North-East-Elev Geoids/g21999u05.gff	•
WGS84	W00"0005.17429"	Elev	Datum:	-31.767m	~
Ellproid Hgt	-201.429	Geoid height	ave Cancel		

Figure 2-34. Select Projection, Geoid, and Transformation

On the *Conversion* panel (Figure 2-35 on page 2-32):

- 5. Enable *Geodetic --> Grid (direct)*:
 - Enable either *Input WGS values* or *Input "local" datum values*,
 - For WGS values, enter the *Latitude*, *Longitude*, and *Ellipsoid Hgt* value in each entry box.

The input format for latitude and longitude is DDD.MMSSssss. Use negative values for West longitude and South latitude.

Enter the Ellipsoid Height in the same unit currently set for distances in the project.

- For Local datum values, press Convert.

3D-Office calculates the corresponding geodetic coordinates (Figure 2-35 on page 2-32) and the grid coordinates (*Latitude/Longitude/Ellipsoid Hgt*) based on the selected projection.

- 6. Enable *Grid* --> *Geodetic* (*inverse*):
 - Select the projection had the geoid (optional) to use in the calculation (Figure 2-35).
 - Enter the XY grid coordinates and the elevation ().

If a geoid file has been specified, leave the Geoid height field blank; 3D-Office will enter the geoid height as determined from the geoid file.

If a geoid model is unavailable, manually enter the geoid height. If you do not know the value, leave the space blank.

• Press Convert.

3D-Office calculates the corresponding geodetic coordinates *North/East/Elev* (based on the selected projection) and the *Geoid height* coordinate, if applicable.

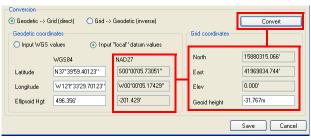


Figure 2-35. Coordinate Calculator – Conversion Panel

7. Press **Save** to save the calculated grid coordinates as a text file (Figure 2-36 on page 2-33)

	skaiZone9)				
	ska[Zone10]	Coo	dinates:	NorthEast-Elev	
	ona(Central)	Geo	d file:		
	ona(East) ona(West)	0.1	topcor/\3dr	vc\Geoids\g21939u0	5.gl
	ansas(North)				
	ancas(South)				
	fornia[Zone1] fornia[Zone2]	Proje	sction: SPC	27-California[Zone3]	
	fornia[Zone3]	Elip	oid CLK68	3	
	fornia[Zone4]	Data	m	NAD27	
	fornia[Zone5]	*			
nversion					
	inid (direct) 🔿 Grid - Inates	> Geodetic (inverse) # "local" datum valu		Grid coordinates	Convet
nversion Geodetic -> (Jeodetic coord	inid (direct) 🔿 Grid - Inates			- Grid coordinates North	Convert 15000315.066
nversion Geodetic -> (Jeodetic coord	ind (direct) O Gind - inates values O Inpu	# "local" datum valu	85		
Geodetic -> (Seodetic coord) Input WGS	inid (direct) O Girid - finates values O Inpu WGSB4	# "local" datum valu NAD27	ess 31''	Noth	15800315.066'

Figure 2-36. All Coordinates Calculated

Creating a Custom Projection

You can create a custom projection if the one you want is not available.

1. Click Project > Utilities > Custom projection.

The *Custom Datum Definition* dialog box displays (Figure 2-37 on page 2-34).

- 2. Enter parameters to define the custom projection (Figure 2-37 on page 2-34):
 - Name enter a name for the projection
 - Projection type select a projection type from the drop-down list.
 - Central meridian enter a value for the meridian
 - Scale enter a value for the scale
 - Origin latitude enter a parameter for latitude
 - Origin easting/northing enter easting/northing parameters **NOTE:** You can enter new parameters or keep the default values (Figure 2-37 on page 2-34)
 - Region enter a description of the region (optional)
 - Note enter and notes (optional) about the custom projection

- Datum select a datum from the drop-down list or press the **Browse** button _____ to create a custom datum (see "Creating a Custom Datum" below).
- 3. Click **Ok** to save the custom projection (Figure 2-37).

Name : My projection Projection type : Transverse Mercator Name Value Central meridian E00°00'00.00000" Scale 1.5000000 Origin latitude N00°00'00.00000" Origin nerthing 0.000' Origin nerthing 0.000'	Custom Decientia	- Definitiin			Name : Projection type :	My projection Transverse M	
Tealling Value Central meridian E00°00'00.0000'' Central meridian E00°00'00.0000'' Scale 1.5 Origin latitude N00°00'00.0000'' Origin latitude N00°00'00.0000'' Origin northing 0.000' Origin northing 0.000' Region : New Town Region : New Town Note : WGS84 Note : Image: Scale Sca	Name :	My projection	rcator			Transverse m	
Datum : WGS84 Note :	Central meridian Scale Origin latitude Origin easting Origin northing Region : Ne	w Town	E00°00'00.000 1.50000000 N00°00'00.000 0.000'		Central meridian Scale Origin latitude Origin easting		E00°00'00.00000" [1.5] <u>T</u> N00°00'00.00000" <u> </u>
	Datum : Wo	5584	OK	-	Note :	New Town	

Figure 2-37. Create Custom Projection

Creating a Custom Datum If a desired datum is not available, you can create a custom datum.

- 1. Click **Project** > **Utilities** > **Custom projection**.
- 2. Click the **Browse** button (Figure 2-38 on page 2-35) to select a name for the datum. The *Custom Datum Definition* dialog box displays.
- 3. Enter the following information on the *Custom Datum Definition* dialog box (Figure 2-38 on page 2-35):
 - Name enter a name for the datum
 - Ellipsoid select the ellipsoid used to create the datum
 - DX(m), DY(m), DZ(m) enter the ellipsoid's shift parameters
 - RX("), RY("), RZ(") enter the ellipsoid's angle rotation parameters

- Scale enter the scale by which to adjust the ellipsoid
- Notes type any notes about the datum (if preferred)

NOTE	These parameters (shifts, rotations, and scale) specify a coordinate transformation from the new datum to the selected ellipsoid (WGS-84) using the following equation:
X Y Z _{WGS – 84}	$= \begin{bmatrix} DX \\ DY \\ DZ \end{bmatrix} + (1 + Scale \cdot 10^{-6}) \cdot \begin{bmatrix} 1 & RZ & -RY \\ -RZ & 1 & RX \\ RY & -RX & 1 \end{bmatrix} \cdot \begin{bmatrix} X \\ Y \\ Z \end{bmatrix}_{new - datum}$

4. Click **Ok** to save the datum and return to the previous screen.

Custom datums will be available in the Datum list on the *Custom Projection Definition* dialog box (Figure 2-38).

Name :	My projectio	n	Custo	m Datum Defin	ition	
Projection type :	Transverse M	1ercator				
Name		Value	Name	CA	RY (")	1.0
Central meridian Scale		E00°00'00.00000" 1.50000000	Ellipsoid	WG584	RZ (")	1.0
Origin latitude Origin easting Origin northing		N00°00'00.00000" 0.000' 0.000'	DX (m)	4	Scale	1.0
			DY (m)	4		project is on budget,
			DZ (m)	4	Note	
Region :	Smallville		RX (")	1.6		
Note :				ОК		Cancel

Figure 2-38. Create Custom Project/Datum

Setting Project Units

The *Project options* dialog box (Figure 2-39 on page 2-37) sets the type of units to use for various quantities used in a 3D Project. When importing data contained in ASCII text, 3D-Office considers the data to be in the same units as that assigned to the project. To view or set the units for 3D Projects, click **Project → Options**.

On the *Units* tab, select the following information and click **OK** to apply the options to the file (Figure 2-39 on page 2-37):

• Distance – select the linear unit to use for distances and coordinates, either *Meters*, *US Survey feet*, *International feet*, or *Feet+Inches* from the drop-down list.

If using Feet+Inches, all values will show as 1'11"1/2 where 12 inches equal 1 foot and any value smaller than an inch will show as a fraction of an inch.

- Decimal Places select the decimal places to use for numbers with fractions of a measurement, from 0 to 4 decimal places from the drop-down list.
- Angles select the angle unit to use, either *DD*°*MM'SS''*, *NDD*°*MM'SS''E*, *Gons*, or *DD*.*DDDD*° from the drop-down list.
- Grade select the grade format to use, either *Percent (%), Run : Rise,* or *Rise : Run* from the drop-down list.
- Area select the area unit to use, either *Square meters, Square feet, Acres,* or *Hectares.*
- Volume select the volume unit to use, either *Cubic meters* or *Cubic yards* from the drop-down list.
- Coordinate select the coordinate order to display in 3D-Office, either *North-East-Elev, East-North-Elev, X-Y-Z*, or *X-Y-Z South azimuth* from the drop-down list.
- Stationing select the stationing format to use, either 100.000, 1+00.000, 10+0.000, or 1+000.000 from the drop-down list.

On the *Comments* tab (Figure 2-39 on page 2-37), type any comments you might have concerning the project (optional).

Project optio	ns		×	
Units Comment				
Distances	US Survey feet	*	Project options	
Decimal Places	3 d.p.	~	Units Comment	
Angles	DD*MM'SS''	~	Project comment:	
Grades	Percent (%)	~		
Areas	Square feet	~		
Volumes	Cubic yards	~		
Coordinates	North-East-Elev	*		
Stationing	1+00.000	*		
	L	OK	Can	
				OK Cancel

Figure 2-39. Set Project Units for 3D Project

Notes:

Point Files

Points are an integral part of a job file and may represent topographic information, control coordinates, "as-build" information, etc. 3D-Office can use points to generate linework, alignments, surfaces, and TINs.

Importing and Opening Point Files

3D-Office can read point records from several file types. Points in 3D-Office can be assigned to layers, exported to various file format types, edited, transformed, displayed, and printed.

3D-Office imports points into 3D Project files from four file types:

- 3D point files (*.pt3) on a computer
- 3D point files (*.pt3) on a Pocket-3D controller
- AutoCAD® files (*.dwg or *.dxf)
- Text files (*.txt)

Importing into a 3D Project or 3D Point File

Follow these steps to import points from a 3D Points file into a 3D Project file or 3D Points file.

- 1. With a 3D Project or 3D Points file open, click **Points → Import points → From 3D point file** (*.**pt3**).
- 2. Navigate to the location of the desired file, select it, and click **Open** (Figure 3-1 on page 3-2).

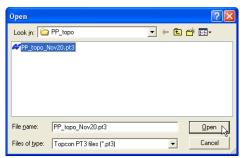


Figure 3-1. Open 3D Point File

The point data from the selected file is added to the 3D Project or 3D Points file.

Importing Points from Pocket-3D

Follow these steps to import a points from a Pocket-3D controller into either a 3D Project file or a 3D Points file.

- 1. Connect the Pocket-3D controller to the computer and turn on the controller (see Appendix A for details). Run Pocket-3D on the controller.
- With a 3D Project or 3D Points file open, click Points > Import points > From Pocket-3D controller. 3D-Office connects with the Pocket-3D controller and retrieves *.pt3 files.
- 3. On the *Pocket-3D files* dialog box, select the file to import and click **Open** (Figure 3-2 on page 3-3). The file type is automatically selected.

Pocket-	3D files			X
Name	Size (kB)	Created		
TEST SITE	EX TOPO) 101.8	Monday, I	March 1st, 2004, 4:	40PM
<				>
File name	TEST SITE (EX TOPO	1)		
File name Files of type	Point files (*.PT3)		Ope	en

Figure 3-2. Select and Open Pocket-3D Point File

The point data from the selected file is added to the 3D Project or 3D Points file.

Importing Points from an AutoCAD File

Follow these steps to import points from an AutoCAD dwg/dxf file into either a 3D Project file or a 3D Points file.

- With a 3D Project or 3D Points file open, click Points > Import points > From AutoCAD file.
- 2. Navigate to the location of the desired file, select it, and click **Open** (Figure 3-3).

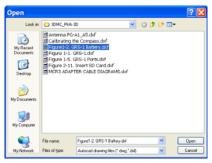


Figure 3-3. Open AutoCAD 3D Points File

The point data from the selected file is added to the 3D Project or 3D Points file.

Importing Points from a Text File

Follow these steps to import points from a text file into either a 3D Project file or 3D Points file.

- 1. With a 3D Project or 3D Points file open, click **Points → Import points → From text file**.
- On the Select custom format dialog box, select the format type and click Next (Figure 3-4). See "Creating Custom Import/ Export Formats for Text Files" on page 2-13 for details on creating or editing import formats.

Select custom format	×
Formats	
ControlFiles NOTEPAD TXT	New format
Points	Edit
	Delete
1	
< Back Next >	Cancel

Figure 3-4. Select Format Type

3. Click Browse.

The *Import points from text file* dialog box displays (Figure 3-5 on page 3-5).

- 4. Navigate to and select the desired *.txt file and click **Open**.
- 5. Enter a name for a new layer or select a current layer to add the points to. If the imported text file includes a layer field as part of its record definition, select *Layer specified as line item*.
- 6. Click **Finish** to import the points (Figure 3-5).

Import points from t	ext file	X
Text file		
and Settings\Amanda_H	all\Desktop\FROM\Kyle\PP_topo_Nov20.txt	Browse
Create new layer	NewLayer	
C Add to existing layer	GROUND	~
C Layer specified as line	e item	
	< Back Finish	Cancel

Figure 3-5. Open Point Text File

Opening a Points File

- 1. To open a 3D Points file click **File ▶ Open**.
- On the *Open* dialog box, navigate to the location of the file, select the file type as Points (*.pt3), select the desired file, and click **Open** (Figure 3-6).

Open		? 🛛
Look jn: 🔎	PP_topo	 • 🎟 •
PP_topo_N	lov20.pt3	
File <u>n</u> ame:	PP_topo_Nov20.pt3	<u>O</u> pen

Figure 3-6. Open 3D Points File

Opening a Pocket-3D Point File

If a Pocket-3D controller and the computer are connected, 3D-Office can open points files directly from the controller. Once opened, the file can be exported to other files or saved to the computer. See Appendix A for details on connecting a computer and controller.

1. Click File > Open Pocket-3D file.

2. On the *Pocket-3D files* dialog box, select the file type (*.pt3) and the desired file, then click **Open** (Figure 3-7).

Pocket	-3D files			
Name		ize (kB)	Created	
TEST SITE	(EX TOPO) 10	D1.8	Monday, Mar	ch 1st, 2004, 4:40PM
<				
,	TEST SITE (
File name	TEST SITE (EX TOPO)	1	Open
,	TEST SITE (E Point files (*.F	EX TOPO)	T	Open Cancel

Figure 3-7. Select File and Click Open

Opening an AutoCAD File

From a 3D Project file, 3D-Office can import points, linework, and text information from an AutoCAD (*.dwg or *.dxf) file.

- 1. Click File > Open AutoCAD drawing file.
- 2. On the *Open* dialog box, select the desired file and click **Open** (Figure 3-8). The AutoCAD entities are imported into 3D-Office.

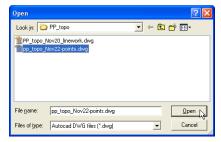


Figure 3-8. Select File and Click Open

Viewing Information

Points are assigned three-dimensional coordinates in the project's coordinate system. 3D-Office provides an interface for viewing, editing, transforming, and printing points, and for saving points to a text file.

Point List View

To view a list of all points in the file, click **Points ▶ Point list view**. The *point list* opens in separate window and displays the following information about all points in the file (except localization control points) (Figure 3-9):

- Select indicates if the point is selected or selects a point
- Pt. # the number of the point
- Description an optional description of the point
- Layer the layer in which the point is located
- Northing (Y) the north coordinate of the point in the project system
- Easting (X) the east coordinate of the point in the project system
- Elevation (Z) the elevation of the point
- Created (local time) the date and time the point was collected, imported, or added

	Description	Layer GRADE BREAKS NOV13	Northing			i
1 1 1 1			Northing	and the second second		
1 1 1	noiek4	CRACE BREAKS MOV/12		Easting	Elevation	
1 1 1	noiek4		2064688.669	6178879.009*	384.452	
1		Creflo	5000.000*	5000.000*	314.000*	
1	OPU43	ROAD EDGE	-1.640'	0.000*	2.000*	
	POND EDGE	EXISTING POINTS - POND	2064747.750'	6178927.530'	384.950'	
1		WETLAND	18411.452	-11353.126'	98.243'	
		DEFAULT	23.000'	10.000'	40.000'	
1		DEFAULT	23.000'	10.000'	40.000'	
1		DEFAULT	23.000'	10.000'	40.000'	
1		GRADE BREAKS NOV13	2064688.669	6178879.009'	384.452'	
1	noiek4	Creflo	5000.000'	5000.000'	314.000'	
1		DEFAULT	23.000*	10.000'	40.000'	
1		DEFAULT	23.000*	10.000'	40.000'	
1		DEFAULT	23.000*	10.000'	40.000'	
2		WETLAND	18411.452	-11353.126"	98.239'	
2	OPU43	ROAD EDGE	-1.640'	0.000*	2.000	
2		GRADE BREAKS NOV13	2064648.710	6178881.243	385.8341	
2	ztox3	Creflo	4510.000*	4510.000'	352.000*	
5		GRADE BREAKS NOV13	2064648.710	6178881.243	385.8341	
2	POND EDGE	EXISTING POINTS - POND	2064792.180	6178935.7304	384.000*	
2	ztox3	Creflo	4510.000'	4510.000'	352.000*	
2	FENCE COR	9063-1114	113.620'	636.360'	-0.000'	
2	FENCE COR	9063-1114	113.620'	636.360*	-0.000'	
3	FENCE COR	9063-1114	103.179	636.354*	-0.000'	
3	FENCE COR	9063-1114	103.179'	636.354*	-0.000'	
3		GRADE BREAKS NOV13	2064638.802	6178880.060'	386.495'	
3		GRADE BREAKS NOV13	2064638.802	6178880.060'	386.495'	
3		WETLAND	18411.452'	-11353.126'	98.241'	
3	POND EDGE	EXISTING POINTS - POND	2064827.820'	6178939.970'	383.160'	

Figure 3-9. Point List

For the *point list* window, the toolbar is modified and provides only save, cut, copy, paste, and about buttons. See "Working with Points" on page 3-11 for details on adding, editing, and deleting points.

Any changes made in the point list are reflected in the plan view and the primary file.



Points selected in the list are also selected in the plan view, and vice versa. Click Window ► Cascade for side-by-side viewing of selected points in the point list and plan view.

Text File View

3D-Office can open a text editor window for viewing data associated with the selected entities.

- 1. Select the entities (points, lines, TIN triangles) to view information on:
 - click the entities
 - use the select tool to select a group of entities
- 2. Click the activated **Information** button on the toolbar. A text editor window opens to display relevant information about the selected entities (Figure 3-10).

<u></u>	∉MyTinFile.tp3:2 -			×
—	File Edit			
	Şelected entities TIN triangles			^
Information	N 771119.370', E 1835150.467', Z 803.230'	N 771126.263', E 1835172.530', Z 804.611'	N 771126.017',E 183515	
	N 771119.370', E 1835150.467', Z 803.230'	N 771098.395', E 1835148.065', Z 803.857'	N 771126.263',E 183517	
Button	N 771149.918', E 1835186.671', Z 804.982'	N 771126.374', E 1835172.501', Z 804.598'	N 771126.263',E 183517	
	N 771126.374',E 1835172.501',Z 804.598'	N 771139.055',E 1835163.817',Z 803.863'	N 771126.017',E 183515	
	N 771139.055', E 1835163.817', Z 803.863'	N 771139.166',E 1835165.496',Z 803.735'	N 771146.591',E 183517	
	N 771139.166',E 1835165.496',Z 803.735'	N 771139.055',E 1835163.817',Z 803.863'	N 771126.374',E 183517	
	N 771139.166',E 1835165.496',Z 803.735'	N 771126.374',E 1835172.501',Z 804.598'	N 771146.591',E 183517	=
	N 771126.374',E 1835172.501',Z 804.598'	N 771126.017',E 1835156.635',Z 803.906'	N 771126.263',E 183517	
	N 771126.263',E 1835172.530',Z 804.611'	N 771098.395',E 1835148.065',Z 803.857'	N 771075.259',E 183516	
	N 771140.410',E 1835236.336',Z 805.819'	N 771126.263',E 1835172.530',Z 804.611'	N 771099.275',E 183523	
	N 771099.275',E 1835238.209',Z 805.468'	N 771126.263',E 1835172.530',Z 804.611'	N 771090.974',E 183523	
	N 771090.974',E 1835235.037',Z 805.369'	N 771126.263',E 1835172.530',Z 804.611'	N 771075.259',E 183516	
	N 771140.410',E 1835236.336',Z 805.819'	N 771149.918',E 1835186.671',Z 804.982'	N 771126.263',E 183517	
	N 771161.768',E 1835177.839',Z 804.050'	N 771177.467',E 1835167.872',Z 804.401'	N 771148.103',E 183515	
	N 771161.768',E 1835177.839',Z 804.050'	N 771146.591',E 1835170.595',Z 804.362'	N 771149.918',E 183518	_
	N 771148.103',E 1835153.498',Z 804.017'	N 771146.591',E 1835170.595',Z 804.362'	N 771161.768',E 183517	
	N 771170.610',E 1835182.114',Z 804.647'	N 771149.918',E 1835186.671',Z 804.982'	N 771171.798',E 183519	
	N 771149.918',E 1835186.671',Z 804.982'	N 771170.610', E 1835182.114', Z 804.647'	N 771161.768',E 183517	
	N 771184.035',E 1835187.793',Z 804.569'	N 771171.798',E 1835196.503',Z 805.123'	N 771140.410',E 183523	~
	<	ш	>	188

Figure 3-10. Click Information Button and View Selected Entities

3. To save the information as a text file, click **File → Save as**. On the *Save As* dialog box, type a name for the file or keep the default

file name. Navigate to the location in which to save the file and click **Save**.

Managing Point Layers

Point files can be divided into layers of points, where each layer is assigned a name and color.

To view, add, or edit layers, click **Points > Layers**. The *View layers* dialog box displays each layer in the points file and it's display status on the Plan View (Figure 3-11 on page 3-10).

- Enable/disable the box next to each layer name by placing a check mark next to it. If a check mark is next to the layer name (enabled), it will display on the Plan View.
- New layer press to add a new layer by entering a name in the new layer box.

Multiple layers are useful for distinguishing between the various land and project features.

When added, the new layer is "empty" until points are manually added or imported. See "Importing and Opening Point Files" on page 3-1 for importing points to a layer.

• **Delete** – press to remove the highlighted layer.



Deleting a layer will also delete all of its contents.

• Set Color – press to display the *Color* screen to select a color for each layer to quickly differentiate between layers.

The layer's points on the Plan View will appear in this color.

- **Point labels** press to display the *Point labels* dialog box (Figure 3-11 on page 3-10).
 - Show names of points in this layer: check mark this box to display the name of all points in the layer.
 - Show descriptions of points in this layer: check mark this box to show description of points on the main screen.

- Show elevations of points in this layer: check mark this box to show point elevations on the highlighted layer.
- Show cut/fill to current TIN surface: check mark this box to view the cut/fill on the TIN surface.
- Show cut/fill current alignment surface: check mark this box to view the cut/fill on the alignment surface.
- Show cut/fill current plane surface: check mark this box to view the cut/fill on the plane surface.
- Apply this labelling to all layers.
- Show all press to display all layers in Plan View.
- Show none press to hide all layers in Plan View.

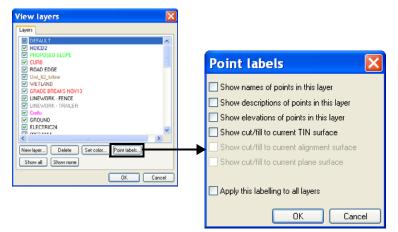


Figure 3-11. View Point Layers

Working with Points

Points can be added, deleted, or edited from both the point list view and the plan view. Points can also be transformed from the plan view.



After making changes to a point file, save it as a version of the original to track progress.

Adding Points

- 1. To add a new point to the point file, click **Points > New point**.
- 2. On the *Add/edit point* dialog box, enter the following information for the new point and click **OK** (Figure 3-12):
 - Type a Number and Description (optional) for the point.
 - Select a *Layer* from the drop-down list.
 - Enter the *North* (*X*), *East* (*Y*), and *Elev* (*Z*) coordinates.

Add/edit	point	×
Number	96	
Description		
EL1		
Layer		
GROUND		•
North	770896.35'	
East	1835167.05'	
Elev	910.01'	
	OK Cancel	

Figure 3-12. Add New Point

Editing Points

- 1. To edit a point, highlight the desired point in the Plan View or point list and click **Points ▶ Edit point**.
- 2. On the *Add/edit point* dialog box, edit the desired information and click **OK** (Figure 3-12).

Deleting Points

To delete points, highlight the desired point(s) in either the point list or plan view and click **Points** \triangleright **Delete points** or press **Delete** on the keyboard.

Click Edit > Undo delete entities to retrieve the deleted points.

Adjusting Point Elevations

The elevation adjustment is a translation along the vertical axis. Point elevations may need to be adjusted for various reasons, for example:

- The surveyor may have assigned an arbitrary elevation to the control points for the initial survey and later will want to translate the survey to a "true" or "known" elevation.
- A mistake may have been made in the height of the antenna, and the elevations will need to be corrected accordingly. If this occurred on one day of a multi-day survey, then only a subset of the data will need to be adjusted.



Use caution with this routine, especially when operating on a subset of the data.

- In the point list view or plan view, check mark the desired point(s) to adjust (press Ctrl+A to select all points) and click Points ▶ Transform coordinates ▶ Adjust elevations.
- On the *Adjust elevations* dialog box, type the number to add to or subtract from the current elevation and click **OK** (Figure 3-13). Use a minus sign to subtract an elevation value.

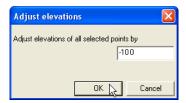


Figure 3-13. Enter Elevation Adjustment Number

1 X I	Concession in the local division of the loca							10000	-	384,500'	Before
elect +	12.8	Description Troatel 4		Crefip			Elevation 114.0001	Created Tuesday, February	72.304	384.300	F 1 <i>V</i>
/	2119	reported to		PROP			894.500*	Thursday, February		384,500'	Elevation
	2110			PROP			104.500*	Thursday, February		384.300	
	2117			PROP			104.5007	Thursday, Babe up	10.30	004.0701	Adjustment
	2116			PROP			894.370*	Thursday, February		384.370'	Aujusimeni
	2115			PROP			183.500° 183.500°	Thursday, February Thursday, February			
-	2113			PROP		6170653.830	274	Thursday, February		383,500'	
	21	TONE		DEPAUL.				Friday, March 05, 2			
	2112			PROP			183-1820,	Thursday, February		383.500'	
	2111 2110			PROP			182.950° 182.950°	Thursday, February Thursday, February		0001000	
	2110			PROP			NE3.820*	Thursday, February			
	2100			PROP			19.200'	Thursday, February			
	2207			PROP		6179674.329	19.200*	Thursday, February			
	2106		_	pere	2064205.062	6179710.0632	987.0001	Thursday, Enhours	19.30		
	29	OPU43 OPU43				3D Offi	ce - [myPR	JTFile.TP3:2]			
	2105	000	12 File	105.14	iem Points West	ine Male					
	2104	Trans. C				and the second	_	_	_	- 0 4	4
	33	OPU43		142	8						
	34	OPU43 OPU43	Select	+ PL		n Layer	Northing	Easting	Elevation	Created	
	36	OPU43	1	32	OPU43	DEFAU.	32.000*	15.617	0.056*	Wednesday, March 10, 201	
	37	OPUNS	4	31	OFU43	DEFAU.		25.617	0.056*	Wednesday, March 10, 201	After Elevation
	38	OPUH3	· 4	20	OPU43	DEFAU.		55.617	0.056*	Wednesday, March 10, 201	Aller Elevation
	39	OPU43	· •	27	OPU43	DEFAUL		-65.617	0.056*	Wednesday, March 10, 201	
	40	OPU43		26	OPU43 OPU43	DEFAUL DEFAUL		65.617' 50.987'	0.056*	Wednesday, March 10, 201 Tuesday, March 09, 2010 3	Adjustment
-			1	24	09043	DEFAUL		50.987	0.056*	Tuesday, March 09, 2010 3.	
				23	TONE	DEFAUL		50.987	0.056'	Tuesday, March 09, 2010 2	
			5	22	TONE	DEFAU.		50.987	0.056'	Friday, March 05, 2010 11:	
			1	20	TONE	DEF-MU.	32.000*	-65.617	0.312"	Friday, March 05, 2010 8:5.	
				10	STORE	DEFAU			0.312"	Friday, March 05, 2010 8:2.	383.300'
			1	10	ST030	DEFAU.	2170420.797		0.312'	Friday, March 05, 2010 8-2.	
			1	17		DEFAU.	2230072.312		0.312"	Friday, March 05, 2010 8:1.	383.300'
			1	16	ST038	DEFAU.	2367731.779	11887986.639	25.312'	Thursday, March D4, 2010	303,300
			1	24	OPU43		2219748.543		15.312'	Thursday, March 04, 2010	004 4701
			1	12	TOVE		-147983.236	9865549.078*	30.3121	Thursday, March 04, 2010	384.170'
			~	211		PROP			363.300"	Thursday, February 19, 20	
			1	211		PROP			363.300*	Thursday, February 19, 20	384,300'
			~	2119		PROP			394.170*	The start, reprise y any sec-	304,300
			×	211		PROP			394.300*	Thursday, February 19, 20	004 0001
			×	211		PROP			394.307	Thursday, February 19, 20 Thursday, February 19, 20	384.300'
			×.	212		PROP.			394.300	Thursday, February 19, 20	
			1	0	ното	DEFAUL.		6706573.373	25.312	Thursday, March 04, 2010	384.300'
			1	212		PROP			304.000*	Thursday, February 29, 20	301.300
			1	212		PROP	2064777.257		305.056*	Thursday, February 19, 20	· · · · · · · · · · · · · · · · · · ·
			1	212		PROP	2064724.079		365.312"	Thursday, February 19, 20	
										~	

Figure 3-14 shows before and after views of this process.

Figure 3-14. Before and After Adjust Elevation Process

Converting Coordinates to Feet or Meters

Rather than simply changing the linear unit that displays in the project, the convert coordinates to feet/meters function changes the units associated with the numerical values of the coordinates. For example, this function is used to change a coordinate value of 3.000m to 3.000 feet, or vise versa. This might be necessary, for example, when a text file with point data in units of meters is imported into 3D-Office but the units in 3D-Office are set to feet. In this case, the units associated with the coordinate values are in error and must be corrected.



Use caution with this routine, especially when operating on a subset of the data.

- In the point list view or plan view, check mark the desired point(s) to convert (press Ctrl+A to select all points) and click Points ▶ Transform coordinates ▶ Feet/meters conversion.
- 2. On the *Convert feet/meters* dialog box, check mark the desired new units from the drop-down list and click **OK**. For *Custom scale factor*, enter the scale factor and click **OK** (Figure 3-15).

Convert feet/meters	Convert feet/meters
Current display units US Survey feet 💌	Current display units
Convert all coordinates to Meters	Convert all coordinates to Custom scale factor 💌
Effective scale factor 3.2808333	Effective scale factor .8579
OK Cancel	OK Lancel

Figure 3-15. Select Conversion Type

Figure 3-16 shows before and after views of this process.

	M. Ven	Points Window H	3D Office - [my	PRJTFile.	TP3:2]							
XR						1	41		0071	_	0.054	
nect +	Pt. #	Description	Layer Northing		ng pera		1'	50	.987'		0.056'	
	12	HOTO	DEFAU937227 DEFAU147903		573.373 25.31 549.02 30.31							
	24	07043	DEFAU 2219748				1'	50	.987'		0.056'	
	16	ST038	DEFAU. 2367733		996.639' 25.31	00.00	-				0.000	
	17 18	51038	DEFAU. 2230072 DEFAU. 2170420		417.319' 0.312 951.410' 0.312	33.20	1'	50	.987'		0.056'	
	19	\$1038	DEFAU 2170420	6313	951.410' 0.312	33.20	1	00	.507		0.000	
	20	TONE	DEF-MJ32.8002	-65.6		32.80	01	65	.617'		0.056'	
	21	TONE	DEFAU_ 32,00' DEFAU_ 32,201'	65.61		32.00	0	00	.017		0.000	
0	23	TOVE	DEFAU 33.201	50.98		Tues	day, March 09, 2	010 2				
(24	OPU43	DEFAU 33.201'	50.96			day, March 09, 2					
-	25	OPU43 OPU43	DEFAU	50.90			day, March 09, 2 hesday, March 11					
-	27	OPUH3	DEFAU	-65.6			wooday, March 31					
	29	OPU43	DEF44.1	55.61			wesday, March 10					
	29 30	0PU43 0PU43	DEFAU. 32.000' DEFAU. 32.000'	45.61			woday, March 10 woday, March 10					
	21	OPUHS	DEFAU 32.900	25.61			wisday, March 10					
	32	OPUH3	DEF.4U. 32.908'	15-61	7" 0.056		wesday, March 10					
	33 34	E		3D Offic	- [myPRJ]	File TP3:21						
	35		w Points Window		Contraction of the second	And the lot of the lot of the			1000			
	36	I X Sherry		Contract of					- 98			
	-37											
			Contraction of the local division of the loc	1	C. Annual Control of C	and the second se	and the second se	distant in the				
	38	Select + Pt. #	Description	Layer	Northing	Easting	Elevation	Created Therates Ma	04,2010			
		Select + Pt.#	21043	DEFAU.	10411.512' 1034829.005'	-11353.051	98.530	Thursday, Ma				
	38 39	Select + PL #	210x3 NAT GRIND ED	DEFAU. DEFAU.	18411.512' 1034829.005' 2065143.367'	-11353.051	98.530	Thursday, Ma		11'	2284.528	1
	38 39	Select A PL #	210x3 NAT GRID ED 210x3	DEFAU DEFAU G. DEFAU DEFAU	10411.512' 1034829.005' 2065143.367' 2064409.428'	-11353.051		Thursday, Ma	05062.59	1'	2284.528	I
1	38 39	5 6 7 8 9	215x3 NAT GRND ED 215x3 MARGE CI MARGE CI	DEFAU. DEFAU. G. DEFAU. DEFAU. DEFAU. DEFAU.	18411.512 1034829.005 2065143.367 2064409.428 14624438.248 14624381.823	14624	98.597 1437.59	Thursday, Ma 94 ¹ 14	05062.59	_		
	38 39	5 6 7 8 9 10 11	20x3 NAT GROD ED 20x3 MARGE CK MARGE CK MARGE CK	DEFAU DEFAU G DEFAU DEFAU DEFAU DEFAU DEFAU	18411.512* 1034829.005* 2065143.367* 2064409.428* 14624438.248* 14624438.248* 14624438.1823* 14624487.761*	14624	98.530	Thursday, Ma 94 ¹ 14		_	2284.528 2284.774	
	38 39	5 6 7 9 10 11 12	21043 NAT GRID ED 21043 MARGE CK MARGE CK MARGE CK MARGE CK	DEFAU. DEFAU. DEFAU. DEFAU. DEFAU. DEFAU. DEFAU.	18411.512* 1034829.005* 2065143.367* 2064409.429* 14624438.248* 14624439.761* 14624534.392*	14624 14624	437.59 388.09	Marsday, Ma 94' 14 99' 14	05062.59 05068.76	6'	2284.774	I
1	38 39	5 6 7 9 10 11 11 12 12 14	20x3 NAT GRID ED 20x3 MARCE CI MARCE CI MARCE CI MARCE CI MARCE CI MARCE CI	DEFAU. DEFAU. DEFAU. DEFAU. DEFAU. DEFAU. DEFAU. DEFAU. DEFAU.	18411.512 1034829.005 2065143.367 2064409.429 14624438.246 14624438.246 14624438.246 14624457.5427 14624575.427 14624608.467	14624 14624	98.597 1437.59	Marsday, Ma 94' 14 99' 14	05062.59	6'		I
,	38 39	5 6 7 9 9 10 11 12 12 13 14 15	2003 NAT GRND ED 2003 MARGE OL MARGE OL MARGE OL MARGE OL MARGE OL MARGE OL	G DEFAU DEFAU DEFAU DEFAU DEFAU DEFAU DEFAU DEFAU DEFAU	18411.512' 1034829.005' 2065143.367' 2054409.429' 1462438.240' 1462438.382' 1462447.754' 14624534.392' 14624575.427' 146245608.457' 14624638.596'	14624 14624 14624	437.59 388.09 341.52	74' 14 99' 14 99' 14 25' 14	05062.59 05068.76 05086.61	- 6' .8'	2284.774 2284.980	1
)	38 39	5 6 7 9 10 11 12 2 13 14 15 16	2455 NAT GRO ED 2553 MARGE O MARGE O MARGE O MARGE O MARGE O MARGE O MARGE O	DEFAU. DEFAU. DEFAU. DEFAU. DEFAU. DEFAU. DEFAU. DEFAU. DEFAU. DEFAU. DEFAU.	18411.512' 1034829.005' 2065143.367' 2054409.429' 14624409.429' 14624409.424' 14624409.246' 14624409.761' 14624505.392' 14624651.596' 14624651.596'	14624 14624 14624	437.59 388.09	74' 14 99' 14 99' 14 25' 14	05062.59 05068.76	- 6' .8'	2284.774	1
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>	38 39	5 6 9 10 11 12 13 14 14 15 16 17 18 19	24543 NAT GRUD ED Today WARGE OL MARGE OL MARGE OL MARGE OL MARGE OL MARGE OL MARGE OL MARGE OL MARGE OL	DEFAU DEFAU DEFAU DEFAU DEFAU DEFAU DEFAU DEFAU DEFAU DEFAU DEFAU DEFAU DEFAU DEFAU	18411.5127 1034829.005' 2065143.367' 2064409.428' 14624480.248' 14624480.761 14624534.392' 14624463.437' 14624631.592' 14624631.470' 14624631.470' 14624631.371' 14624631.371'	14624 14624 14624 14624 14624	9437.59 1388.09 1341.52 1300.58	Thursday, Ma 94' 14 99' 14 25' 14 34' 14	05062.59 05068.76 05086.61 05115.10	- 6' .8'	2284.774 2284.980	1
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2	38 39	5 6 9 10 11 12 13 14 14 15 16 17 18 19	Exets dia deno Tran constructio	DEFAU. DEFAU. DEFAU. DEFAU. DEFAU. DEFAU. DEFAU. DEFAU. DEFAU. DEFAU. DEFAU. DEFAU. DEFAU. DEFAU. DEFAU. DEFAU. DEFAU.	18411.5127 1034829.005' 2065143.367' 2064409.428' 14624480.248' 14624480.761 14624534.392' 14624463.437' 14624631.592' 14624631.470' 14624631.470' 14624631.371' 14624631.371'	14624 14624 14624 14624 14624	9437.59 1388.09 1341.52 1300.58	Thursday, Ma 04' 14 09' 14 25' 14 34' 14 Thursday, Ma Thursday, Ma Thursday, Ma Thursday, Ma Thursday, Ma Thursday, Ma	05062.59 05068.76 05086.61 05115.10	- 6' .8'	2284.774 2284.980	1
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	38 39	5 6 7 8 10 11 12 13 14 15 16 16 17 17 18 9 20 20 22 22 22 23	Crists Dig Crists Crists Dig Dig Crists Dig Dig Crists Dig Dig Crists Dig	DEFAUL DEFAUL DEFAUL DEFAUL DEFAUL DEFAUL DEFAUL DEFAUL DEFAUL DEFAUL DEFAUL DEFAUL DEFAUL DEFAUL DEFAUL DEFAUL DEFAUL DEFAUL	1841.512 1034829.005 2065143.267 206499.420 44624409.420 44624409.421 44624409.424 4462457.421 4462457.423 4462457.423 4462457.423 4462463.470 4462463.470 4462463.301 4462463.401463.401463.401463.401463.40146454.4	14624 14624 14624 14624 14624	437.59 388.09 341.52 300.58	Thursday, Ma 09' 14 25' 14 34' 14 Thursday, Ma Thursday, Ma Thursday, Ma Thursday, Ma Thursday, Ma Thursday, Ma	05062.59 05068.76 05086.61 05115.10	- 6' .8'	2284.774 2284.980	1
)	38 39	5 7 8 9 10 11 12 13 14 15 15 16 15 19 20 21 22 22 22 23 24 25 25 27 27	2553 NAT CRADE DE CARAN 2553 NAMEG CI NAMEG CI	CEFAU. DEFAU.	19411.512 10341290.005 202543.307 20254430.4430.244 14524430.244 14524534.302 146246534.302 146246534.302 146246534.302 14624653.1597 14624633.1597 14624633.257 14624633.257 14624633.257 14624633.257 14624633.257 14624633.257 14624633.257 14624633.257	-11953/051 14624 14624 14624 14624 14624 14624 14624 14624 14625 146055 146055 146055 146055 146055 146055 146055 146055 146055 14605 14705 14	94.597 1437.59 1388.09 1341.52 1300.58 200.58 200.58 200.58 200.597 200.597 200.597 200.597 200.597 200.597 200.597 200.597 200.597	Thursday, Ma 24' 14 29' 14 25' 14 34' 14 Thursday, Ma Thursday, Ma	05062.59 05068.76 05086.61 05115.10	- 6' .8'	2284.774 2284.980	1
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	38 39	5 7 8 9 10 11 12 13 14 15 15 16 15 19 20 21 22 22 22 23 24 25 25 27 27	2553 NAT CRADE DE CARAN 2553 NAMEG CI NAMEG CI	CEFAU. DEFAU.	10411.512 10341290.009 2025143.327 2026459.4338 14634458.249 14634458.249 14634458.249 14634458.249 14634457.5427 14634457.5427 14634453.301 14634453.301 14634453.301 14634453.291 14634453.291 14634453.291 14634453.291 14634453.291 14634457.295 14634445.295 146344457.295 146344455 146344555 146344555 1463455555555555555555555555555555555555	-11953/051 14624 14624 14624 14624 14624 14624 14624 14624 14625 146055 146055 146055 146055 146055 146055 146055 146055 146055 14605 14705 14	94.597 1437.59 1388.09 1341.52 1300.58 200.58 200.58 200.58 200.597 200.597 200.597 200.597 200.597 200.597 200.597 200.597 200.597	Thursday, Ma 24' 14 29' 14 25' 14 34' 14 Thursday, Ma Thursday, Ma	05062.59 05068.76 05086.61 05115.10 05115.10	- 6' .8'	2284.774 2284.980	1
	38 39	5 9 9 10 11 12 12 13 14 14 14 14 15 15 15 15 15 17 17 18 10 27 27 27 27 28 29 29 20 20 20 20 20 20 20 20 20 20 20 20 20	21533 NAT CONDUCT 2433 NAT CONDUCT 2433 NATION CONT 2433 NATION CONT 2433 NATION 24	OFFAU, OFFAU, OFFAU, DF	1941.512 2054.00,00 2054.00,00 2054.00,00 1944.00,40 1944.00 1	-1185 091 14624 14624 14624 14624 14624 14624 14624 14624 14624 14624 14624 14624 14624 14624 14624 14625 197 197 197 197 197 197 197 197	98587 1437.59 1388.09 1341.52 1300.58 1400.58 1300.58 1400.58	Thursday, Ma 99' 14 99' 14 99' 14 95' 14 94' 14 94' 14 94' 14 94' 14 14 14 15 14 16 14 17 14 18 14 19 14 19 14 10 14 11 14 11 14 11 14 11 14 11 14 11 14 11 14 11 14 11 14 11 14 11 14 11 14 11 14 11 14 11 14 11 14 11 14 11 <td< td=""><td>05062.59 05068.76 05086.61 05115.10 05115.10</td><td>- 6' .8'</td><td>2284.774 2284.980</td><td>1</td></td<>	05062.59 05068.76 05086.61 05115.10 05115.10	- 6' .8'	2284.774 2284.980	1
	38 39	5 7 9 9 111 112 121 14 15 15 15 15 15 15 15 17 18 19 20 27 27 27 27 27 27 27 27 27 27 27 27 27	21533 NAT CRISID EDD 21533 OC 2000 CO 2000 MARCE CO MARCE	OFFAU. OFFAU. OFFAU. DFFAU.	10411.512 1034129.005 2065143.307 206459.430 463430.440 1463430.440 1463430.407 14634407.51 14634407.51 14634407.51 14634407.51 14634407.55 14634457.55 14634457.	-11851091 14624 14625 147 14626 147 147 147 147 147 147 147 147	98587 1437.59 1388.09 1388.09 1341.52 1300.58 1400.59	Thursday, Ma 294' 14 299' 14 25' 14 34' 14 Thursday, Ma Thursday, Ma	05062.59 05068.76 05086.61 05115.10 05115.10 05115.10	- 6' .8'	2284.774 2284.980	1

Figure 3-16. Before and After Coordinate Conversion Process

Translating Point Coordinates

Point translations are shifts along the X (East), Y (North), and Z (Elevation) axes. Typically, point translations are done on the entire data set, if at all, rather than on a subset of points.



Use caution with this routine, especially when operating on a subset of the data, since data will be PERMANENTLY changed.

- In the point list view or plan view, check mark the desired point(s) to translate (press Ctrl+A to select all points) and click Points ▶ Transform coordinates ▶ Translate in XYZ.
- 2. On the *Translation* dialog box, enter the desired *North*, *East*, and *Elev* translation values, then click **OK** (Figure 3-17).

Translation 🛛 🔀						
Translate points b	y					
North	5.000'					
East	10.000'					
Elev	6					
	OK Cancel					

Figure 3-17. Enter XYZ Translation Values

XS		en Points Window H			File.TP3:2]	DEFAU.	14624	1643.470'	1405293.8	97' 2283.093'
lect +	Pt. #	Description		arthing (H11.512"	Easting -11353.051*	📳 DEFAU.	14624	4643.391'	1405244.0	19' 2283.141'
	6	210x0 NAT GRND EDG	DEFAU., 1	034829.005'	3092039.304' 6170942.969'	DEFAU.	1460/	1631.366'	1405195.6	12' 2283,285'
		20x3 MARGE CK	DEFAU 2	064409.428'	6176757.078*	DEFAU.	14024	+031,300	1400100	12 2203,203
	10	MARGE OK	DEFAU. 1	4624281.823	1405134.179/	🗄 DEFAU,	14624	1608.095'	1405151.4	95' 2283.518'
	11 12	MARGE CK MARGE CK		4624497.761	1405469.957* 1405452.253*	E DEI AVI	1102	10001050	1100101/1	50 2200,010
	13	MARGE CK		4624575.423	1405423	2293.495' TI	hursday, March 04	2010		
	14	MARGE CK	DEFAU1	4624608.457	+4/5386-532*	2283.291' TI	hureday, March D4	, 2010		
	15	MARGE CK	DEFAU.		1405342.342		hursday, March D4		_	
<u>(</u>	16	MARGE CK		4024043.470			hursday, March D4			
<u></u>	17 18	MARGE OK MARGE OK		4624643.391	1405195.612		hursday, March D4 hursday, March D	, 2010		
<u> </u>	10	MARGE CK		4624608.0957	1405151-4057	2293.510'	hursday, March D4	2010		
-	20	MARGE OK		4624574.934"	1405114.238'		huroday, March D4			
	21	MARGE CK		4624533.012"	1405006-009/		hursday, March D4			
	22	MARGE DX		4624407.126'	1405068-453'		hursday, March D4			
	23	MARGE CK MARGE CK		4624437.594	1405062.591' 1405068.766'		hunsday, March 04 hunsday, March 04			
	25	MARGE CK		4024341.525	1405086-618		hursday, March 04			
	26	MARGE CK		4624300.584	1405115.107		hursday, March 04			
	27	MARGE CK		4624267.659	1405152.573		hursday, March 04			
v.	31 32	Select * Pt.# 8 12	Description HOTQ TOYE	Layer DEFAU DEFAU	Northing -937227.162' -147903.236'	6708573.373' 9865549.078'	25.312' 30.312'	Dreated Thursday, March D4, Thursday, March D4,	2010	
v		Select * Pt, # 8 12 24 16 17 18 19 20	HOTQ TOYE OPUH3 STO38 STO38 STO38 STO38 TOYE	DEFAU DEFAU DEFAU DEFAU DEFAU DEFAU DEFAU	-997227.162' -147903.236' 2219749.543' 2307731.779 2290072.312' 2170420.797' 2170420.707' 2170420.707'	6708573.373' 9665549.078' 7395161.009' 11007905.639' 7432417.319' 6313951.410' 6313951.410' -65.617'	25.912' 30.912' 25.912' 0.312' 0.312' 0.312' 0.312' 0.312' 0.312'	Thursday, March D4, Thursday, March D4, Thursday, March D4, Thursday, March D4, Finday, March 05, 201 Finday, March 05, 201 Finday, March 05, 201 Finday, March 05, 201	2010 2010 0 0 1 0 0 2 0 0 2 0 0 2	
¥.		Select + Pt. # 8 12 24 15 17 18 19 20 21 22	HOTQ TOYE 0PU43 ST038 ST038 ST038	DEFAU DEFAU DEFAU DEFAU DEFAU DEFAU DEFAU DEFAU	-997227,162' -147903,236' 2207731,759 220072,312' 2170420,797' 2170420,797' 2170420,797' 2170420,797' 3170420,797' 33201'	6708573.373' 9865549.078' 7399161.009' 11087986.659' 7432417.319' 6313951.410' 6313951.410' 6313951.410' 65.617'	25.312' 30.312' 15.312' 25.312' 0.312' 0.312' 0.312' 0.312' 0.312' 0.312' 0.312'	Pharsiday, March D4, Thursiday, March D4, Thursiday, March D4, Thursiday, March D5, 201 Fielday, March 05, 201 Fielday, March 05, 201 Fielday, March 05, 201	2010 2010 2010 0 0 0 1. 0 8 2. 0 8 2. 0 8 5.	
Y		Select A Pt. # 8 12 24 16 17 18 19 20 21 22 2123	HOTQ TOYE OPU43 ST038 ST038 ST038 TOYE TOYE	DEFAU DEFAU DEFAU DEFAU DEFAU DEFAU DEFAU DEFAU DEFAU DEFAU	-997227.162* -147903.236* 2219790.543* 22697731.779 2230072.312* 2170420.797*	6708573.373' 9665549.076' 7299161.009' 11007966.639' 7432417.319' 6313951.410' 6313951.410' 6313951.410' 655.617' 65.617' 55.647' 50.967'	25.312 30.312 15.312 25.312 0.056 0.312 0.056 0.312 0.056	Pharsday, March D4, Pharsday, March D4, Pharsday, March D4, Pharsday, March D4, Priday, March 05, 201 Priday, March 05, 201 Priday, March 05, 201 Priday, March 05, 201 Priday, March 05, 201	2010 2010 2010 0 0 0 1. 0 8 2. 0 8 2. 0 8 5.	
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Figure 3-18 shows before and after views of this process.

Figure 3-18. Before and After XYZ Translation Process

Setting Unit Options See "Setting Project Units" on page 2-35 for details on the *Units* tab to set the type of units for the various project quantities.

Exporting Points

3D-Office exports points from a 3D Point file or 3D Project file to point files (*.pt3) and text files, as well as a Pocket-3D controller.

Exporting Points to a 3D Point File

Use this process to keep copies of files or to track progress.

- 1. Select the points to export and click **Points ▶ Export selected points ▶ To 3D point file (*.pt3)**.
- 2. On the *Save As* dialog box, do one of the following (Figure 3-19 on page 3-17):

- To export to another point file, navigate to the location of the file and select it, then click **Save**,
- To save to a new file, navigate to the desired folder, type a name for the new file, and click **Save**.

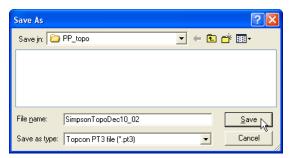


Figure 3-19. Save Point File

The selected points are added to the existing or new 3D point file.

Exporting Points to a Pocket-3D Controller

- 1. Connect the Pocket-3D controller to the computer and turn on the controller. See Appendix A for details.
- 2. Select the points to export and click **Points → Export selected points → To Pocket-3D controller**. 3D-Office connects with the Pocket-3D controller.
- 3. On the *Pocket-3D files* dialog box, do one of the following and click **Save** (Figure 3-20 on page 3-18):
 - Select a file to overwrite.
 - Enter a new file name or keep the default file name to save a new file to the controller's memory.

The file type is automatically selected.

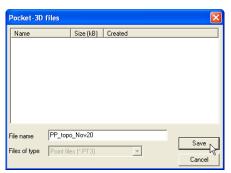


Figure 3-20. Save File to Pocket-3D Controller

The selected points data is saved in the specified folder on the Pocket-3D controller.

Exporting Points to a Text File

- Select the points to export and click **Points** > **Export selected** points > **To text file**.
- 2. Select the format type and click **Next** (Figure 3-21). See "Creating Custom Import/Export Formats for Text Files" on page 2-13 for creating new or editing current formats (Figure 3-21).

Select custom format	
Formats NDTEPAD TXT Test	New format Edit Delete
< <u>B</u> ack Next	Cancel

Figure 3-21. Select Custom Format

3. Click **Browse**. Navigate to the desired location in which to save the file, select a current file to replace or type a name for a new file. Click **Save**.

- 4. Enable the view results box to automatically open the text file when the export completes. If needed, select the desired *Viewer*.
- 5. Click **Finish** to export the selected points to a text file (Figure 3-22).

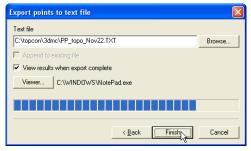


Figure 3-22. Exporting Points to Text File

If the view results box was checked, the selected text editor opens and displays the exported points (Figure 3-23).

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Figure 3-23. Exported Points Displayed in Text Editor

Notes:

Linework Files

Linework files contain layers comprised of polyline entities, where each layer is assigned a name and color. A polyline is a series of continuous line segments that may represent features or objects within the project, such as building pads, curbs and sidewalks, top and toes of slopes, or the boundary of the project. With 3D-Office, linework can be transformed into points and alignments.

Importing and Opening Linework

3D-Office can read linework files from several formats. Linework in 3D-Office can be assigned to layers, draped onto TINs, converted to alignments, edited, deleted, and exported to various file format types.

3D-Office recognizes linework from three file types:

- 3D linework files (*.ln3)
- Pocket-3D controller files See "Importing Linework from Pocket-3D" on page 4-2 for import details.
- AutoCAD® files See "Importing from an AutoCAD File" on page 4-3 for import details.

Importing Linework into a 3D Project File

Follow these steps to import linework from a 3D Linework file into a 3D Project file.

- 1. With a 3D Project file open, click Linework ▶ Import linework ▶ From 3D linework file (*.ln3).
- 2. On the *Open* dialog box, navigate to the location of the desired file, select it, and click **Open** (Figure 4-1).

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PP_topo_N	lov20.ln3		
File <u>n</u> ame:	PP_topo_Nov20.In3		Open 📐
Files of type:	Linework (*.ln3)	•	Cancel

Figure 4-1. Open 3D Linework File

Importing Linework from Pocket-3D

Follow these steps to import a Pocket-3D controller linework file into a 3D Project file.

- 1. Connect the Pocket-3D controller to the computer and turn on the controller (see Appendix A for details). Run Pocket-3D on the controller.
- With a 3D Project file open, click Linework ▶ Import linework ▶ From Pocket-3D controller.
 3D-Office connects with the Pocket-3D controller and retrieves

3D-Office connects with the Pocket-3D controller and retriev *.ln3 linework files.

3. On the *Pocket-3D files* dialog box, select the file to import and click **Open** (Figure 4-2 on page 4-3). The file type is automatically selected.

Pocket-	3D files	;			X
Name		Size (kB)	Created		
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<					>
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					Open
Files of type	Linework file	s (*.LN3)	•		ancel
					ancei

Figure 4-2. Open Pocket-3D Linework File

Importing Linework from an AutoCAD File

Follow these steps to import linework from an AutoCAD (dwg or dxf) file into either a 3D Project file or a 3D Linework file. All associated layers defined in the AutoCAD file will be imported.

- With a 3D Project or 3D Linework file open, click Linework ▶ Import linework ▶ From AutoCAD file.
- 2. On the *Open* dialog box, navigate to the location of the desired file, select it, and click Open (Figure 4-3).

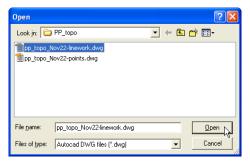


Figure 4-3. Open AutoCAD 3D Linework File

Opening a Linework File

- 1. To open a 3D linework file, click **File ▶ Open**.
- On the *Open* dialog box, navigate to the location of the file, select the file type as Linework (*.ln3), select the desired file, and click **Open** (Figure 4-4).

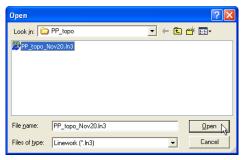


Figure 4-4. Open 3D Linework File

Opening a Pocket-3D Linework File

If a Pocket-3D controller and the computer are connected, 3D-Office can open linework files directly from the controller. Once opened, the file can be exported to other files or saved to the computer. See Appendix A for details on connecting a computer and controller.

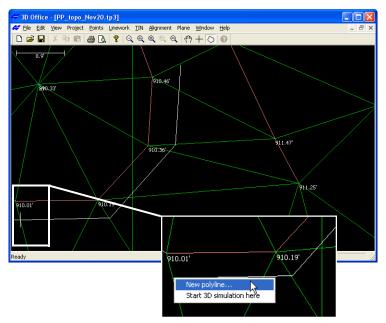
- 1. Click File > Open Pocket-3D file.
- 2. On the *Pocket-3D files* dialog box, select the file type (*.ln3) and the desired file, then click **Open** (Figure 4-5).

Figure 4-5. Select File and Click Open

Creating Linework

The polygon selection tool can be used to create polylines in a 3D Project file. With 3D-Office, linework can be transformed into points and alignments.

- 1. To add a new polyline to the file, click the polygon selection tool, then click on the screen to begin the polyline. Click at subsequent locations to create the end point or corner points (Figure 4-6).
- 2. Click once at the end-point, then do one of the following:
 - right click and click **New polyline** on the pop-up menu (Figure 4-6)



• click Linework > New polyline

Figure 4-6. Trace New Polyline with Polygon Tool and Add to File

3. On the *Polyline* dialog box, select the layer in which to enter the new polyline and enter an elevation for the polyline, then click **OK** (Figure 4-7).



Figure 4-7. Enter New Polyline Parameters

The new polyline is stored as linework in the file. The elevation entered in the dialog box is assigned to all vertices of the new polyline.

Draping Polylines onto TIN

The drape polyline to TIN function allows a polyline to be created across the current TIN model. Using this function, the elevations of the polyline vertices are derived from the TIN model. Thus, the polyline is "draped onto the TIN model".

- 1. After drawing a polyline in the plan view, use the Selection tool to select the new polyline. Click Linework ▶ Drape polyline(s) onto TIN.
- 2. Click **OK** to create new TIN vertices (Figure 4-8).

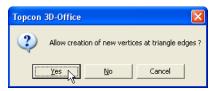


Figure 4-8. Create New Vertices at Triangle Edges

3D Office will redraw the portion of the TIN surface that changed, adding vertices to the TIN surface along the new polyline.

Deleting Polylines

- 1. To delete polylines from the file, use the *Selection* tool and click the desired polylines.
- 2. Press **Delete** or click **Linework** > **Delete polyline(s)**.

Viewing Linework Information

Linework information can be viewed using a text editor that displays the layer the linework resides in, the number of vertices in the linework, and the coordinates for the vertices of the selected linework. This information can be saved as a text file for reference.

- 1. Do the following to view information on selected linework:
 - click on the individual linework OR
 - use the select tool to select a group of linework
- 2. Click the activated **Information** button on the toolbar or rightclick on the mouse and click **Properties**. A text file opens, displaying linework properties. (Figure 4-9).

()	# PP_topo_Nov20.tp3:2 -		×
	<u>File Edit</u>		
Information Button	Selected entities Polylines (layer, # vertices) Default, 6 Vertices (coords, curve radius, curve direction) X1835276.63, Y 771100.62, 2 912.92' X1835307.40', Y 771009.00', 2 912.42' X1835362.90', Y 771050.04', 2 911.98' X1835367.68', Y 771038.87', 2 911.58' X1835387.68', Y 771038.87', 2 911.58'		
	Default, 11 Vertices (coords, curve radius, curve direction) X 1835293.61', Y 771102.51', 2 912.88' X 1835298.73', Y 77107.84', 2 912.92' X 1835236.54', Y 771062.18', 2 912.94'	>	11. (<

Figure 4-9. Click Information Button and View Selected Entities

3. To save the information as a text file, click **File → Save as**. On the *Save As* dialog box, type a name for the file or keep the default file name. Navigate to the location in which to save the file and click **Save**.

Managing Linework Layers

To view, add, or edit layers, click **Linework → Layers**. The *View layers* dialog box displays each layer in the linework file.

For details on using the *View Layer* dialog box, see "Managing Layers" on page 2-16.

Setting Unit Options

To set unit options in a Linework file, click **View** ▶ **Options**. The *Project options* dialog box displays and sets the type of units to use for the various quantities used in the 3D Linework file.

The *Project options* dialog box also has the same fields as for 3D Project files. See "Setting Project Units" on page 2-15 for details on the *Units* tab.

Exporting Linework

If you made changes to a linework file, you can export the changed file to a new linework file, or replace a current file with the new information.



Export versions of the file to track progress.

Exporting Linework to a File

The following steps describe exporting linework to a 3D Linework file (*.ln3).

Select the linework to export and click Linework > Export selected linework > To 3D linework file.

2. On the *Save As* dialog box, type a name for the new linework file or select a linework file to replace. Click **OK** to export the file (Figure 4-10).

Save As			? 🛛
Save in: 🛅 I	°P_topo	• •) 💣 🎟 -
PP_topo_Nc	w20.ln3		
File <u>n</u> ame:	PP_topo_Nov22		<u>Save</u>
Save as type:	Topcon LN3 file (*.ln3)	•	Cancel

Figure 4-10. Export Linework to 3D Linework File

Exporting Linework to a Pocket-3D Controller

To use the linework file in the field, export it to a Pocket-3D controller.

- 1. Connect the Pocket-3D controller to the computer and turn on the controller (see Appendix A for details). Run Pocket-3D on the controller.
- 2. Select the linework to export and click Linework ▶ Export selected linework ▶ To Pocket-3D controller.
- 3. On the *Pocket-3D files* dialog box, do one of the following and click **Save** (Figure 4-11 on page 4-10):
 - Select an existing file to replace.
 - Enter a new file name or keep the default file name.

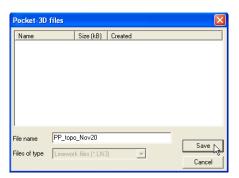


Figure 4-11. Export Linework File to Pocket-3D Controller

Exporting Linework to an AutoCAD File

Follow these steps to import linework from an AutoCAD (dwg or dxf) file into either a 3D Project file or a 3D Linework file. All associated layers defined in the AutoCAD file will be imported.

 With a 3D Project or 3D Linework file open, click Linework ▶ Export selected linework ▶ To Autocad file.

On the *Open* dialog box, navigate to the location of the desired file, highlight it, and press **Open.**



Figure 4-12. Export Linework to AutoCAD

TIN Files

A TIN (Triangulated Irregular Network) model can be used to represent an irregular land surface. The model is derived from a set of points and edges (optional). 3D-Office can generate a TIN from existing point/line data, or it can read an existing TIN model from an outside source, such as an AutoCAD® file. A TIN model of the existing ground can be used to display cut and fill information and earth volume quantities with respect to a design surface.

Importing and Opening a TIN Surface

3D-Office opens/imports a TIN model for displaying, editing, exporting, and comparing to other surfaces. TIN options can also be set in 3D-Office.

3D-Office recognizes TIN surfaces from four file types:

- 3D TIN files (*.tn3) See "Importing a TIN Surface" on page 5-2.
- Pocket-3D controller files See "Importing from Pocket-3D" on page 5-2 for import details.
- AutoCAD files See "Importing from an AutoCAD File" on page 5-3 for import details.
- REB triangle files See "Importing an REB Triangle File" on page 5-4 for import details.

Importing a TIN Surface

Follow these steps to import a TIN surface from a 3D TIN file into a 3D Project file.

- 1. With a 3D Project file open, click **TIN** ▶ **Import TIN** ▶ **From 3D TIN file (*.TN3)**.
- 2. On the *Open* dialog box, navigate to the location of the desired file, select it, and click **Open** (Figure 5-1). The TIN surface from the selected file is added to the 3D Project file.

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Pp_topo_n	ov4.tn3		
File <u>n</u> ame:	pp_topo_nov4.tn3		<u>O</u> pen
Files of type:	TIN surface (*.tn3)	•	Cancel

Figure 5-1. Open 3D TIN File

Importing from Pocket-3D

Follow these steps to import a Pocket-3D controller TIN file into a 3D Project file.

- 1. Connect the Pocket-3D controller to the computer and turn on the controller (see Appendix A for details). Run Pocket-3D on the controller.
- With a 3D Project file open, click TIN ▶ Import alignment ▶ From Pocket-3D controller. 3D-Office connects with the Pocket-3D controller.
- 3. On the *Pocket-3D files* dialog box, select the file to import and press **Open** (Figure 5-2 on page 5-3). The file type is automatically selected.

Name		Size (kB)	Created			
TEST SITE 1	TIN (SUPER)	85.4	Monday,	March 1st	, 2004,	4:43PM
						2
<						>
	TEST SITE					>
File name	TEST SITE	TIN (SUPER)	.) Dpen

Figure 5-2. Select and Open Pocket-3D TIN File

The information from the selected file is added to the 3D Project file.

Importing from an AutoCAD File

Follow these steps to import a TIN surface from an Autocad (dwg/dxf) file into a 3D Project file.

- 1. With a 3D Project file open, click **TIN** ▶ **Import TIN** ▶ **From** AutoCAD file.
- 2. On the *Open* dialog box, navigate to the location of the desired file, select it, and press **Open** (Figure 5-3). The information from the selected file is added to the 3D Project file.



Figure 5-3. Open AutoCAD 3D TIN File

Importing an REB Triangle File

Follow these steps to import a TIN surface from an REB triangle file (*.reb) into a 3D Project file.

- 1. With a 3D Project file open, click **TIN** ▶ **Import TIN** ▶ **From REB triangle file** (*.**REB**).
- 2. On the *Open* dialog box, navigate to the location of the desired file, select it, and press **Open** (Figure 5-4). The information from the selected file is added to the 3D Project file.

Open			? 🛛
Look jn: 🔎	3dmc	• + 1	d 🖬 🕶
MachineFile			
File <u>n</u> ame:	EYL_OSS.REB		<u>O</u> pen
Files of type:	REB triangle files (*.reb)	•	Cancel

Figure 5-4. Open REB Triangle File

Opening a TIN Surface File

- 1. To open a 3D TIN surface file, click **File → Open**.
- 2. On the *Open* dialog box, navigate to the location of the file, select the file type as TIN surface (*.tn3), select the desired file, and press **Open** (Figure 5-5).

Open			? 🛛
Look jn: 🔎	PP_topo	▼ ← €	* 🖬 •
Pp_topo_n	ov4.tn3		
File <u>n</u> ame:	pp_topo_nov4.tn3		<u>O</u> pen
Files of type:	TIN surface (*.tn3)	•	Cancel

Figure 5-5. Open 3D TIN Surface File

Opening a Pocket-3D TIN File

If a Pocket-3D controller is connected to the computer, 3D-Office can open TIN surface files directly from the controller. Once opened, the file can be exported to other files or saved to the computer. See Appendix A for details on connecting a computer and controller.

- 1. Click **File ▶ Open Pocket-3D file**.
- 2. On the *Pocket-3D files* dialog box, select the file type (*.tn3) and the desired file, then press **Open** (Figure 5-6).

Pocket-	3D files				X
Name TEST SITE	TIN (SUPER)	Size (kB) 85.4	Created Monday,	March 1st, i	2004, 4:43PM
File name Files of type	TEST SITE 1 TIN surface I		.		Open Cancel

Figure 5-6. Select File and Click Open

Creating a TIN Surface File

In many applications, an elevation of the terrain or a cut/fill to a design surface is needed at an arbitrary location within the project. 3D-Office can provide this information based on a TIN model generated from the project point-data. A design surface TIN is useful for stakeout and grading, and is an essential model for 3DMC.

TIN surfaces can only be created in 3D Project files and 3D TIN files.

Creating a TIN Surface File from a 3D Alignment

3D-Office offers a powerful tool to generate a TIN model from a 3D Alignment. This is useful for comparing the existing terrain surface to

a road design surface, thus providing a means to compute cut and fill volume quantities.

- From a 3D Project file that contains both a horizontal and vertical alignment, click Alignment > Generate TIN from 3D alignment.
- 2. On the *Generate TIN surface* dialog box, select the desired generation parameter, and click **OK** (Figure 5-7).
 - *Generate points using regular sampling interval* generates a TIN having more uniformly shaped triangles. This option may take longer to generate the TIN. Enter the sampling interval in the project's units.
 - *Generate points only where necessary* may reduce the size of the TIN file. Triangle vertices will be generated at the alignment definition points and as necessary to maintain the break lines implied in the alignment definition.
 - *Maximum arc/chord separation* sets the maximum separation distance between the straight side of the triangle and the arc of a curve. A smaller separation value will create triangle edges that will more closely approximate the curve (but this will also create more, and smaller, triangles).

3D-Office generates a TIN model from the points of the alignment.

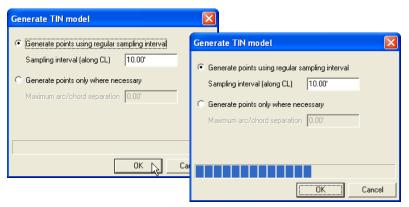


Figure 5-7. Select TIN Generation Parameters and Generate TIN Model

Creating a TIN Surface From Selected Points/Linework

3D-Office permits graphical selection of point and line data for TIN generation. This is very useful for generating a TIN model from an imported data set, for example, survey data. All selected points become vertices of the TIN mesh, and all selected lines appear as edges in the mesh. Thus the selected lines function as "breaklines;" that is, they will not be crossed by any other edges in the TIN mesh. The default boundary of the TIN is the so-called convex hull, a unique mathematical boundary for any point set. See "Creating a TIN Surface Clipped to the Selection Polygon" on page 5-8 for an alternate way to define the TIN boundary.

- 1. From a 3D Project file that contains points and/or linework, use the selection tool to select the elements from which to generate the TIN model. Press **Ctrl+A** to select all elements in the 3D Project.
- 2. Click **TIN** → **Generate new TIN surface** → **From selected points/linework**.

3D-Office generates a TIN model from the selected points and/or linework.

Creating a TIN Surface From Selected Triangles

3D-Office permits graphical selection of triangle data for TIN generation. This is useful for creating a TIN surface that is a subset of an existing TIN surface.

- 1. From a 3D Project file that contains triangles, use the selection tool to select the triangles from which to generate the TIN model.
- 2. Click **TIN** ▶ Generate new **TIN** surface ▶ From selected triangles.

3D-Office generates a TIN model from the selected triangles.

Creating a TIN Surface Clipped to the Selection Polygon

Rather than using the convex hull of the point set to define the TIN boundary, this function will clip the TIN model to the perimeter defined using the selection polygon. This provides an easy way to customize the boundary of the TIN model.

- 1. From a 3D Project file that contains points and/or linework, use the selection tool to select the elements from which to generate the TIN model.
- 2. Press Ctrl+A to select all elements in the 3D Project.
- 3. Click **TIN** > Generate new **TIN** surface > Clipped to selection boundary.

3D-Office generates a TIN model from the selected points and/or linework, clipped to the selection polygon.

Merging TIN Surfaces

You can now merge all visible TIN surfaces together into one surface.

Click **TIN** • Generate new **TIN** surface • Merge all visible **TIN** surfaces.

3D-Office will merge all visible active surfaces into one new surface.

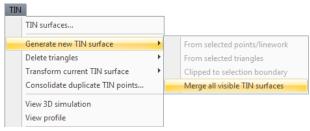


Figure 5-8. Merge TIN Surfaces

Viewing Triangle Information

TIN (Triangulated Irregular Network) surface files are comprised of a mesh of non-overlapping triangles computed from irregularly spaced points with x, y coordinates. 3D-Office opens a text file for viewing TIN triangle information.

- 1. Select the TIN triangles on which to view information:
 - click the individual triangle(s)
 - use the select tool to select a group of triangles
- 2. Click the activated **Information** button on the toolbar. A text editor window opens, displaying the coordinates for the three points of each selected triangle (Figure 5-9).

N 770906.27/E 1835266.30/2 800.05' N 770915.68/E 1835374 56/2 41/2 800.05' N 770952.29/E 1835374 56/2 801.36' N 770952.29/E 1835413.36/2 800.03' N 770950.05/E 1835413.36/2 800.03' N 770950.05/E 1835439.77/2 800.15' N 770950.73/E 1835557.92/2 804.23' N 770960.6;E 1835439.77/2 800.15'	N 770919.68',E 1835374.21',2 800.06' N 770919.68',E 1835374.21',2 800.06' N 770943.02',E 1835394.09',2 801.30' N 770943.02',E 183549.09',2 801.30' N 770940.52',E 183549.09',2 801.36' N 770952.29',E 1835475.92',2 801.36' N 770969.04',E 1835475.92',2 801.36' N 771089.73',E 183557.92',2 801.36' N 771089.29',E 1835482.01',2 801.37' N 771009.29',E 1835482.01',2 801.37'	N 770933.67',E 1835318.25',2 801.24' 770936.77',E 1835287.06',2 800.19' N 770933.67',E 1835287.06',2 801.24' N 770949.68',E 1835374.21',2 800.06' N 770969.04',E 1835401.99',2 801.15' N 770949.62',E 1835413.6',2 800.03' N 770943.02',E 1835413.6',2 800.33' N 770943.02',E 1835413.6',2 800.33' N 770969.04',E 1835419,2 801.15' N 771006.47',E 18354415.31',2 801.52' N 771060.62',E 1835471.43',2 803.52'
--	---	--

Figure 5-9. Click Information Button to View Selected Entities

3. To save the information as a text file, click **File → Save as**. On the *Save As* dialog box, type a name for the file or keep the default file name. Navigate to the location in which to save the file and click **Save**.

Viewing and Editing TIN Surfaces

Viewing the TIN model may be helpful for getting a feel of how the point and line data are used to represent the physical land surface. The view can also be used to select triangles to delete. Triangles might be deleted in order to trim the model along its perimeter or to otherwise reduce the model size. Long, narrow triangles can also be removed if desired.

To view 3D Project's TIN surfaces, click **TIN ▶ TIN surfaces**. The *TIN surfaces* dialog box displays the following information about the selected TIN surface (Figure 5-10 on page 5-11):

- TIN surfaces a listing of all TIN surfaces in the 3D Project file.
- Name the name of the selected/current TIN surface.
- Layer the layer in which the TIN surface exists. Click the dropdown box to change the layer for the currently selected TIN surface.
- Visible whether or not the triangles, perimeter, and contours of the TIN surface are visible, or if these element are visible by layer.
- TIN element color boxes the color of the TIN element (triangle, perimeter, and contour). Click the button to change the element's color.
- Number of triangles the number of triangles on the TIN model.
- Number of points the number of points in the TIN model.
- Number of regions the number of regions in the TIN model.
- Number of holes the number of holes in the TIN model.
- Surface area the surface area of the TIN model in the project's unit.

TIN surfaces		×
NOV20 TOPO TRI-SURF WCRINE LAG08 TIN_Stfc MyTINStfc MyTINStfc		
Copy D	elete	
Selected surface		
Name :	TRI-SURF	
Layer:	<no layer=""></no>	~
Visible :	Yes Vitiangles Perimeter Contou	rs
Number of triangles :	174 Number of regions : 1	
Number of points :	91 Number of holes : 0	
Surface area : 329	9961183.54ft²	
	OK Cancel Apply	

Figure 5-10. TIN Surfaces

Editing a TIN Surface

- On the *TIN surfaces* dialog box (in a 3D project file, click TIN ▶ Tin surfaces), select the TIN surface to edit (Figure 5-10).
- 2. Change or edit the following parameters as needed:
 - The name of the TIN surface.
 - The layer in which the TIN surface exists.
 - If the elements of the TIN surface are visible, not visible, or visible by position in a layer.
 - The color of the triangles, perimeter, or contours of the TIN surface (click the element's button and select a new color).
- 3. Click **OK** to save the changes and apply then to the selected surface.

Copying a TIN Surface

The copy function provides a way to produce multiple versions of a TIN surface, which may be useful for reducing an existing TIN into one or more sub-regions. Selecting a TIN surface and clicking **OK** will display the TIN in the design view.

- 1. On the *TIN surfaces* dialog box, select the TIN surface to copy and click **Copy** (Figure 5-11).
- 2. Type a unique name for the new TIN surface and press **Enter** (Figure 5-11).

TIN surfaces		X
NOV20 TOPO TRI-SURF WCRINE LAG08 TIN_Sric MyTINSric MyTINSric TRI-SURF_August 13	3, 2010	
Copy D	elete	
Selected surface		
Name:	TRI-SURF_August 13, 2010	
Layer :	<no layer=""></no>	~
Visible :	Yes Vitriangles Perimeter Co	ntours
Number of triangles :	174 Number of regions : 1	
Number of points :	91 Number of holes : 0	
Surface area : 329	9961183.54ft²	
	OK Cancel Ap	oply

Figure 5-11. Copy and Name TIN Surface

- 3. Make any desired changes as described in "Editing a TIN Surface" on page 5-11.
- 4. To view or edit the copied TIN, select it and click **OK**.

From here, you can make changes to the TIN surface, then export it for use in another file. See "Working with TIN Surfaces" on page 5-13 for editing the TIN surface.

Deleting a TIN Surface

Only delete a surface when the data it contains will never be needed again. If necessary, save a backup copy of the file before deleting surfaces.



Deleting a surface will also delete all of its contents.

- 1. On the *TIN surfaces* dialog box, select the TIN surface to delete and click **Delete**.
- 2. Click **OK** to confirm the deletion (Figure 5-12).



Figure 5-12. Delete TIN Surface

To undo the deletion, click **Edit ▶ Undo edit TIN surfaces** or press **Ctrl+Z**.

Working with TIN Surfaces

3D-Office provides the power to easily view, edit, and import/export TIN surfaces. The following sections describe the TIN editing functions.

Deleting Triangles with Long Sides

Before deleting information, make a backup copy of the file. This function affects the current TIN surface. If deleted triangles fall within the interior of the mesh, a red border replaces the outer edge of the deleted triangles, indicating a boundary around the "hole" left by deleted triangles.

1. If needed, select the desired TIN surface (click **TIN ▶ TIN surfaces**, select the surface and click **OK**).

- 2. Click **TIN** ▶ **Delete triangles** ▶ With long sides.
- 3. Enter a length to delete triangles with at least one edge greater than the entered value (Figure 5-13). 3D-Office deletes all triangles that have at least one edge as long as the length.



Figure 5-13. Delete Triangles with an Edge Greater Than...

3D-Office automatically regenerates the surface.

Figure 5-14 shows before and after screen shots of this process.

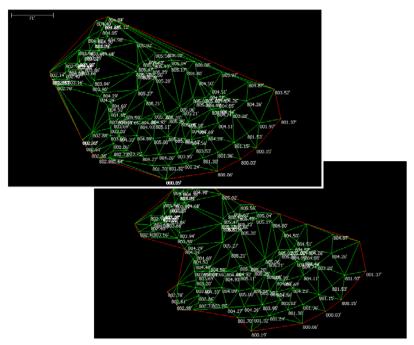


Figure 5-14. Before and After Deleting Triangles with Long Sides

Deleting Triangles

If deleting interior triangles, a red border replaces the outer edge of the deleted triangles, indicating a boundary around the "hole" left by deleted triangles.

This function affects the current TIN surface.

- 1. Using the select tool, click or draw a rectangle around the triangles to delete.
- Click TIN ➤ Delete triangles ➤ Selected or press Delete on the keyboard. 3D-Office deletes the selected triangles.

3D-Office automatically regenerates the surface.

Figure 5-15 shows before and after screen shots of this process.

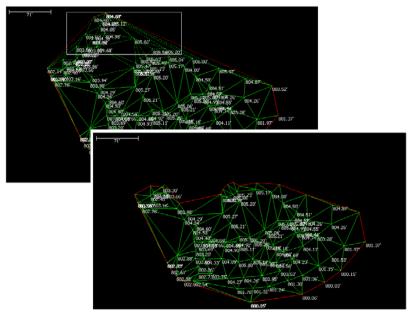


Figure 5-15. Before and After Deleting Selected Triangles

Consolidating Duplicate TIN Points

Some data sets may contain points that are so close to their neighbors that they can be considered duplicates and unnecessary. Such points will cause small or narrow triangles in the TIN mesh. The consolidate duplicate points function removes one of the "duplicate" points.

The consolidate duplicate TIN points option is only available in 3D Project files, not 3D TIN files. This function affects the current TIN surface.

- 1. From a 3D Project with a TIN model, click **TIN → Consolidate duplicate TIN points**.
- 2. Enter the tolerance value and click **OK** (Figure 5-16). The tolerance value specifies the 3D distance used to consider two point to be duplicates. 3D-Office consolidates duplicate points (removing one of them from the TIN data set) and regenerates the TIN model.



Figure 5-16. Enter the Duplicate Tolerance of Points

Viewing a 3D Simulation of the TIN Surface

The 3D-views in 3D-Office use lines and colors to give a threedimensional perception of a field or pad on a two-dimensional screen. Using the 3D view can help to visualize what the topography or design surface looks like.

To view a simulation of the TIN surface, click **TIN** ▶ **View 3D simulation**. A new window opens to display an interactive, 3-dimensional, simulation of the TIN surface (Figure 5-17 on page 5-17).

• Click and hold on the screen to have the pointer rotate the view.

- The arrow keys on the keyboard control the motion of the machine: up arrow is forward, down arrow is backward, left and right arrows rotate the "ground" accordingly.
- On a mouse with a scroll wheel, use the scroll wheel to zoom in/ out.
- See "3D-view and Profile View Menu Bars" on page 1-14 for details on the menus and menu items.
- See "3D-view and Profile View Toolbars" on page 1-16 for details on the 3D-view toolbar.

To play a machine log file, click **Motion > Playback from log file** and select the machine log file (*.ml3) for the job. The machine on the 3D-view will move as the machine at the jobsite moved.

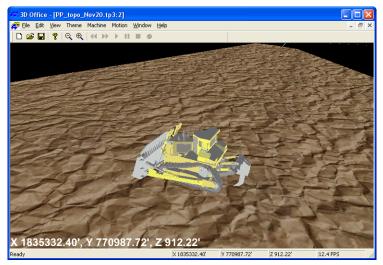


Figure 5-17. TIN Simulation

Viewing a Profile of the TIN Surface

The profile view is a powerful tool for visualizing cut and fill heights along a line through the TIN model and can be used for the following:

- to check clearances between the design surface and existing gas lines, or other utility lines, of known depth
- to determine the grade of the design or existing surface along a line

The profile can be viewed statically or dynamically by dragging the profile line across the field.

- 1. To view a profile of the field, click **TIN** ► **View profile**. A check mark displays next to the menu option.
- In the Plan View, click a location at which to begin the profile. Stretch the line across the field and click once to end it (Figure 5-18).

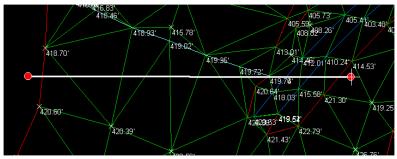


Figure 5-18. Profile View

The Profile View displays (Figure 5-19 on page 5-19) the following information:

- elevation tic marks on the left of the view window
- a cross section of the current TIN
- a pop-up box showing XY point coordinates, TIN 'Z' coordinates, and grade at the point of the crosshair
- a horizontal scale bar

• cross hair coordinates in the status bar

The vertical exaggeration is shown as a ratio next to the elevation in the status bar on the far right.

#				
View				
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- 410.00'			H	46'
- 400.00'				
- 390.00'				
— 380.00'	Brick - N 200 47	03.197', E 6178730.1	0.21	
— 370.00'	TIN : Z 389.256	, Grade 15.036%	.27	
- 360.00'				
— 350.00' Ready	N 2064703.197	E 6178730.127'	Z 378.683' (2 :	1) //

Figure 5-19. Profile View

- 3. On the *View* dialog box (Figure 5-19), use the toolbar to manipulate the view. See "3D-view and Profile View Toolbars" on page 1-16 for information on the toolbar buttons.
- 4. To change the position of the profile view, click in the Plan View, then click, "grab" and "drag" the start or end point of the profile line in the Design View to a new position. The "grabbed" point is green while being moved. The Profile View changes accordingly.

Or, you can "grab" the line and shift it without changing its direction or length.



Closing the Profile View exits the profile function. Repeat steps 1 through 3 to display the profile view again.

5. To quit this function, press Esc.

Comparing Surfaces

When 3D-Office compares two surfaces, it computes the volume of cut and fill between the surfaces, the area of intersection between the surfaces, and the maximum and minimum cut and fill heights between the surfaces. Such information is useful for documenting excavation progress on a job.

Comparing Surfaces in 3D Project Files

The 3D Project file must have a TIN surface and at least one other surface (TIN, plane, or alignment) for this option to be available.

- 1. With a 3D Project file open, click **TIN** ▶ **Compare current TIN** surface ▶ With 3D surface file.
- 2. Select the *Surface of type* to compare with from the drop-down list (Figure 5-20).
- 3. If more that one surface type exists, select the desired surface from the surface list.
- 4. Click OK.

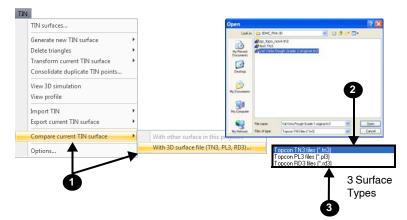


Figure 5-20. Compare Surfaces in 3D Project File

Comparing 3D Surface Files

- With a TIN surface file or a 3D Project file open, click TIN ➤ Compare TIN surface ➤ With 3D surface file or TIN ➤ Compare current TIN surface ➤ With 3D surface file.
- 2. On the *Open* dialog box, navigate to the location of the desired file, select the file type (either TIN, Plane, or RD3 alignment), and click **Open** (Figure 5-21).



Figure 5-21. Open File to Compare With

3D-Office compares two surfaces and opens a cut/fill view to display the comparison between the two surfaces (Figure 5-22).

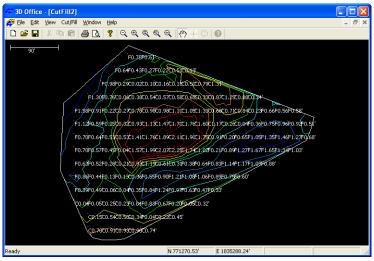


Figure 5-22. Cut/fill File for Compared Surfaces

- 3. View the cut/fill information. See "Cut/Fill Files" on page 9-1 for details on cut/fill surface files.
 - If needed, re-compare the surfaces after making changes tot he original surfaces (for example, changing plane parameters or deleting triangles in a TIN file).
 - Save the cut/fill file. Click **File** ► **Save as**, navigate to the desired located, type a name for the file, and click **Save**.

Setting TIN Surface View Options

The *TIN options* dialog box (Figure 5-23 on page 5-23) sets plan view parameters and TIN computation parameters.

1. Click **TIN ▶ Options**.

The *TIN options* dialog box displays (Figure 5-23 on page 5-23).

- 2. On the *Plan view* tab, enable/disable the desired parameters (Figure 5-23 on page 5-23).
 - Enable or disable the *Show triangle edges*, *Show boundaries*, and *Show point elevations* as needed.
 - Enable *Show contours* and enter a parameter for the contour interval to display the contours of the TIN surface.
 - Enable *Use colors* to display the contour lines as colors associated with an elevation as shown in the color chart.
- 3. Click the *Triangulation* tab and enable/disable the desired parameters (Figure 5-23 on page 5-23).
 - Select either "Divide and conquer" or "Incremental" for the *Triangulation algorithm*. The default "Divide and conquer" selection is usually sufficient.
 - Enable *Ok to generate and add interpolated points to data set* as needed. Use this function if the length of linework segments included in the TIN model were generally longer than the length of the typical triangle edge. Otherwise, long line segments included in the TIN might cause long, narrow

triangles along the linework. If enabling this parameter, select the desired sub-parameters.

4. Press **OK** to apply the view and triangulation options to the TIN file.

	TIN options	X
	Plan view Triangulation	
	Show triangle edges	Show contours
	Show boundaries	Contour interval 1.000'
	Show point elevations	Use colors
		>= 807.00' 806.00'
TIN options		805.00'
Plan view Triangulation		804.00' 803.00'
		802.00'
Triangulation algorithm Divide	e and conquer 🛛 👻	801.00' 800.00'
☑ OK to generate and add interpola	ated points to data set	<= 799.00'
☑ OK to add interpolated points a	long boundaries	OK Cancel
Avoid creating triangles with an	igles less than 20*00'00''	
Avoid creating triangles with an	ea greater than 1076.39ft	
	OK Cancel	

Figure 5-23. Set Plan View and Triangulation Options

Setting Unit Options

The *Project options* dialog box sets the type of units to use for the various quantities used in the 3D Project.

To set unit options in a TIN file, click **View ► Options**. The dialog box that displays has the same fields as for 3D Project files. See "Setting Project Units" on page 2-35 for details on the *Units* tab.

Exporting a TIN Surface

If you made changes to a TIN surface, you can export the changed surface to a new TIN file, or replace an existing file with the new information.



Export versions of the file to track progress.

Exporting a TIN Surface to a TIN Surface File

- 1. Select TIN ▶ Export current TIN surface ▶ To 3D TIN file (*.TN3).
- 2. On the *Save As* dialog box, do one of the following (Figure 5-24):
 - To export to an existing TIN file, navigate to the location of the file and select it, then click **Save** (the contents of the existing file are replaced).
 - To save to a new file, navigate to the desired folder, type a name for the new file, and click **Save**.

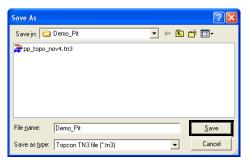


Figure 5-24. Save TIN Surface File

The selected TIN surface overwrites the existing file or creates a new 3D TIN surface file.

Exporting a TIN Surface to Pocket-3D

To use the TIN surface file in the field, export it to a Pocket-3D controller.

- 1. Connect the Pocket-3D controller to the computer and turn on the controller (see Appendix A for details). Run Pocket-3D on the controller.
- 2. With a TIN surface file or 3D Project open, click **TIN** ▶ **Export TIN surface** ▶ **To Pocket-3D controller** or **TIN** ▶ **Export current TIN surface** ▶ **To Pocket-3D controller**.
- 3. On the *Pocket-3D files* dialog box, do one of the following and click **Save** (Figure 5-25):
 - Select an existing file to replace.
 - Enter a new file name or keep the default file name.

Pocket-3D	files					X
Name		Size (kB)	Created	1		
File name Files of type	NOV20	TOPO	N3)	_	_	Save Cancel

Figure 5-25. Save TIN Surface File to Pocket-3D Controller

Notes:

Alignment Files

An alignment defines the route of a road, utility line, water way, etc., and is typically comprised of both horizontal and vertical elements. Also, an alignment may include cross-sectional information. This chapter The following topics describe creating alignments and how alignments are used in 3D-Office.

Opening an Alignment File in 3D-Office

- 1. Click **File** > **Open** to open a 3D alignment file.
- 2. On the *Open* dialog box, navigate to the location of the file, select the file type as Alignment (*.rd3), select the desired file, and click **Open** (Figure 6-12).

Open		? 🛛				
Look jn: 隘	PP_topo	- 🔁 🚔 💷 -				
夢6220-A12 Grade Work.rd3 愛A.RD3 愛 Inner perimeter of lake.rd3						
File <u>n</u> ame:	Inner perimeter of lake.rd3	<u>O</u> pen				
Files of type:	Topcon RD3 files (*.rd3)	Cancel				

Figure 6-1. Open 3D Alignment File

Tools Menu Options

On the Tools menu in 3D-Office, you can compute the distance between points and areas of polygons, show the elevation of a selected surface, and you can compare surfaces of two or more alignment files.

Measuring the Distance/Area of the Alignment

 To measure (compute) the distance/area of a selected point on the alignment surface, click Tools ➤ Measure distance/area (Figure 6-2).

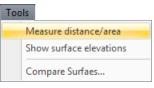
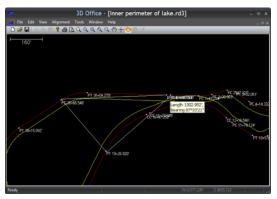
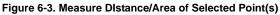


Figure 6-2.

The pop-up to measure the Length/Bearing of a selected point on the alignment surface displays (Figure 6-3).

2. Double-click on the mouse to select the points you want to measure.





3. Press the **Esc** key to end the routine.

Showing Surface Elevations

1. To display the elevation anywhere within the alignment, click **Tools ▶ Show surface elevations** (Figure 6-4).

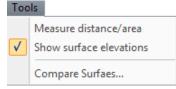


Figure 6-4. Check Elevations to All Surfaces

2. Drag the cursor anywhere within the surface to display the elevation (Figure 6-5).

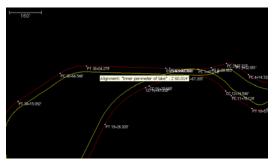


Figure 6-5. Show Surface Elevation for Alignment

3. Click **Tools** > **Show surface elevations** to end the routine.

Comparing Alignment Surfaces

To compare grid surfaces in an alignment file, click **Tools** > **Compare surfaces.**

The Grid Surfaces dialog box displays (Figure 6-6 on page 6-4).

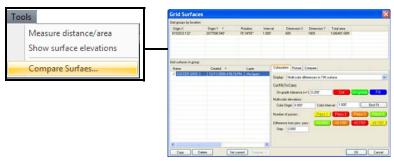


Figure 6-6. Compare Grid Surfaces

See "Viewing Grid Information" on page 8-10 and Figure 8-15 on page 8-11 for more information on this dialog box.

Importing and Opening an Alignment

3D-Office opens three dimensional alignment files for viewing and editing horizontal centerlines and vertical profiles, creating and applying templates, viewing a vertical profile or 3D simulation, exporting an alignment, or setting alignment options.

3D-Office imports alignments into 3D Project files from three file types:

- 3D alignment files (*.rd3) See "Importing an Alignment" on page 6-5 for details.
- Pocket-3D controller files See "Importing from Pocket-3D" on page 6-6 for details.
- LandXML files See "Importing a LandXML Alignment File" on page 6-6 for details.

On the *Open* dialog box, navigate to the location of the file, select the file type as Alignment (*.rd3), select the desired file, and click **Open** (Figure 6-12).

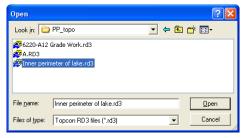


Figure 6-7. Open 3D Alignment File

Importing an Alignment

Follow these steps to import an alignment from a 3D alignment file into a 3D Project file.

- 1. With a 3D Project open, click Alignment ▶ Import alignment ▶ From 3D alignment file (*.RD3).
- 2. On the *Open* dialog box, navigate to the location of the desired file, select it, and click **Open** (Figure 6-8). The alignment from the selected file is added to the 3D Project file.

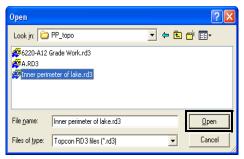


Figure 6-8. Import 3D Alignment File

Importing from Pocket-3D

Follow these steps to import an alignment from a Pocket-3D controller into a 3D Project file.

- 1. Connect the Pocket-3D controller to the computer and turn on the controller. See Appendix A for details. Run Pocket-3D on the controller.
- With a 3D Project open, click Alignment ▶ Import alignment ▶ From Pocket-3D controller. 3D-Office connects with the Pocket-3D controller and retrieves alignment files.
- 3. On the *Pocket-3D files* dialog box, select the file to import and click **Open** (Figure 6-9). The file type is automatically selected. The alignment information from the selected file is added to the 3D Project file.

Pocket-	3D fi	les		X
Name		Size (kB)	Created	
TEST SITE	(ROAD)	2.8	Monday, Mar	ch 1st, 2004, 4:40PM
<				>
				_
File name	TEST S	ITE (ROAD)		
Files of type	Road su	urface files (*.RD3)	-	Open Cancel

Figure 6-9. Select and Open Pocket-3D Alignment File

Importing a LandXML Alignment File

Follow these steps to import an alignment from a LandXML file into a 3D Project file.

1. With a 3D Project file open, click Alignment ▶ Import alignment ▶ From LandXML file.

2. On the *Open* dialog box, navigate to the location of the desired file, select it, and click **Open** (Figure 6-10).



Figure 6-10. Open LandXML File

- 3. On the *Import LandXML alignment(s)* dialog box, select the desired alignment(s) (Figure 6-11 on page 6-8) and press **Open**.
 - Click the desired alignment(s).
 - Hold down the **Shift** key to select groups of alignments.
 - Hold down the Ctrl key to select separate alignments.
 - Press **Select All** to select all available alignments. The button toggles to a **Select First** button to select only the first alignment.

When selecting all alignments, any cross-section surfaces associated with the selected alignments will display in the bottom pane.

4. If the alignment selected in the top pane contains cross-section surfaces, click **Import <CrossSectionSurf> as TIN surfaces** to select/de-select the desired surfaces in the bottom pane.

By default, all cross-section surfaces will be imported as TIN surfaces. Uncheck the box to prevent the surface from being imported.

The selected alignments from the LandXML file are added to the 3D Project file.

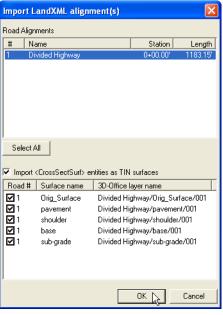


Figure 6-11. Select LandXML Alignment(s)

Importing Alignment Features

A 3D Project file can import horizontal centerlines, vertical profiles, and cross sections from other files types.

To import a horizontal centerline, click Alignment > Import alignment > Horizontal centerline > From CLIP file (*.plt). Navigate to and select the *.*PLT* CLIP file and click **Open**.

To import a vertical profile, click Alignment → Import alignment → Vertical profile → From CLIP file (*.*ALZ*). Navigate to and select the *.*ALZ* CLIP file and click **Open**.

To import a cross section, click Alignment → Import alignment → X-section → <file type>. Navigate to and select the desired file and click **Open**. Cross sections can be imported from ISPOL files (*.sc1), CLIP files (*.trv), and InRoads files (*.soe).

Opening an Alignment in 3D-Office

- 1. Click **File** > **Open** to open a 3D alignment file.
- 2. On the *Open* dialog box, navigate to the location of the file, select the file type as Alignment (*.rd3), select the desired file, and press **Open** (Figure 6-12).

Open				? 🛛
Look jn: 隘	PP_topo	•	(-	-1
🧭 A.RD3	Grade Work.rd3 neter of lake.rd3			
File <u>n</u> ame:	Inner perimeter of lake.rd3			<u>O</u> pen
Files of type:	Topcon RD3 files (*.rd3)		•	Cancel

Figure 6-12. Open 3D Alignment File

Opening a Pocket-3D Alignment File

If a Pocket-3D controller is connected to a computer, 3D-Office can open alignment files directly from the controller. Once opened, the file can be exported to other files or saved to the computer.

- 1. Connect the Pocket-3D controller to the computer and turn on the controller. See Appendix A for details.
- 2. Click File > Open Pocket-3D file.
- 3. On the *Pocket-3D files* dialog box, select the file type (*.rd3) and the desired file, then click **Open** (Figure 6-13). The Pocket-3D alignment file opens in 3D-Office.

Pocket-	3D fi	les		X
Name TEST SITE I	(ROAD)	Size (kB) 2.8	Created Monday, March 1:	st, 2004, 4:40PM
<				>
File name Files of type		ITE (ROAD) urface files (*.RD3)	_	Open Cancel

Figure 6-13. Select File and Click Open

Creating and Editing an Alignment in a 3D Project File

The following sections give details on creating an alignment in a 3D Project file using imported linework or user-drawn polylines. Steps for creating and applying basic road templates are also given.



A layer must exist before creating an alignment. See "Managing Layers" on page 2-16 for layer information.

Creating a Polyline

An alignment can be created from either a newly drawn polyline or imported linework.

- If drawing a polyline, see "Creating Linework" on page 4-5.
- If importing linework, see "Importing and Opening Linework" on page 4-1.
- With the selection tool, select the polyline or linework and click Linework ▶ Convert polyline(s) to alignment.
- Enter a name for the new alignment and the connectivity tolerance for multiple polylines, then click **OK** (Figure 6-14). Selected polylines whose end points are within the tolerance from each other will be linked in the new alignment definition.

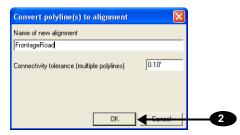


Figure 6-14. Set New Alignment Parameters

Creating Feature Line Templates

1. Click Alignment → Templates and press Add on the *Road templates* dialog box (Figure 6-15).

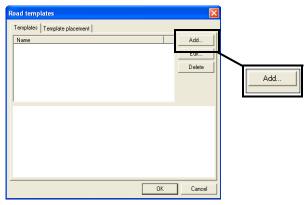


Figure 6-15. Add Feature Line Template

2. Enter a name for the template and press **Add** on the *Edit template* dialog box. Select the first element type as *Offset from CL*, enter the *H.Dist* and *V.Dist* values, and press **OK** (Figure 6-16).

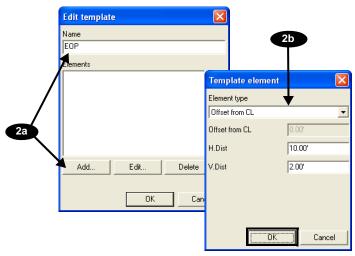


Figure 6-16. Set First Template Element

 Press Add to enter further elements, selecting from the Grade, H.Dist & V.Dist, Curb, and Side slope as needed (Figure 6-17). Click OK to save the element.

Template elem	nent				
Element type		Template eler	nent		
Grade		Template eter	nem		
Feature name	Center	Element type		Template elen	nent 🛛 🔀
Offset from CL	10.000'	H.Dist & V.Dist	0.51	Element type	
H.Dist	10.000'	Feature name	OuterEdge	Grade	•
Grade	2.000%	Offset from CL	30.000'	Feature name	RightEdge
	12.000/0	H.Dist	5.000'	Offset from CL	35.000'
		V.Dist	2.250'	H.Dist	5.000'
	OK Car			Grade	2.300%
			ОК Са		
					OK 📐 Cancel

Figure 6-17. Add Templates Elements

4. Press **OK** to save template. Press **OK** again to save the template to the file (Figure 6-18).

Road templates	
Edit template	icement
Name EOP	Add Edit
Elements Diffset: 10.000°, 2.000° "" Grade: 10.000°, 2.000° "Center" H. Dist & V.Dist & J.Dist * J.Dis	Delete
OK Cancel	InnerEdgeftEdgeCenter Center
	OK Cancel

Figure 6-18. Save Template

Placing a Road Template

1. Click **Alignment** → **Templates** and click the *Template placements* tab. Then press **Add** (Figure 6-19).

1	Road templates	;	\mathbf{X}
	Templates Tem	plate placement	
	Station	Name	Applied
Add			
	<u> </u>		
	Add	Edit Delete	
			OK Cancel

Figure 6-19. Place Road Templates

2. Select the *Template*, the *Side of centerline to apply it to*, and the *Station* to start at. Then press **OK** (Figure 6-20).

Edit template placen	nent 🛛 🔀
Template	
EOP	-
Side of centerline	Left/right 💌
Station	0+00.00'
	_
OK	Cancel

Figure 6-20. Apply Template to Centerline

3. Press **OK** on the *Road template placement* dialog box to place the template and view the result on the Plan View (Figure 6-21 on page 6-14). If needed, set view options to view template information (see "Setting View Options" on page 6-41 for details).

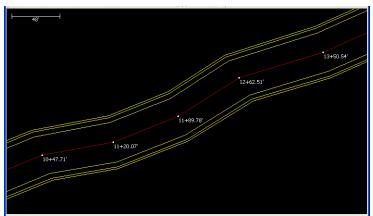


Figure 6-21. Alignment with Templates

Editing Templates

- 1. Click Alignment > Templates.
- 2. Select the template and press **Edit**.
- 3. Press **Add** to add more elements, or select an element and click **Edit** to change its parameters.
- 4. When finished, press **OK** until the main screen appears. The changes are automatically applied to the alignment file.

Using Multiple Templates

Use multiple templates for a complicated project with frequent or sudden changes—for example, when the road narrows and widens at spots along the way, or in grade changes.

- 1. Follow the steps in "Creating Feature Line Templates" on page 6-11 for each new template.
- 2. When finished, apply the templates as seen in "Placing a Road Template" on page 6-13.

All templates within a single alignment must have the same number of elements on the respective road sides.

Viewing and Editing Alignments

To view an existing alignment in a 3D Project, click **Alignment** > **Alignments**. The *Alignments* dialog box (Figure 6-22) lists all existing alignments in the 3D Project.

- Select an alignment to view its name, layer information, and station properties in the lower part of the dialog box.
- Press **OK** to display the selected alignment in the plan view.

Alignments		×
Divided Highwa	зу	
New	Copy Delete	
- Selected align	ment	
Name :	Divided Highway	
Layer :	<no layer=""></no>	•
Visible :	Yes 💌	
Starting station	0+00.000'	
Ending station	: 11+83.151'	
	OK Cancel Apply	

Figure 6-22. Alignments in 3D Project

The Alignments option is only available in 3D Project files, not 3D Alignment files.

Copying an Alignment

The copy function is useful for creating a new alignment that has components common to an existing alignment.

Selecting an alignment and pressing **OK** will display that version on the Plan View. From there, the current alignment can be edited and exported for use in other files.

- 1. On the *Alignments* dialog box, select the alignment to copy and press **Copy** (Figure 6-23).
- 2. Type a unique name for the new alignment and press **Enter** or click elsewhere on the screen (Figure 6-23).

Alignments	×
Divided Highway	
	Alignments
	Divided Highway
O	Divided Highway_Plan2
New Copy Delete	
Selected alignment	
Name : Divided Highway	
Layer : <no layer=""></no>	New Copy Delete
Visible : Yes 💌	Selected alignment Name : Divided Highway
Starting station : 0+00.000'	Layer : <no layer=""></no>
Ending station : 11+83.151'	Visible : Yes 💌
	Starting station : 0+00.000'
ОК	
	Ending station : 11+83.151'
	OK Cancel Apply

Figure 6-23. Copy and Name Alignment

- 3. Make layer and visibility changes to the selected, new alignment as applicable. Or rename it if needed.
- 4. If needed, select the new alignment and press **OK** to view it on the Plan View.

Deleting an Alignment

Delete an alignment only when the data it contains will never be needed again. If necessary, save a backup copy of the file before deleting alignments.



Deleting an alignment will also delete all of its contents.

- 1. On the *Alignments* dialog box, select the alignment to delete and press **Delete** (Figure 6-24).
- 2. Press **OK** to confirm the deletion (Figure 6-24).

Alignments		
Divided Highway		
Divided Highway_Pla	anz	
		Delete
New	Copy Delete	
Selected alignment		
Name :	Divided Highway_Plan2	
Layer :	<no layer=""></no>	
Visible :	Yes	
	To	pcon 3D-Office 🛛 🔀
Starting station :	0+00.000'	2 Confirm the deletion of this alignment ?
Ending station :	11+83.151'	
		OK Cancel
	OK Cancel	Арру

Figure 6-24. Delete Alignment

To undo the deletion, click **Edit ▶ Undo edit alignments** or press **Ctrl+Z**.

Horizontal Elements

Horizontal elements define the location of the alignment in the horizontal plane. Horizontal elements consist of straight segments, curves, and spiral curves. Each segment has an associated beginning and ending station, beginning and ending coordinates, and curve parameters (if it is a curve).

To view, add, or edit horizontal elements, click **Alignment Horizontal centerline**. The *horizontal alignment table* displays along with the plan view. The table contains the following information about each horizontal element in the alignment file (Figure 6-25 on page 6-19):

- Start station the starting station of the element
- Element the element type; either Straight, Curve PC-PT, Spiral TS-SC, or Spiral SC-ST
- Curve Dir the direction of the curve; either left or right
- Length the length of the element in the project units
- Radius In/Out the radius of the curve or spiral
- Start E(X), Start N(Y) the horizontal coordinates of the beginning point of the element
- Start Azi the starting azimuth (direction) of the element
- End station the ending station of the element

To import a horizontal centerline, see "Importing Alignment Features" on page 6-8.

Adding a Horizontal Element

When selecting elements on the *horizontal alignment table*, fields highlighted in yellow can be edited; fields highlighted in red cannot be edited.

On the *horizontal alignment table*, press **Add**. The new element is added at the end of the horizontal elements table (Figure 6-25).

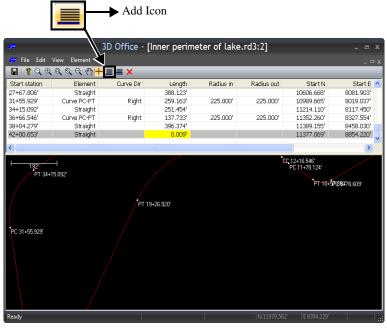


Figure 6-25. Add New Element

See "Editing a Horizontal Element" on page 6-21 for editing the element's fields.

Inserting a Horizontal Element

An inserted element is placed above the selected element. Inserting an alignment element will affect all elements following the new element.

On the *horizontal alignment table*, select an element to insert the new element before and press **Insert** (Figure 6-26).

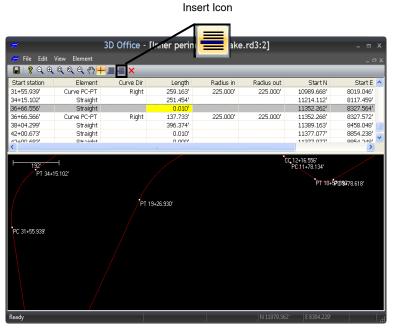


Figure 6-26. Insert New Element

See "Editing a Horizontal Element" on page 6-21 for editing the element's fields.

Editing a Horizontal Element

The editable cells of the *horizontal alignment table* contain either drop-down lists or text entry boxes for editing horizontal element components.



Editable cells highlight in yellow; static cells highlight in red.

Except for the first record, *Start Station*, *Start X*, *Start Y*, and *End station* cannot be directly changed; however, they could be changed indirectly when editing fields they are based on.

To edit a horizontal element, double-click (or select and press F2) to place the table cell in edit mode (Figure 6-27).

- For drop-down lists, click the selection. Element types include *Straight, Curve PC-PT, Spiral TS-SC,* and *Spiral SC-ST.* Curve directions are either *Right* and *Left*.
- For text entry boxes, type the value and press Enter.

Any changes are reflected in the plan view below the table.

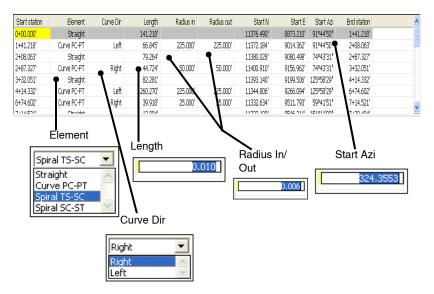


Figure 6-27. Edit Element

Deleting a Horizontal Element

To delete an element from the file, select the desired element from the *horizontal alignment table* and click **Delete**, or click **Element** ▶ **Delete** ▶ **Current record**. Deleting an alignment element will affect all following elements.

Click **Edit** • **Undo delete element** to return the deleted element to the list.

Printing Horizontal Elements

When the *horizontal alignment table* displays, the File menu contains specific options for previewing and printing the table or graph (Figure 6-28).



Figure 6-28. File Menu for Horizontal Elements List



Before printing, view the display by clicking **File > Preview Table**

Saving the Horizontal Alignment Table as a Text File

The File menu contains an option to save the horizontal elements list as a text file. Click **File** \triangleright **Save as text file**, then save the file to the desired location using the *Save As* dialog box.

The text file will include all information shown in the table, as well as the date, file name, and road name.

Vertical Profile Elements

Vertical profile elements define the height component of the alignment. The elements are either constant-grade lines or (parabolic) vertical curves.

To view, add, edit, or copy vertical profiles, click **Alignment** > **Vertical profile**. The *vertical profile table* displays along with the profile view. The table contains the following information about the vertical alignment (Figure 6-29):

- Element the type of the vertical element
- Sta @ PVI the station at the point of vertical intersection
- Elev @ PVI the elevation at the point of vertical intersection
- Radius/K-value ??
- Curve Length only for vertical curve elements, the length of the vertical curve
- Grade @ PVT displays the grade at the point of vertical tangency
- Grade @ PVC displays the grade at the point of vertical curve

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	eady					N 11679.78		

Figure 6-29. Vertical Alignments

To import a vertical profile, see "Importing Alignment Features" on page 6-8.

Adding a Profile Element

When adding a new vertical profile element, 3D-Office places the new record at the end of the table and highlights it for editing.

On the *vertical profile table*:

Click *Element Add* on the Add icon. The new element is added to the end of the table (Figure 6-30).

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Figure 6-30. Add New Element

See "Editing a Vertical Profile Element" on page 6-26 for editing the element's fields.

Inserting a Vertical Profile Element

An inserted curve is placed above the curve. Inserting an alignment element will affect all elements following the new element.

On the *vertical profile table*:

To insert a new element, highlight an element and click **Element** ► **Insert** or click on the **Insert** icon (Figure 6-31).

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ertical point	26+01.458'	55,000'			0.000%	0.029%	
ertical point	26+35.758'	55.010'			0.029%	-0.029%	
ertical point	26+70.058'	55.000'			-0.029%	0.000%	
ertical point	27+67.806'	55,000'			0.000%	0.000%	
ertical point	31+55,929'	55,000'			0.000%	0.008%	
ertical point	32+85.511'	55.010'			0.008%	-0.008%	
ertical point	34+15.092'	55,000'			-0.008%	0.000%	
ertical point	36+66.546'	55.000'			0.000%	0.000%	
ertical point	38+04.279'	55.000'			0.000%	0.000%	
ertical point	42+00.653'	55.000'			0.000%	100.000%	
ertical point	42+00.663'	55.010'			100.000%	100.000%	
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Figure 6-31. Insert New Element

See "Editing a Vertical Profile Element" on page 6-26 for editing the element's fields.

Editing a Vertical Profile Element

The editable cells of the *vertical profile table* (Figure 6-32) contain either drop-down lists or text entry boxes for editing element components.



Editable cells highlight in yellow; static cells highlight in red.

NOTE: *Grade@PVT* and *Grade@PVC* cannot be directly changed; however, they can be changed indirectly by editing the fields that they are based on.

To edit a vertical profile element, double-click (or press **F2**) the desired cell to place the cell in edit mode (Figure 6-32).

- For drop-down lists, click the selection. Elements include Vertical point and Symbol parabola.
- For text entry boxes, type the value and press Enter.

Any changes are reflected in the plan view below the vertical curves table.

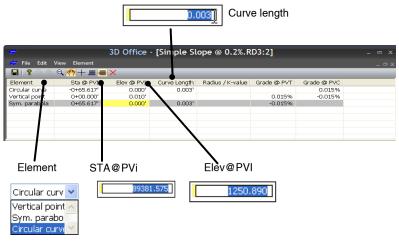


Figure 6-32. Edit Element

Deleting a Vertical Profile Element

To delete an element, select the desired element from the *vertical profile table* and press **Delete**, or click **Element > Delete > Current record**. Deleting an element will affect all following elements.

Click **Edit** ▶ **Undo delete element** to return the deleted element to the list.

Printing Vertical Profiles

When the *vertical profile table* dialog box displays (Figure 6-32 on page 6-26), the File menu contains specific options for previewing and printing the table or profile view (Figure 6-33).



Figure 6-33. File Menu for Vertical Profile View

To print either view, click in the view to make it active, then click **File ▶ Print**.



Before printing, view the display using the Print Preview.

Saving the Vertical Profile Table as a Text File

To save the *vertical profile table* as a text file, click **File** \triangleright **Save as text file**, then save the file to the desired location using the *Save As* dialog box.

The text file will include all information shown in the table, as well as the date, file name, and road name.

Templates

Templates provide a way to design and view the cross-sectional profile of a road or channel.

To view, add, or edit current road templates, click **Alignment** ► **Templates**. The *Road templates* dialog box (Figure 6-34) displays.

The *Templates* tab shows the following information about the available templates:

- The names of all available templates
- A graphical representation of the selected template

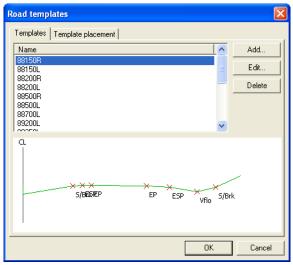


Figure 6-34. Road Templates

Adding a Template

The following procedure creates a new template definition. Once added, the template is available to place along the horizontal alignment.

- 1. On the *Road templates* dialog box (Figure 6-34), click Add.
- 2. On the *Edit template* dialog box (Figure 6-35 on page 6-29), type a name for the new template.

3. Click Add to add elements to the new template (Figure 6-35).

Edit template		
Name 89450L		
Elements		
Add	Edit	Delete Cancel

Figure 6-35. Enter Template Name and Add Element

- 4. On the *Template element* dialog box, select the type of element and enter the required information. The fields differ depending on the element selected (Figure 6-36 on page 6-30).
 - Element type select an element type from the drop-down list, either *Offset from CL, Grade, H.Dist & V.Dist, Curb,* or *Side slope*.
 - Offset from CL the offset from the centerline displays; the offset for the first element will always be Zero (0).
 - H.Dist enter the horizontal distance of the element. For curbs, this can be zero or less than zero.
 - V.Dist enter the vertical height of the element. For curbs, this can be zero or less than zero.
 - Grade enter the grade of the element.
 - Curb grade enter the curb grade of the element.
 - Ditch width enter the ditch width of the element.
 - Cut slope enter the cut slope of the element.
 - Fill slope –enter the fill slope of the element.
- 5. Click **OK** to add the element to the template.

Template eleme	nt 🛛 🛛	Template eler	nent		Template eleme	nt 🛛
Element type		Element type			Element type	
Offset from CL	-	Grade		-	H.Dist & V.Dist	-
Feature name	InsideShoulder	Feature name	Ridge	Line	Feature name	RightLane
Offset from CL	0.000'	Offset from CL	8	5.000'	Offset from CL	85.000'
H.Dist	85.000'	H.Dist	8	5.000'	H.Dist	32.000'
V.Dist	10.000'	Grade	0	.120%	V.Dist	5.000'
	Template element			Template eler	ment 🚺	X
	Element type			Element type		
0	Side slope	-	ок 📐	Curb		Cancel
	Feature name Ca	anal		Feature name	RightEdge	
	Offset from CL	85.000'		Offset from CL	85.000'	—
	Ditch width	15.000'		H.Dist	32.000'	_
	Cut slope	0.230%		V.Dist	5.000'	_
	Fill slope	0.160%				
	OK	Cancel			OK Cancel	

Figure 6-36. Template Element Dialog Boxes

- 6. To add other elements to the same template, press **Add** on the *Edit template* dialog box (Figure 6-35 on page 6-29) and repeat steps 3 and 4.
- 7. Review the elements as needed and press **OK** to add the template to the template list (Figure 6-37).

Road templates		
Templates Template placement	Edit template 🛛 🔀	
Name	Name	
88800R 89200R	89450L	
83300F 83300F 84500F 85500F 89550F 89583 91F end normal sect. 89450L	Elements Grade : 85.00' @ 0.120% H.Dist & V.Dist - 32.00', 5.00'	
	Add	6
		7
-	ОК	8

Figure 6-37. Add Template to Road Templates List

8. Click **OK** on the *Road templates* dialog box (Figure 6-37 on page 6-30) to apply the changes to the file.

Editing a Template

- 1. On the *Road templates* dialog box, select the template to edit and press **Edit**.
- 2. Select the element to edit and press Edit (Figure 6-38).

Road templates	
Edit template	Add
Name 88200R	Edit
Elements	Delete
H, Dist & V, Dist : 0.010; -4.000' "" H, Dist & V, Dist : 21.990', 3.670' "S/Brk'' Grade : 4.000' @ 4.0003' "ESP" Grade : 4.000' @ 4.0003' "EP"	
Grade: 24.000° @-2.0003° "E"P" Grade: 10.000° @-4.0003° "ESF" Grade: 12.000° @-16.667% "Vflo" Grade: 8.000° @25.0003° "S/84K" Grade: 27.200° @100.0003° ""	
Edit Delete	
OK Cancel	ESP vflo S/Brk
	OK Cancel

Figure 6-38. Select Template and Element to Edit

3. On the *Template element* dialog box, edit the desired parameters and press **OK** (Figure 6-39). The fields differ depending on the element type selected.

Template element 🛛 🛛				
Element type				
Grade				
Feature name	ESP			
Offset from CL	22.000'			
H.Dist	8.000'			
Grade	4.000%			
	Cancel			

Figure 6-39. Edit Element Parameters and Update Template

4. Press **OK** to update the template. Review the elements as needed and press **OK** to update the template on the Roads template list (Figure 6-40).

Road templates	
	Edit template 🛛 🔀
Templates Template placement	Name
Name	88200R
88150R 88150L) Elements
88200R 88200L 88500R	H.Dist & V.Dist : 0.010', -4.000' '''' H.Dist & V.Dist : 21.990', 3.670' ''S/Brk'' Grade : 8.000' @ 4.000% ''ESP''
88500L 88700L 89200L	Grade : 4.0000'@ 4.000% 'EP'' Grade : 24.000'@ 4.000% ''EP'' Grade : 10.000'@ -4.000% ''ESP''
	Grade : 12.000' @ -16.667% 'V/lo'' Grade : 8.000' @ 25.000% ''S/Brk'' Grade : 27.200' @ 100.000% ''''
	Add Edit Delete
S/BriESEP EP ESP vfio S/B	ок 4а
	OK 4b

Figure 6-40. Update Template

5. Press **OK** on the *Road templates* dialog box to apply the changes to the file.

Deleting an Element

- To delete an element from a template, select the template and press Edit. Then select the element and press Delete (Figure 6-41 on page 6-33).
- 2. Repeat step 1 to delete any other elements in the selected template.
- 3. Press **OK** to apply the changes to the template, then press **OK** to apply the changes to the file.

Edit template 🛛 🔀	
Name	
88500R	
Elements H.Dist & V.Dist : 0.010', -4.000' ''''	
H Dist AV, Dist 21,950,3 670 "S/Brk" Grade : 4.000 @ 4.0003, "EP" Grade : 2000 @ 4.0003, "EP" Grade : 2000 @ 4.0003, "EP" Grade : 10.000 @ 4.0003, "EP" Grade : 10.000 @ 4.0003, "ES" Grade : 10.000 @ 4.0003, "SBR" Grade : 60.000 @ 25.003, "S/Brk" Grade : 60.000 @ 100.0003, "" Add Edit Delete	Delete
OK Cancel	

Figure 6-41. Delete Element

Deleting a Template

- 1. To delete a template, select the desired template and click **Delete** (Figure 6-42).
- 2. Press **OK** to apply the changes to the file.

Road templates			3	
Templates Template placement				
Name 88000R 89300R 89300R 89400R 89500R 89500R 89500R 89508 31 Rend normal sect. 89583 31 Rend normal sect.		Add	Delete	
	OK	Cancel	Ī	

Figure 6-42. Delete Template

Placing a Road Template

Once a template has been created, it is available for placement along the road (alignment). Placing a template along the road defines where the various cross-sectional designs begin and end. See "Templates" on page 6-28 for creating a template.

To view, add, or edit the placement of road templates, click **Alignment → Templates**.

The *Templates placement* tab displays the following information about the template used at each station (Figure 6-43):

- Station the station at which the template is placed
- Name the name of the template
- Applied the side to which the template is applied; either *Left, Right,* or *Left/right* of the alignment

NOTE: Left and right are based on the direction of increasing stationing

<mark>load template</mark> Templates Te	n s mplate placement	2
Station	Name	Applied 🔼
881+50.000'	88150R	Right
881+50.000'	88150L	Left
882+00.000'	88200R	Right
882+00.000'	88200L	Left
885+00.000'	88500R	Right
885+00.000'	88500L	Left
887+00.000'	88700L	Left
892+00.000'	89200L	Left
892+50.000'	89250L	Left
893+00.000'	89300L	Left
895+50.000'	89300L	Left
897+13.910	89713.91L end normal sect.	Left
888+00.000'	88800R	Right
892+00.000'	89200R	Right
893+00.000'	89300R	Right
894+00.000' 894+00.000'	89400R 89400B	Right 🛁
894+00.000	89400R 89550B	Right 🔽
		Binn
Add	Edit Delete	
		OK Cancel

Figure 6-43. Road Templates – Template Placement Tab

Adding a Road Template Placement

- 1. To add a road template, press Add.
- 2. Select and enter the following on the *Edit template placement* dialog box and press **OK** (Figure 6-44):
 - Template enter the name of the template or select one from the drop-down list.
 - Side of centerline select the centerline side to apply the template to; select either *Left*, *Right*, or *Left/right*.
 - Station enter the *Station* value as a single number.

3D-Office will automatically convert to the station type (selected on the *Units* dialog box. See "Setting Project Units" on page 2-35.

Edit template placement 🛛 🛛 🔀				
Template				
89550R	•			
Side of centerline	Left/right			
Station	89600.000			
	_			
ОК	Cancel			

Figure 6-44. Enter Template Placement Information

3. Press **OK** on the *Road template placement* dialog box (Figure 6-44) to save and apply your changes.

Editing a Road Template Placement

- 1. On the *Template placement* tab, press Edit.
- 2. Edit the desired information on the *Edit template placement* dialog box and press **OK** (Figure 6-45):
 - Template select the template to edit from the drop-down box.
 - Side of centerline select which side to apply the template to, either *Left, Right*, or *Left/right*.
 - Station enter the station value as a single number.

3D-Office will automatically convert to the station type (selected on the *Units* dialog box) (Figure 6-44 on page 6-35).

Edit template placement 🛛 🛛 🔀				
Template				
88800R	-			
Side of centerline	Right 💌			
Station	888+00.00'			
ОК	Cancel			

Figure 6-45. Enter Template Placement Information

3. Click **OK** on the *Edit template placement* dialog box to apply the changes to the file.

Deleting a Road Template Placement

- 1. To delete a template placement, highlight the desired template placement on the *Road template placement* dialog box (Figure 6-43 on page 6-34) and click **Delete**.
- 2. Press **OK** on the *Road template placement* dialog box to apply the changes to the file.

Viewing a 3D Simulation of the Alignment

The 3D views in 3D-Office use lines and colors to give a threedimensional perception of a field or pad on a two-dimensional screen. 3D view will help you to visualize what the project terrain looks like. Any changes made in this view using the Road options menu selection will also be saved in the Plan view.

To view a wireframe simulation of the alignment, click **Alignment** ► **View 3D simulation** ► **Wire frame**. A new window opens to display an interactive, 3-dimensional simulation of movement along the alignment (Figure 6-46). For wire frame simulations, lines mark the centerline, horizontal alignments, vertical curves, and stations.

- The arrow keys on the keyboard control the motion of the machine: up arrow is *forward/go*, down arrow is *slow down/stop*.
- Use the Alignment → Options menu to set the type of machine used in the simulation and simulation steering details (see "Setting View Options" on page 6-41 for details).

See "3D-view and Profile View Toolbars" on page 1-16 for details on the 3D-view toolbar.

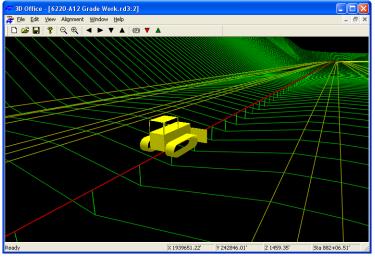


Figure 6-46. Alignment Simulation – Wire Frame

To view a solid model simulation of the alignment, click **Alignment ► View 3D simulation ► Solid model**. A new window opens displaying an interactive, 3-dimensional simulation of movement along the alignment (Figure 6-47).

- Press and hold the mouse on the screen to have the pointer rotate the view.
- The arrow keys on the keyboard control the motion of the machine: up arrow is forward, down arrow is backward, left and right arrows rotate the "ground" accordingly.
- On a mouse with a scroll wheel, the scroll wheel zooms in/out.
- Use the View menu to display contour or grid lines, the road alignment, or a cross section of the road.
- Use the Alignment **>** Options menu to set grid and contour intervals.
- See "3D-view and Profile View Menu Bars" on page 1-14 for details on the menus and menu items.
- See "3D-view and Profile View Toolbars" on page 1-16 for details on the 3D-view toolbar.

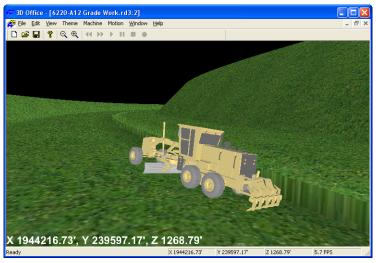


Figure 6-47. Alignment Simulation – Solid Model

Viewing a Profile of the Alignment

The profile view is a powerful tool for visualizing cut and fill heights along a line through the alignment (road surface) and can be used for the following:

- to check clearances between the design surface and existing gas lines, or other utility lines, of known depth
- to determine the grade of the design or existing surface along a line

The profile can be viewed statically or dynamically by dragging the profile line across the field.

- 1. To view a profile of the field, click **Alignment → View profile**. A check mark displays next to the menu option.
- In Plan View, click a location at which to begin the profile. Stretch the line across the field and click once to end it (Figure 6-48).

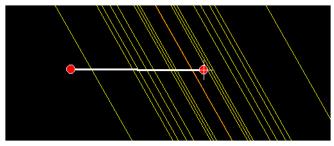


Figure 6-48. Select Area to View in Profile

The Profile View displays (Figure 6-49 on page 6-40) the following information:

- elevation tic marks on the left of the view window
- a cross section of the current TIN
- a pop-up box showing XY point coordinates, TIN : Z coordinates, and grade at the point of the crosshair
- a horizontal scale bar

• cross hair coordinates in the status bar

The vertical exaggeration is shown as a ratio next to the elevation in the status bar on the far right.

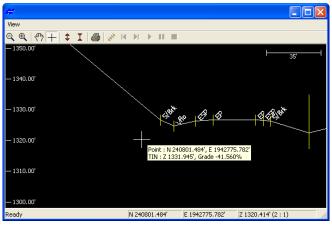


Figure 6-49. Profile View

- 3. On the *View* dialog box (Figure 6-49), use the toolbar to manipulate the view. See "3D-view and Profile View Toolbars" on page 1-16 for information on the toolbar buttons.
- 4. To change the position of the profile view, click on the Plan View, then click, "grab" and "drag" the start or end point of the profile line in the Design View to a new position. The "grabbed" point is green while being moved. The Profile View changes accordingly.

Or, you can "grab" the line and shift it without changing its direction or length.



Closing the Profile View quits the profile function. Repeat steps 1 through 3 to display the profile view again.

5. To quit this function, press **Esc**.

Setting View Options

The *Road options* dialog box sets the parameters to use for the various alignment views (plan view, profile view, simulation view).

- 1. Click **Alignment ▶ Options**.
- 2. On the *Plan view* tab, select the desired parameters (Figure 6-50) and press **OK**.
 - Show road feature lines check mark this box to show road feature lines in plan view.
 - Show regular station lines at intervals of check mark this box to display station lines at a certain interval along the route (enter a value in the field tot he right).
 - Show horizontal transition points check mark this box to display horizontal transition points in plan view.
 - Show vertical transition points check mark this box to display vertical transition points in plan view.

Road options		
Plan view Profile view 3D simulation		
Show road feature lines		
Show regular station lines at intervals of	100.00'	-
Show horizontal transition points	,	
Show vertical transition points		
·	ок	Cancel

Figure 6-50. Set Plan View and Profile View Options

- 3. On the *Profile view* tab, select the desired parameters (Figure 6-51 on page 6-42) and press **OK**.
 - Show vertical transition points check mark this box to display vertical transition points in profile view.

- Show vertical transition point labels check mark this box to display vertical transition point labels.
- Show tangent lines check mark this box to display tangent lines (if needed).
- Default vertical scale exaggeration factor enter an exaggeration factor to set the amount the vertical scale is magnified as compared to the horizontal scale.

Road options		X
Plan view Profile view 3D simulation		
Show vertical transition points		
✓ Show vertical transition point labels		
Show tangent lines		
Default vertical scale exaggeration factor	1	
	OK	Cancel

Figure 6-51. Set Plan View and Profile View Options

- 4. On the *3D simulation* tab, select the desired parameters for wire frame simulations (Figure 6-52 on page 6-43). ??
 - Machine type select either *Bulldozer*, *Motor grader*, or *3-track curb* machine from the drop-down list.
 - Road feature to steer to select either *Centerline*, ??
 - Machine steering point select blade position of the machine from the drop-down list.
 - Start simulation at start of road enable to begin simulation where the road starts.
 - *Start simulation at specific station along road* enter a station number to begin the simulation at a specific station.
 - Travel in direction of increasing stations ??
 - Travel in direction of decreasing stations ??

• Loop indefinitely – check mark this box to have the simulation restart when the virtual machine reaches the end of the road.

Road options	
Plan view Profile view 3D simulation]
Machine type	Bulldozer 👻
Road feature to steer to	Centerline
Machine steering point	Middle of blade
Start simulation at start of road	
 Start simulation at specific station alo 	ong road 881+50.00'
Travel in direction of increasing static	ons
 Travel in direction of decreasing stat 	
Loop indefinetly	
	OK Cancel

Figure 6-52. Set 3D Simulation View Options

5. Press **OK** to apply the view options to the alignment file.

Exporting an Alignment

If you made changes to an alignment, you can export the modified alignment to a new alignment file or overwrite a current file with the new information.



Export different versions of the file to track progress.

Exporting to an Alignment File

- 1. With a 3D Project file open, click Alignment ▶ Export current alignment ▶ To 3D alignment file (*.RD3).
- 2. On the *Save As* dialog box (Figure 6-53 on page 6-44), do one of the following:

- To export to another alignment file, navigate to the location of the file and select it, then press **Save**. This will overwrite the content of the existing file.
- To save to a new file, navigate to the desired folder, type a name for the new file, and press **Save**.



Figure 6-53. Save Alignment File

The selected alignment overwrites the existing file or creates a new alignment file.

Exporting to a Pocket-3D Controller

To use the alignment file in the field, export it to a Pocket-3D controller.

- 1. Connect the Pocket-3D controller to the computer and turn on the controller (see Appendix A for details). Run Pocket-3D on the controller.
- With a 3D Alignment file or 3D Project file open, click
 Alignment > Export alignment > To Pocket-3D controller or
 Alignment > Export current alignment > To Pocket-3D controller.
- 3. On the *Pocket-3D files* dialog box, do one of the following and press **Save** (Figure 6-54 on page 6-45):
 - Select an existing file to replace.
 - Enter a new file name or keep the default file name.

Name	Si	ize (kB) 🛛 Cre	ated	
ïle name	6220-A12 G			

Figure 6-54. Save Alignment to Pocket-3D Controller

Setting Unit Options

The *Project options* dialog box sets the type of units to use for various quantities and is the same as for 3D Project files. See "Setting Project Units" on page 2-35 for details.

Notes:

Plane Files

A plane file defines a planar surface with a particular location and orientation in three-dimensional space. Planar surfaces are frequently used to define a design surface.

Importing and Opening a Plane Surface

3D-Office opens any three dimensional plane surface file (*.pl3) for setting plane parameters, exporting to another plane surface file, comparing with another plane surface, or setting plane options.

3D-Office recognizes plane surfaces from two file types:

- 3D plane files (*.pl3)
- Pocket-3D controller files See "Importing from Pocket-3D" on page 7-2 for import details.

Importing a Plane Surface

Follow these steps to import a plane surface from a 3D plane file into a 3D Project file.

- 1. With a 3D Project open, click Plane ▶ Import plane ▶ From 3D plane file (*.pl3).
- 2. On the *Open* dialog box, navigate to the location of the desired file, select it, and click **Open** (Figure 7-1 on page 7-2). The plane surface from the selected file is added to the 3D Project file.

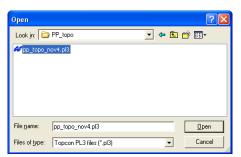


Figure 7-1. Open 3D Plane Surface File

Importing from Pocket-3D

Follow these steps to import a Pocket-3D controller plane file into a 3D Project file.

- Connect the Pocket-3D controller to the computer and turn on the controller (See Appendix A for details). Run Pocket-3D on the controller.
- With a 3D Project file open, click Plane ▶ Import plane ▶ From Pocket-3D controller. 3D-Office connects with the Pocket-3D controller and retrieves *.pl3 (plane) files.
- 3. On the *Pocket-3D files* dialog box, select the file to import and click **Open** (Figure 7-2). The file type is automatically selected. The information from the selected file is added to the 3D Project file.

Pocket	-3D files	
Name	Size (kB)	Created
PAD1	0.4	Thursday, April 1st, 2004, 7:37PM
<		>
-ile name	PAD1	
	1	Open
Files of type	Plane surface files (*.PL3)	Cancel

Figure 7-2. Select and Open Pocket-3D Plane File

Opening a Plane Surface in 3D-Office

- 1. To open a 3D plane file, click **File ▶ Open**.
- 2. On the *Open* dialog box, navigate to the location of the file, select the file type as 3D Plane (*.pl3), select the desired file, and click **Open** (Figure 7-3).

Open		? 🔀
Look jn: 隘	PP_topo	- 🖬 📩 🖃
₩pp_topo_r	iov4.pl3	
File <u>n</u> ame:	pp_topo_nov4.pl3	<u>O</u> pen
Files of type:	Topcon PL3 files (*.pl3)	Cancel

Figure 7-3. Open 3D Plane Surface File

Opening a Pocket-3D Plane File

If a Pocket-3D controller is connected to the computer, 3D-Office can open plane surface files directly from the controller. Once opened, the file can be exported to other files or saved to the computer. See Appendix A for details on connecting a computer and controller.

- 1. Click File > Open Pocket-3D file.
- 2. On the *Pocket-3D files* dialog box, select the file type (*.pl3) and the desired file, then click **Open** (Figure 7-4). The Pocket-3D plane file opens in 3D-Office.

Pocket-	-3D files	
Name	Size (kB)	Created
PAD1	0.4	Thursday, April 1st, 2004, 7:37PM
<		
File name	PAD1	
Files of type	Plane surface files (*.PL3)	Open
	, , , ,	Cancel

Figure 7-4. Select File and Click Open

Calculating a Plane Surface

When 3D-Office calculates a best-fit plane surface, it produces a single planar surface, based on the input point and line data, that most closely fits the data-point elevations. A best-fit design computation is often a good starting point for a user-customized design. The plane parameters—point on surface, mainfall/crossfall slopes, and boundary—can be easily modified after completing a best-fit computation.

- 1. If needed, import points into a 3D Project file. Select the desired points from which to create a plane surface (Figure 7-5).
- 2. Click Plane ► Calculate new plane surface ► Best fit through selected points. 3D office calculates a plane surface and applies a boundary (Figure 7-5).

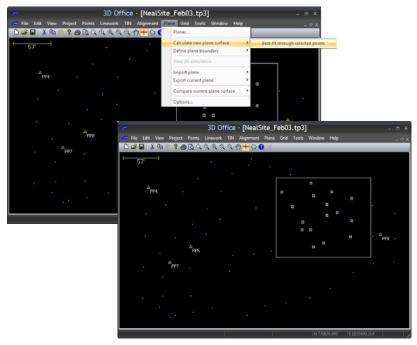


Figure 7-5. Import and Select Points, then Calculate Surface

To edit the main-fall and cross-fall slopes of the plane surface, see "Working with Plane Surfaces" on page 7-5.

Plane surfaces can also be created or copied from existing surfaces using the *Planes* dialog box. See "Working with Plane Surfaces" on page 7-5 for details.

Working with Plane Surfaces

Once you have a Plane surface, you can edit it for project requirements. A plane surface can also be compared to other surfaces within the job for volume computation purposes. Making copies of plane surfaces is also useful for project management and design.

In This Section:

- Viewing, copying, and deleting existing plane surfaces
- Creating a new plane surface
- Editing plane parameters and defining plane boundaries

Viewing Plane Surfaces

To view the plane surfaces in a 3D Project file, click **Plane > Planes**. The *Planes* dialog box displays the following information about the selected plane surface (Figure 7-6 on page 7-6):

- Plane surfaces a listing of all plane surfaces in the 3D Project file.
- Name the name of the selected/current plane surface.
- Layer the layer in which the plane surface exists. Click the drop-down box to change the layer for the currently selected plane surface.
- Visible whether or not plane surface is visible, or if the surface is visible by layer.
- Point on surface the unique definition of a planar surface. Changing any of these parameters affects the location and slopes of the plane surface.
 - Point on surface: enter the coordinates through which the plane passes.

- Direction of mainfall: enter a parameter for mainfall slope direction.
- Main-fall: enter the percentage of slope along the plane in the direction of the main-fall.

NOTE: Enter a positive value if the plane rises along the main-fall direction.

 Cross-fall: enter the percentage of slope in the direction that is 90° clockwise from the main-fall direction.

NOTE: Enter a positive value if the plane rises in the cross-fall direction.

To view a plane surface, select the surface from the list and press **OK**.

Planes		×
Idroid NewPlaneSurface CopiedPlaneSurface		
New C	Copy Delete	
Selected surface		
Name :	droid	
Layer :	<no layer=""></no>	~
Visible :	Yes 👻	
Point on surface		
North	0.250' Orientation : 0*00'00''	
East	0.250' Main-fall : 0.000%	
Elev	0.510' Cross-fall : 0.000%	
	OK Cancel App	y)

Figure 7-6. Plane Surfaces

Viewing a 3D Simulation of the Plane Surface

The 3D views in 3D-Office use lines and colors to give a threedimensional perception of a field or pad on a two-dimensional screen. 3D view will help you to visualize what the project terrain looks like. Any changes made in this view using the Road options menu selection will also be saved in the Plan view.

For more details on the 3D simulation menu and menu items, see "3D-view and Profile View Menu Bars" on page 1-14.

Copy a Plane Surface

The copy function provides a way to produce multiple versions of a plane surface, which may be useful for monitoring job progress.

Select a plane surface and press **OK** to display that version on the Plan View. From there, the plane surface can be edited and exported for use in other files.

- 1. Click **Plane → Planes** to view all available plane surfaces in the 3D Project.
- 2. Highlight the plane surface to copy and press **Copy** (Figure 7-7 on page 7-8).
- 3. Type a name for the duplicate plane surface and press **Enter** (Figure 7-7 on page 7-8).

If needed, click-pause-click a plane surface name to rename a plane surface.

Planes		×	
Thursday, May 25th, 2	2006, 4:10PM		
		Planes	<u>×</u>
9		Thursday, May 25th, CopiedPlaneSurface	
- Y			
	Copy Delete		
Selected surface		2	
Name:	Thursday, May 25th, 2006, 4:10PM		
Layer:	<no layer=""></no>	New	Copy Delete
Visible :	Yes 💌	Selected surface	
Point on surface		Name :	Thursday, May 25th, 2006, 4:10PM
North	770983.609' Orientation : 0°00	Layer:	<no layer=""></no>
East	·	Visible :	Yes 💌
	1835292.200' Main-fall : 1.95		
Elev	910.538' Cross-fall : -0.4		
	OK Cancel	North	770983.609' Orientation : 0*00'00''
		East	1835292.200' Main-fall : 1.959%
		Elev	910.538' Cross-fall : -0.478%
			OK Cancel Apply

Figure 7-7. Create a Copy of a Plane Surface

Create a New Plane Surface

This process will create a plane surface without a boundary. After creating the surface, you can define a boundary using the polygon selection tool (see "Editing a Plane's Boundary" on page 7-9).

- 1. Click Plane > Planes.
- 2. Press New (Figure 7-8 on page 7-9).
- 3. Type a name for the copied plane surface and press **Enter** (Figure 7-8 on page 7-9). If needed, click-pause-click a plane surface name to rename a plane surface.

Planes					
Thursday, May 25th, NewPlaneSurface	2006, 4:10PM				
CopiedPlaneSurface					
		Planes			
Ψ		Thursday, May 25th			
		CopiedPlaneSurface NewPlaneSurface			
		▲			
▼					
New	Copy Delete				
Selected surface					
Name :	Thursday, May 25th, 2006,	411 2			
Layer :	<no layer=""></no>	New	Copy De	elete	
Visible :	Yes	- Selected surface -			
Point on surface		Name :	Thursday, May 2	5th, 2006, 4:10P	M
North	770983.609' Orientati	Layer:	<no layer=""></no>		•
East	1835292.200' Main-fall	: Visible :	Yes 💌]	
Elev	910.538' Cross-fal	Point on surface			
L	OK Car	North	770983.609'	Orientation :	0*00'00''
		East	1835292.200'	Main-fall :	1.959%
		Elev	910.538'	Cross-fall :	-0.478%
		L	OK	Cancel	Apply
			UK		Shhà

Figure 7-8. Create a New Plane Surface

Editing a Plane's Boundary

The boundary of a plane defines the extents of the region to use in volume comparison calculations. In order to compare the volume between two plane surfaces, at least one of the planes must have a boundary.

3D-Office provides two ways to define the boundary of a plane surface: either use the polygon selection tool or choose an existing closed polygon.

Remove a Current Boundary

A boundary "clips" a plane surface to a defined perimeter. Removing a plane's boundary detaches and deletes the boundary from the plane, infinitely extending the plane surface in 3-dimensional space.

To remove the boundary from the current plane surface, click **Plane ▶ Define plane boundary ▶ Remove current boundary**.

Figure 7-9 illustrates this process. The arrows along the grid lines indicate main-fall and cross-fall direction.

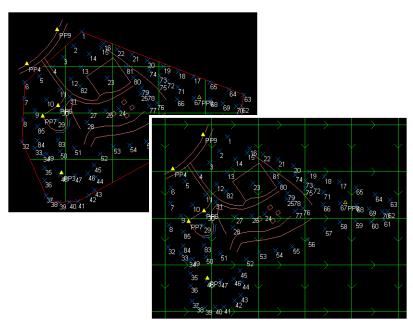


Figure 7-9. Removing the Boundary of a Plane Surface

Define a Boundary Using the Selection Polygon

The selection polygon may be used to define the boundary of an existing polygon. Use this tool to re-define the boundary of a plane or to apply a boundary to a plane. To create a plane surface, see "Calculating a Plane Surface" on page 7-4.

1. Using the polygon selection tool, trace a polygon around the area for which to define a boundary. When the polyline becomes a thick white border, click once to close the polygon (Figure 7-10 on page 7-11).

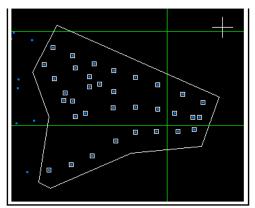


Figure 7-10. Trace Polygon and Calculate Best-fit Surface

Click Plane > Define plane boundary > By selection polygon.
 3D office generates a new boundary for the existing plane surface based on the selection polygon (Figure 7-11).

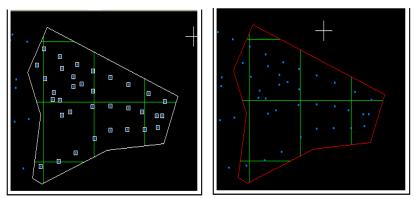


Figure 7-11. Define Boundary and Apply

Define a Boundary by Selecting an Existing Polygon

This function uses an existing polygon to create a boundary. This may be useful when a project already contains one or more closed polygons, such as building pads, that mark the edges of regions that must be graded to planar surfaces.

- 1. Using the selection tool, select a closed polygon using one of the following methods:
 - If creating a polygon (closed polyline), see "Creating a Polyline" on page 6-10.
 - Click an existing polygon.
- 2. Click Plane ▶ Define plane boundary ▶ By selected closed polyline. 3D-Office calculates a plane surface and applies a boundary based on the chosen polygon (Figure 7-12).

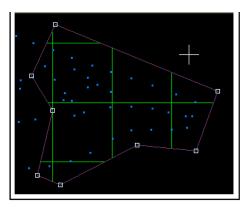


Figure 7-12. Select Polyline and Define Boundary

Notice that the chosen polygon changes color to indicate that it overlays a plane surface boundary.

Deleting a Plane Surface

Only delete a surface when the data it contains will not be needed again. If necessary, save a backup copy of the file before deleting surfaces.

- 1. Click **Plane → Planes** to view all available plane surfaces in the 3D Project.
- 2. Select the plane surface to delete and click **Delete**.
- 3. Press **OK** at the confirmation, then press **OK** on the *Planes* dialog box to apply the change to the file.

Comparing Surfaces

When comparing surfaces, 3D-Office creates and opens a cut/fill file. Surface comparisons are useful for monitoring excavation or for determining the quantity of material that has been imported to, or exported from, the job site.

Comparing Surfaces in the Current File

The compare surfaces in current file option is only available in 3D Project files, not 3D Plane files.

- 1. Click Plane > Compare current plane surface > With other surface in this project.
- 2. On the *Surfaces* dialog box, select the following and click **OK** (Figure 7-13 on page 7-14):
 - The *Surface of type* from the drop down list, either TIN surface, Road alignment surface, or Plane surface. Only the surface types that exist in the project will be available from this list.
 - The desired surface from the surface list

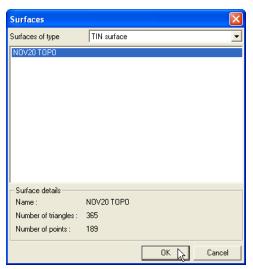


Figure 7-13. Select Surface to Compare

3D-Office compares the two surfaces and opens a Cut/Fill view to display surface comparison information (Figure 7-14).

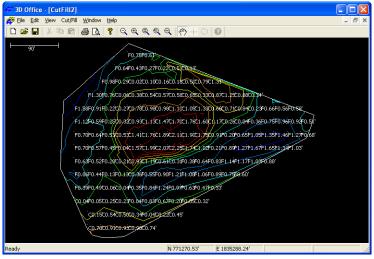


Figure 7-14. Cut/fill View to Compare Surfaces

3. View the cut/fill information. See "Cut/Fill Files" on page 9-1 for details on cut/fill surface files.

- If needed, re-compare the surface files after making desired adjustments in the original 3D surface files (for example, changing the Direction of mainfall for a plane file).
- Save the cut/fill file. Click **File** ▶ **Save as**, navigate to the desired located, type a name for the file, and click **Save**.

Comparing Surfaces in Different Files

- Click Plane > Compare plane surface > With 3D surface file for 3D Plane files or Plane > Compare current plane surface > With 3D surface file for 3D Project files.
- On the *Open* dialog box, navigate to the folder in which the file resides, select the *Files of type* from the drop down list (either TN3 files, PL3 files, or RD3 files), select the desired file and click **OK** (Figure 7-15).

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Files of <u>type</u> :	Topcon TN3 files (*.tn3)	•	Cancel

Figure 7-15. Select Surface to Compare



The selected surfaces must overlap, otherwise, no comparison is possible.

3D-Office compares the two surfaces and opens a Cut/Fill file displaying the compared information (Figure 7-16 on page 7-16).

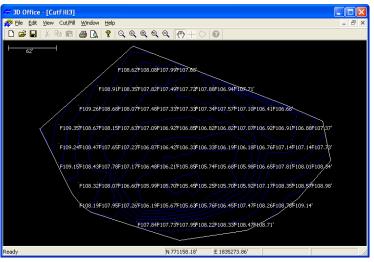


Figure 7-16. Cut/fill File for Compared Surfaces

- 3. View the cut/fill information. See "Cut/Fill Files" on page 9-1 for details on cut/fill surface files.
 - If needed, re-compare the surface files after making desired adjustments in the original 3D surface files (for example, changing the Direction of mainfall for a plane file).
 - Save the cut/fill file. Click **File** ▶ **Save as**, navigate to the desired location, type a name for the file, and press **Save**.

Setting Plane Options

The *Plane options* dialog box sets grid lines for showing the orientation of the mainfall and crossfall and determines if the plane's boundary will display on the Plan View.

- 1. Click **Plane ▶ Options**.
- 2. Select and enter the following information on the *Plane options* dialog box, then click **OK** (Figure 7-17):
 - Enable *Show main-fall and cross-fall grid lines* to show a grid oriented along the main-fall and cross-fall directions.
 - Grid interval sets the spacing between grid lines.
 - Grid orientation rotates the grid. Changing the grid orientation value will also change the main-fall and cross-fall directions shown in the *Plane options* dialog box (Figure 7-17).

Changing the grid orientation value in this dialog box will not alter the location or orientation of the plane in 3D space.

• Enable *Show boundary* to display the boundary.

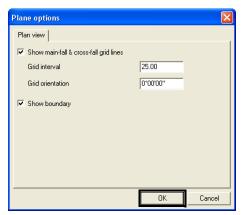


Figure 7-17. Set Plane Surface File Options

Exporting a Plane Surface

If you made changes to a plane file, you can export the changed plane surface to a new plane file or replace a current file with the revised information. This function is the same as the Save as function.



Export versions of the file to track progress.

Exporting to a Plane File

- Click Plane > Export plane surface > To 3D plane file for 3D Plane files or Plane > Export current plane surface > To 3D plane file for 3D Project files.
- 2. On the *Save As* dialog box, type a name for the new plane surface file or select a plane file to replace. Click **OK** to export the file (Figure 7-18).

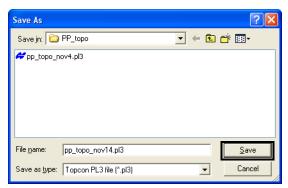


Figure 7-18. Save Plane File

Exporting to a Pocket-3D Controller

To use the plane surface file in the field, export it to a Pocket-3D controller.

- 1. Connect the Pocket-3D controller to the computer and turn on the controller (see Appendix A for details). Run Pocket-3D on the controller.
- With a plane surface file open, click Plane > Export plane surface > To Pocket-3D controller for 3D Plane files or Plane > Export current plane surface > To Pocket-3D controller for 3D Project files.
- 3. On the *Pocket-3D files* dialog box, do one of the following and click **Save** (Figure 7-19):
 - Select an existing file to replace.
 - Enter a new file name or keep the default file name.

Pocket-3D	files					×
Name		Size (kB)	Created			
File name Files of type	pp_topo	_plane Irface files (*	.PL3)	¥	Save Cancel	

Figure 7-19. Save Plane Surface File to Pocket-3D Controller

Notes:

Grid Files

A grid surface represents elevation at a specific interval and can display changes in elevation and passes by a machine using a range of colors.

Opening a Grid Surface in 3D-Office

3D-Office provides an interface for working directly with grids through grid files (*.GD3). Using a grid, you can add, edit, or delete grids, as well as view grid information.

Opening a Grid File

- 1. Click **File** > **Open** to open a grid surface file in 3D-Office.
- 2. On the *Open* dialog box, navigate to the location of the file, select the file type as Alignment (*.GD3), select the desired file, and press **Open**.

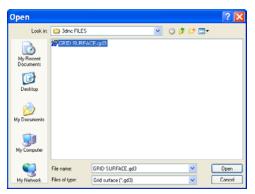


Figure 8-1. Open a Standalone Grid File

The file opens on the 3-Office main screen (Figure 8-2 on page 8-2).

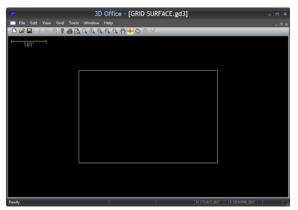


Figure 8-2. 3D Grid Main Screen

Grid Properties

To view grid properties, click **Grid > Grid Properties**. The *Grid surfaces* dialog box displays parameter and display information about the selected grid surface. See "Viewing Grid Information" on page 8-10 and Figure 8-15 on page 8-11 for more details.

Tools Menu Options

The Tools menu provides tools to measure a distance or area in the plan view, show surface elevation, and compare surfaces.

Computing the Distance Between Points/Polygons

The measuring tool computes distances between points and areas of polygons. For example, this tool can be used to determine the length along a route or to measure the area of a building pad.

 WIth a 3D Project file open, click Tools ▶ Measure distance/ area (Figure 8-3 on page 8-3). A check mark displays next to the menu option.

Тоо	ls
	Measure distance/area
Show surface elevations	
	Compare Surfaes

Figure 8-3. Compute the Distance/Area of the Grid Surface

The polygon cursor is automatically selected and a pop-up box displays running length and bearing (Figure 8-4).

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Figure 8-4. Tools Menu – 3D Grid Main Screen

- 2. Click at a point to begin the measurement. Move the polygon cursor to the next point and click until the desired distance or area has been delineated.
 - When measuring a distance, the length of the drawn line displays (Figure 8-5 on page 8-4).

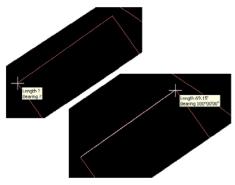


Figure 8-5. Measuring Distance

• When measuring an area, click three or more points, then return the polygon cursor to the starting point to complete the polygon. The polygon perimeter length and its area display in the pop-up box (Figure 8-6).

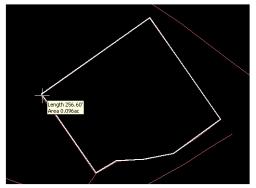


Figure 8-6. Measuring Area

3. To quit the routine, click **Tools ► Measure distance/area**, click one of the selection tools, or press the **Esc** key to end the operation.

Displaying Surface Elevation

1. To display surface elevation anywhere within the grid surface, click **Tools ▶ Show surface elevations** (Figure 8-7).

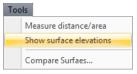


Figure 8-7. Show Surface Elevations

2. Select an area of the grid surface and right-click on the mouse to display the elevation of the grid surface (Figure 8-8).

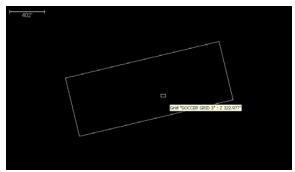


Figure 8-8. Display the 'Z" Elevation of the Grid Surface

3. Click **Tools** ► **Show surface elevations** again or press **Esc** to end the routine.

Comparing Grid Surfaces

To compare grid surfaces, click **Tools > Compare surfaces.**

The Grid Surfaces dialog box displays (Figure 8-9 on page 8-6).

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V SOLDER GRID	3 12/11/208-459	16 PM (No laye		Display: Multi-color de CuUF#I (TirColor) Orn-gaade tolerance (+ Multi-color elevations : Color Origin; 0.0007 Number of passes : Difference from prev. pa	/1 0.200 Color Ini Pass 1	Cut (terval : 1.007 (Pass 2)	Best Fa Best Fa
¢			>	Step : 0.0507		0 an	

Figure 8-9. Compare Grid Surfaces

See "Viewing Grid Information" on page 8-10 and Figure 8-15 on page 8-11 for more information on this dialog box.

Importing a Grid

3D-Office imports grids into 3D Project files from 3D grid files (*.gd3). Follow these steps to import a grid from a 3D Grid file into a 3D Project file.

- With a 3D Project file open, click Grid ▶ Import grid ▶ From 3D grid file (*.GD3).
- 2. On the *Open* dialog box, navigate to the location of the desired file, select it, and click **Open** (Figure 8-10). The information from the selected file is added to the 3D Project file.

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🚝 Grid1.gd3			
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Files of <u>type</u> :	Topcon GD3 files (*.gd3)	•	Cancel

Figure 8-10. Open 3D Grid File

3. On the *Open* dialog box, navigate to the location of the file, select the file type as Grid surface (*.GD3), select the desired file, and click **Open** (Figure 8-11).

Open					? 🗙
Look jn: 障	PP_topo	•	← 🗈	Ċ	
🗱 Grid 2.gd 3					
File <u>n</u> ame:	Grid2.gd3				<u>O</u> pen
Files of type:	Grid surface (*.gd3)		•		Cancel

Figure 8-11. Open Grid File

Creating a Grid Surface

A grid surface represents elevation at specific intervals, and two types of grid surfaces can be created in 3D Project files. Using the selection rectangle option, a rectangle is drawn on the surface that is aligned north-south and east-west. Using the rotated rectangle selection, a line is first drawn to show the orientation from start to end, then a rectangle can be drawn with that same orientation.

- Click Grid ➤ Create new grid ➤ From selection rectangle or Grid ➤ Create new grid ➤ From rotated rectangle.
- 2. On the Plan View, click and draw a rectangle around the area from which to create a grid surface. The width and height of the new grid displays in the pop-up box (Figure 8-12). When done, the *New Grid* dialog box displays (Figure 8-13 on page 8-9).

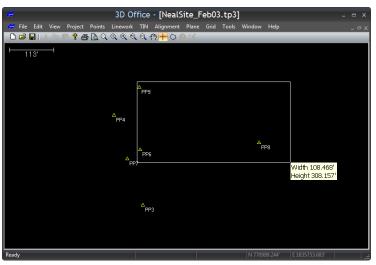


Figure 8-12. Draw Rectangle for New Grid Surface

- 3. On the *Parameters* tab, enter the following parameters for the grid (Figure 8-13 on page 8-9):
 - Name enter a name for the new grid surface.
 - Layer select a layer in which to store the grid surface.
 - Visible select whether or not the grid surface is visible, or if it will be visible by layer.
 - Origin X/Y enter the X/Y origin of the grid surface. This is the point that represents the bottom-left corner of the rectangle.
 - Dimension X/Y enter the X/Y dimensions of the grid. These values determine the size of the grid surface and affect the Extents X/Y values.
 - Orientation enter the orientation of the grid surface from the bottom left to bottom right corners. This should be the same line drawn for a rotated rectangle grid.
 - Interval enter the interval for grid lines.

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Parameters	Parameters Di	play			
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	Visible :	Yes 💌]		
	Origin X :	1835025.645'	Orientation :	0°00'00"	
	Origin Y :	770829.665'	Interval :	10.000'	
	Dimension X :	18	Extents X:	180.000'	
	Dimension Y :	25	Extents Y:	250.000'	
				ок 📐	Cancel

Figure 8-13. Enter New Grid Parameter Information

- 4. On the *Display* tab, enter the following display information for the grid (Figure 8-14 on page 8-10):
 - Display select one of the following displays to use for grid surface information.
 - Tri-color differences to TIN surface: shows differences to the surface in three colors.
 - Multi-color differences to TIN surface: shows differences to the TIN surface in multiple colors.
 - Multi-color elevations: shows colored elevation contours at the entered interval.
 - Number of passes: shows a different color for each pass of a machine.
 - Previous pass height diff: shows the elevation difference between the previous pass and the current pass.
 - Cut/Fill (Tri-Color) enter a (+/-) value for *On-grade tolerance*, then press the **Cut**, **On grade**, and **Fill** buttons to select a color from the *Color Selection* screen to represent each one.
 - Multi-color elevations:
 - Color Origin: enter the elevation that appears as the center contour.
 - Color Interval: enter the elevation difference between contours.

- Best Fit press to use the highest and lowest elevation within the grid to calculate the optimal color origin/ interval to cover the grid surface evenly.
- Number of passes press either **Pass 1**, **Pass 2**, **Pass 3**, or **Pass 4** and select a color to represent each machine pass.
- Difference from prev. pass press the less than/greater than button to change the color for up to four passes.
 - Step: enter the step difference (size of elevation change between each stage) between passes.

New Grid	Tri-color differences to TIN surface
Parameters Display	Tri-color differences to TIN surface
Display. Tri-color differences to TIN surface	Multi-color differences to TIN surface
Cut/Fill (Tri-Color)	Multi-color elevations
On-grade tolerance (+/-) 0.200' Cut On grade Fill	Number of passes Previous pass height diff.
Multi-color elevations :	The vious pass height diff.
Color Origin: 0.000' Color Interval: 0.500' Best Fit	
Number of passes : Pass 1 Pass 2 Pass 3 Pass 4	
Difference from prev. pass : <0.050' <0.100' <0.150' >0.150'	
Step : 0.050'	
OK Cancel	

Figure 8-14. Enter New Grid Display Information

5. Click **OK** to save the grid surface.

Display Tab

Viewing Grid Information

To view 3D Project and 3D Grid grid surfaces, click **Grid** > **Grid surfaces**. The *Grid surfaces* dialog box displays parameter and display information about the selected grid surface (Figure 8-15 on page 8-11).

On the Grid groups by location panel:

• Origin X/Y – enter the X and Y origin of the grid surface (the point that represents the bottom-left corner of the rectangle).

- Rotation enter the orientation of the grid surface from the bottom left to bottom right corners. This should be the same line drawn for a rotated rectangle grid.
- Interval enter the interval for grid lines.
- Dimension X/Y enter the X and Y dimensions of the grid, which determines the size of the grid surface.
- Total area enter the total sum for the area.

On the Grid surfaces in groups panel:

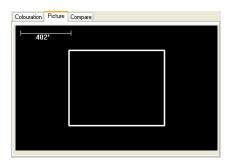
The columns to the left shows the name of the grid, the date of creation, layers (if any), the date the grid surface was updated, any active cells and the active area pertaining to the grid surface.

- **Copy** press to produce multiple versions of a grid surface (useful for reducing an existing grid into one or more subregions)
- **Delete** press to delete a grid surface.
- Set current press to set current grid to the active surface.
- Compare press to compare grid surfaces.

The Colouration Tab: See Figure 8-14 on page 8-10, Step 4 to set parameters for the *Colouration* tab.

Grid groups by location	MC C						
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Figure 8-15. Grid Surface Dialog Box



The Picture Tab: shows a graphical display of the grid surface.

Figure 8-16. Graphical Display of the Grid Surface

On the *Compare* Tab, enter the following parameters to compare surfaces:

- From/To press to select the surfaces to compare.
- Cut Area/CUT VOLUME cut value given after comparing two grid surfaces.
- Fill Area/FILL VOLUME fill value given after comparing two grid surfaces.
- Swap To/From press to swap selected grid surfaces that are being compared.
- Clear All press to clear all selected grid surfaces.
- **Calculate** press to calculate the value for comparing grid surfaces.
- **Export** press to export the grid cut/fill plot.

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<			>
	Swap To/From	Clear All	Calculate
Swell factor for "fill" \	volumes: 1.000		Export

Figure 8-17. Compare Surfaces

Editing a Grid Surface

- 1. On the *Grid surfaces* dialog box, select the grid surface to edit (Figure 8-18 on page 8-14).
- 2. Change or edit the following parameters as needed:
 - The name of the grid surface.
 - The layer in which the grid surface exists.
 - If the grid surface is visible, not visible, or visible by layer.
 - The color of the triangles, perimeter, or contours of the TIN surface (click the element's button and select a new color).
 - The origin of the grid surface.
 - The size of the grid surface (the also affects the extents).
 - The orientation of the grid surface.
 - The interval of the grid lines.
- 3. Change or edit the following display information as needed:
 - If using multi-color elevation display type, the color origin and/or interval.
 - If using the number of passes display type, the color for up to four passes.
 - If using the difference from a previous pass display type, you can display the color for up to four passes. Enter the step difference between passes.
- 4. Click **OK** to save the changes and apply then to the selected surface.

Copying a Grid Surface

The copy function provides a way to produce multiple versions of a grid surface, which may be useful for reducing an existing grid into one or more sub-regions. Selecting a grid surface and clicking **OK** will display the grid in design view.

- 1. On the *Grid surfaces* dialog box, select the grid surface to copy and click **Copy** (Figure 8-18 on page 8-14).
- 2. Type a unique name for the new grid surface and press **Enter** (Figure 8-18 on page 8-14).

- 3. Make any desired changes as described in "Editing a Grid Surface" on page 8-13.
- 4. To view or edit the copied grid surface, select it and press **OK**.

You can now make changes to the grid surface, then export for use in another file.

Figure 8-18. Copy and Name Grid Surface

Deleting a Grid Surface

Only delete a surface when the data it contains will never be needed again. If necessary, save a backup copy of the file before deleting surfaces.



Deleting a surface will also delete all of its contents.

- 1. On the *Grid surfaces* dialog box, select the grid surface to delete and click **Delete**.
- 2. Click **OK** to confirm the deletion (Figure 8-19 on page 8-15).

To undo the deletion, click **Edit ▶ Undo edit grid surfaces** or press **Ctrl+Z**.



Figure 8-19. Delete Grid Surface

Loading a Grid Surface from a TIN Surface

3D-Office can load the 3D Grid surface with interpolated data from a TIN surface. A TIN surface must exist in the 3D Project file. You can select to either match the color origin/interval from the TIN file, or to enter a new color origin/interval for the Grid surface.

To load a grid surface from a TIN surface, click **Grid → Load current** grid → Load from TIN surface.

The *Load grid from TIN surface* dialog box displays (Figure 8-20 on page 8-16).

- TIN surface select a TIN surface from the drop-down list from which to load data.
- On the *Colouration* panel:
 - Match TIN color origin: check mark this box to match TIN color origin.
 - Match TIN color interval: check mark this box to match TIN color interval.
 - Color origin: enter the color origin.
 - Color interval: enter the color interval.

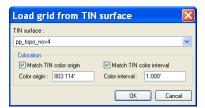


Figure 8-20. Load Grid Information from TIN Surface

The Grid surface will load with information from the TIN surface (Figure 8-21).

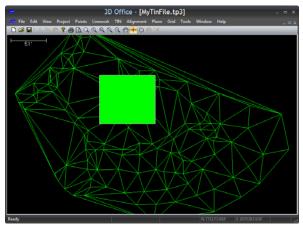
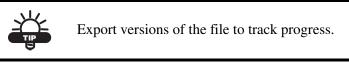


Figure 8-21. Grid Surface Loaded with TIN Information

Removing Grid Data To clear loaded TIN surface grid information, click **Grid ▶ Remove grid data ▶ Remove all grid data**, then press **OK** at the confirmation.

Exporting a Grid Surface

If you made changes to a grid surface, you can export the changed surface to a new grid surface file, or replace an existing file with the new information.



- 1. Click Grid > Export current grid > To 3D grid file (*.GD3).
- 2. On the *Save As* dialog box, do one of the following (Figure 8-22):
 - To export to an existing TIN file, navigate to the location of the file and select it, then click **Save** (the contents of the existing file are replaced).
 - To save to a new file, navigate to the desired folder, type a name for the new file, and click **Save**.

Save As			? 🗙
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💞 Grid1.gd3 💞 Grid2.gd3			
File <u>n</u> ame:	Grid 3. gd3		Save
Save as <u>t</u> ype:	Topcon GD3 files (*.gd3)	•	Cancel

Figure 8-22. Save Grid Surface File

The selected grid surface overwrites the existing file or creates a new 3D Grid surface file.

Notes:

Cut/Fill Files

Cut/fill files provide relative height information between two surfaces. These files can be used to determine cut and fill volumes between surfaces and to ascertain the high and low excavation areas within a project. 3D-Office creates cut/fill files through the surface comparison function.

Opening a Cut/fill File

3D-Office opens a current cut/fill file or creates cut/fill files through the compare surface function.

- 1. To open a cut/fill file (*.cf3), click **File ▶ Open**.
- 2. On the *Open* dialog box, navigate to the location of the file, select the file type as Cut/fill plot (*.cf3), select the desired file, and press **Open** (Figure 9-1).

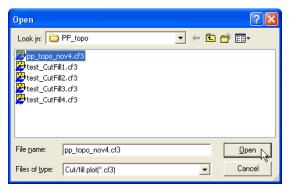


Figure 9-1. Open Cut/fill File

Cut/Fill Main Screen

After opening a Cut/Fill file, the main screen displays (Figure 9-1).



Figure 9-2. The Cut/Fill Main Screen

Viewing Plot Properties

To view the cut/fill plot properties, click **Cut/Fill > Plot properties**. The *Properties* dialog box (Figure 9-3) displays the following parameters:

- Total area of surface model
- Total cut and fill volumes
- Total balanced volume
- Cut/fill minimum and maximum values
- Effective cut/fill ratio (cut to fill volume)

The above information also displays in the title bar when printing the graph.

Properti	es		D	
Total are	a : 1.604ac			
Total cut volume : 1211.910yd®				
Total fill volume : 1242.367yd ^a				
Total balanced volume : 30.457yd² (Fill)				
Cut/fill m	in/max : 1.916' (Fill)	- 3.564' (Cut)		
Effective	cut-fill ratio : 0.98			
	Save	Print	Close	

Figure 9-3. Plot Properties

Saving Plot Properties

- Click Cut/Fill ▶ Plot properties and press Save (Figure 9-4 on page 9-3).
- 2. Navigate to the location in which to save the text file, enter a name for the file, and press **Save**.

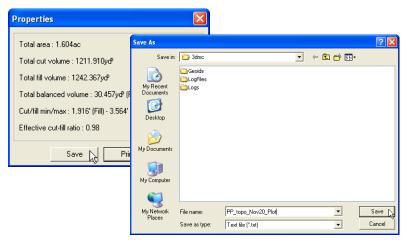


Figure 9-4. Save Plot Properties As Text File

Printing Plot Properties

- 1. Click **Cut/Fill → Plot properties** (Figure 9-5).
- 2. On your system's print dialog box, select desired settings and press **Print**.

Properties	×
Total area : 1.604ac Total cut volume : 1211.910yd ^a Total fill weberg : 1222.027yd	
Total fill volume : 1242.367yd ^e Total balanced volume : 30.457yd ^e (Fill) Cut/fill min/max : 1.916' (Fill) - 3.564' (Cut)	
Effective cut-fill ratio : 0.98	
Save Print Close	

Figure 9-5. Print Plot Properties As Text File

Creating a Cut/fill File

Cut/fill files are created through the compare surfaces function using TIN surfaces, plane surfaces, or road alignments in a 3D Project file. The "compare surfaces in current file" option is only available in 3D Project files.

- 1. Click one of the following menu options to compare two surfaces in the same file.
 - Plane > Compare current plane surface > With other surface in this project
 - TIN > Compare current TIN surface > With other surface in this project

2. On the *Surfaces* dialog box, select the Surface type from the drop-down list and press **OK** (Figure 9-6).

Surfaces			
Surfaces of type	TIN surface		•
NOV20 TOPO			
Surface details			
Name :	NOV20 TOPO		
Number of triangles :	365		
Number of points :	189		
		ок 📐	Cancel

Figure 9-6. Select Surface to Compare

3D-Office compares two surfaces and opens a Cut/Fill file to display contours and/or a grid of cut/fill values, depending on the display settings (Figure 9-7).

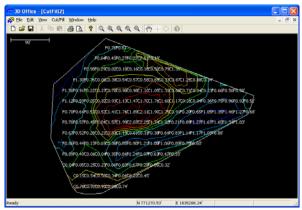


Figure 9-7. Cut/fill File for Compared Surfaces

3. Save the cut/fill file. Click **File ►** Save as, navigate to the desired located, type a name for the file, and press Save.

Comparing Surfaces in Different Files

Saving surfaces in different files allows you to track grading progress. 3D-Office supports this approach to project management through the compare surface function. Comparing surfaces in different files creates a cut/fill file of the highs and lows of the overlapping surfaces.

- 1. Depending on the type of file open, click one of the following:
 - For 3D Plane files, click Plane > Compare plane surface > With 3D surface file
 - For 3D TIN files, click TIN > Compare TIN surface > With 3D surface file
 - For 3D Project files, click Plane > Compare current plane surface > With 3D surface file or TIN > Compare current TIN surface > With 3D surface file
- On the *Open* dialog box, navigate to the folder in which the file resides, select the *Files of type* from the drop down list (either TN3 files, PL3 files, or RD3 files), select the desired file and click OK (Figure 9-8).



Figure 9-8. Select Surface to Compare



No comparison is possible unless the selected surface file overlaps with the current surface.

3D-Office compares the two surfaces and opens a Cut/Fill view displaying the results of the comparison (Figure 9-9).

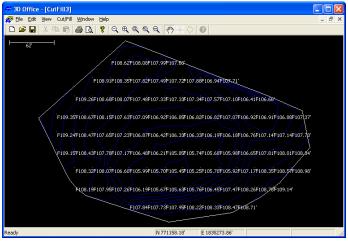


Figure 9-9. Cut/fill File for Compared Surfaces

- 3. View the cut/fill information. See "Cut/Fill Files" on page 9-1 for details on cut/fill surface files.
 - If needed, re-compare the surface files after making desired adjustments in the original 3D surface files (for example, changing the Direction of mainfall for a plane file).
 - To save the Cut-Fill file, click **File** ► **Save as**, navigate to the desired located, type a name for the file, and press **Save**.

Setting Plot Options

The *View Options* dialog box sets various cut/fill display options, and the type of units to use for various project quantities.

- 1. With a cut/fill file open, click **Cut/Fill ▶ Plot options**.
- 2. On the *Cut/fill* tab, select and enter the following information (Figure 9-10 on page 9-9):
 - *Show boundaries* enable to display the boundary of the surface.
 - *Show breaklines* enable to display any breaklines in the surface definition.
 - *Show grid of cut/fill values* enable to display a grid of cut/ fill values.
 - *Grid interval* enter a value to set the spacing of the cut/fill grid lines.
 - *Show contours* enable to display contours of the cut/fill surface.
 - *Show solid colored regions* enable to display the cuts and fills as solid colors. The color grid describes the colors associated with a cut/fill value.
 - *Color interval* enter a value to change the cut/fill range value associated with the corresponding color.
- 3. See "Setting Project Units" on page 2-35 for a description of the fields on the *Units* tab ("Set Cut/fill View Options" on page 9-9).

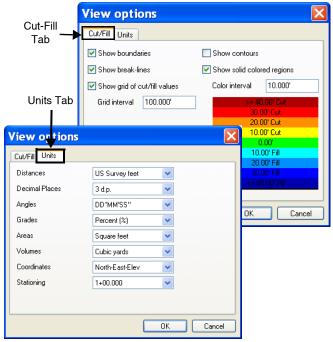


Figure 9-10. Set Cut/fill View Options

Notes:

Connecting a Computer to a Controller

Connecting the Pocket-3D controller and a computer will allow files to be transferred between devices for jobsite and file management.

Connect your device and computer using the desired connection method: serial cable, USB cable (Figure A-1), ethernet cable to connect to a network, or Bluetooth® wireless technology.

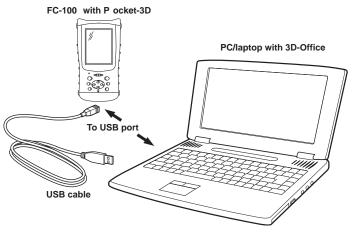


Figure A-1. Connect Controller and Computer

Regardless of the connection method, Microsoft® ActiveSync® must be installed on the computer to transfer data between a Pocket-3D controller and a computer with 3D-Office. ActiveSync establishes a connection between the computer and a mobile device, such as a TPS Controller. The mobile device must have the Windows CE operating system. ActiveSync is available free of charge from the Microsoft website (http://www.microsoft.com). Follow the procedure below to establish a connection between the computer and a Pocket-3D controller using Microsoft ActiveSync.

- 1. If needed, download and install Microsoft ActiveSync, following the on-screen instructions from microsoft.com and the ActiveSync Install Wizard.
- 2. Connect your device and computer using the desired connection method (serial cable, USB cable, ethernet cable to connect to a network, or Bluetooth® wireless technology).
- 3. Switch on the Pocket-3D controller and computer.
- 4. Start Microsoft ActiveSync.
- 5. Click Next on the Get Connected dialog box (Figure A-2).



Figure A-2. Connect Using ActiveSync

The computer establishes a connection with the device. If the device is switched on, the *Connected* dialog box displays. The system tray also displays a green ActiveSync circle, indicating a successful computer-to-device connection (Figure A-3).

Microsoft ActiveSync	
<u>Eile View Tools H</u> elp	
Image: Sync Image: Stop Image: Stop	Successful Connection
Guest	
Connected	6:16 PM
Information Type Status	

Figure A-3. Connection Established

If the computer has only one COM port:

- 1. Start Microsoft ActiveSync.
- 2. Click File > Connection Settings (Figure A-4).



Figure A-4. Open Connection Settings

- 3. On the *Connection Settings* dialog box, click and enable the following parameters (Figure A-5):
 - "Allow network (Ethernet) and Remote Access Service (RAS) server connection with this desktop computer"
 - "Show status icon in Task bar"



Figure A-5. Connection Settings

In this case, ActiveSync does not request the COM Port after disconnecting the TPS controller from the computer. The COM Port connects the computer with a TPS GPS+ receiver or Total Station. If there are two or more COM ports on the computer:

- 1. Start Microsoft ActiveSync.
- 2. Click **File > Connection Settings**.
- 3. On the *Connection Settings* dialog box, set the following parameters (Figure A-6):
 - click and enable "Allow serial cable or infrared connection to this COM port"
 - select a COM port from the drop-down list (usually COM 1)



Figure A-6. Connection Settings for Multiple COM Ports

In this case, Microsoft ActiveSync requests the COM Port after disconnecting the controller and computer. The COM Port is available only for devices that use the Windows CE operating system.



Use separate COM Ports for computer-to-controller connections and computer-to-receiver/Total Station connections.

When reconnecting the Pocket-3D controller and TPS Controller, use the same serial interface port set in the *Connection Settings* dialog box.

Hot Keys

Table B-1 lists common keyboard shortcuts, or hot keys, for some 3D-Office functions.

Press This	To Perform this Function
Ctrl+A	Selects all (in active view).
Ctrl+C	Copies the selected information to the clipboard.
Ctrl+N	Opens a new 3D Project.
Ctrl+O	Displays the Open dialog box for selecting a file to open.
Ctrl+P	Displays the <i>Print</i> dialog box for printing the Plan View.
Ctrl+S	Saves the project.
Ctrl+V	Pastes copied information to the selected location.
Ctrl+X	Cuts the selected information for pasting to the clipboard.
Ctrl+Y	Redoes the last operation.
Ctrl+Z	Undoes the last operation.
Esc	Quits the Measure distance/area, create new polyline, and TIN profile view functions.
Arrow keys	When in 3D simulation mode, pans the screen left, right, up, and down (also depends on the type of simulation).
=	When in 3D simulation mode for TIN files, zooms in.
-	When in 3D simulation mode for TIN files, zooms out.
F2	When in 3D simulation mode for TIN files, changes the view from inside the machine's cab. When in the Points List view, allows in-place editing.
F3	When in 3D simulation mode for TIN files, changes the view from outside the machine's cab.
F4	When in 3D simulation mode for TIN files, changes the view from above the machine.
Tab	When in 3D simulation mode for TIN files, changes the machine to the next machine in the Machine menu.

Table B-1. AGForm-3D Hot Keys

Hot keys that correspond to a menu option are listed next to that menu option (Figure B-1).

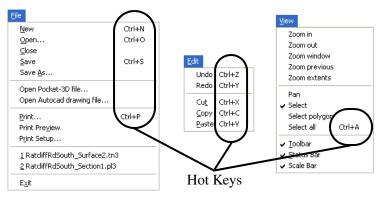


Figure B-1. Menu Examples with Hot Keys

Index

Index

Numerics

3D Project See Project
3D simulation See 3D-view play log 5-17
3D-view 5-16, 6-37 log file 5-17 menus 1-14 options 6-41 simulation options 6-42 toolbar 1-16 view menu 1-8

A

About 3D-Office 1-12, 1-25 ActiveSync A-1-A-4 connections A-2 install A-1 settings one COM port A-3 two COM ports A-4 starting A-2 Alignment 1-10, 6-1 See also Horizontal element See also Templates See also Vertical curve and linework 4-5. 6-10 compare 5-20, 5-21 copy 6-16 create 6-10-6-14 feature line 6-11 generate TIN 5-6 horizontal elements 6-18 import 6-4 open 6-4

print 6-22, 6-27 rename 6-16 template placement 6-13, 6-34 templates 6-28 versions 6-16 vertical curve 6-23 view options 6-41 view profile 6-23 Authorization codes 1-4, 1-25 update 1-25

В

Backup file **1-20** Boundary, create **7-9–7-11**

С

Calculate plane surface 7-4 Calculate coordinates 2-30 Compare plane, boundary note 7-8 Compare surfaces 5-20–5-22, 7-12, 7 - 14generate cut/fill 5-20, 9-4 Control points 1-8, 2-8 accuracy 2-27 add ??-2-11 edit 2-11 location 2-27 Controller, import files A-1 Coordinate system 2-8 Create job 1-13 Create new 3D Project 2-2 Creating a Grid Surface 8-6 Crossfall 7-6, 7-16 Cut/fill plot 5-20, 5-21

generate **7-13**, **9-4**–**9-7** options **9-8** print **1-20** print setup **1-21**

D

DGPS geoids 2-23

Е

Export, text file format 2-13

F

Feature line 6-11 template placement 6-13 templates 6-12 File backup 1-20 geoid 2-30 open 1-18 save 1-19 save as 1-20 XML configuration 2-30

G

Geoid 2-8 Geoid file 2-30 Geoids 2-23 cannot assign 2-23 Grid 8-1 remove data 8-14

Η

Horizontal element **6-18–6-22** add **6-19** delete **6-22** edit **6-21** edit first record **6-21** insert **6-20** print **6-22** view **6-18** Horizontal error **2-10**

Import 3-1, 4-1, 5-1, 6-4, 7-1, 8-1 create format 2-13 from TPS controller A-1 text files 2-13 Insert horizontal element 6-20 vertical curve 6-25 Install 3D-Office 1-1 ActiveSync A-1

L

LandXML 6-4 Layers 2-16 add 2-17 color 2-19 delete project layer 2-18 import points to 3-4 linework 4-1, 4-5, 4-8 point labels 2-19 point location on 3-7 points **3-9** project 2-16 project menu **1-8** Linework 1-9, 4-5, 4-7 and alignment 6-10 convert to alignment 6-10 create 4-5 delete 4-7 layers 4-5, 4-8 use to create TIN 5-7 view 4-7 Localization 2-8, 2-10, 2-25 principle of 2-26 Log file, play 5-17

Μ

Main screen 1-5, 1-12 Mainfall 7-6, 7-16 direction 7-6 Menus 1-6 3D-view 1-8

Index

3D-views **1-14** alignment **1-10** edit **1-7** file **1-7** grid **1-11** linework **1-9** plane **1-11** points **1-9** profile view **1-14** project **1-8** TIN **1-10** tools **1-11** view **1-8** window **1-12**

Ν

NGS 2-23

0

Open 1-18, 6-4 job 1-13 Project 2-2

Ρ

Plane surface 7-1 calculate 7-4 compare 5-20, 5-21, 7-12, 7-14 copy 7-6 create 7-4 grid orientation 7-16 grind interval 7-16 options 7-16 parameters 7-6 rename 7-7 view 7-6 Points 1-9, 3-6 layers 3-9 list view 3-6-3-8 view 3-8 Polvline 6-10, 7-11 See also Linework connectivity 6-10 define boundary 7-11

delete 4-7 draping onto TIN 4-6 multiple 6-10 Print 1-20, 6-22, 6-27 alignment 6-22, 6-27 horizontal elements 6-22 preview 1-21, 6-22, 6-27 setup 1-21, 6-22 vertical elements 6-27 Profile 1-14 Profile view 5-18-5-19, 6-23, 6-39-6-40change view 5-19, 6-40 menu 1-14 quit 5-19, 6-40 Project 1-8, 2-1, 2-2 create 2-2 layers 2-16 open 1-18, 2-2 print 1-20 print setup 1-21 units 2-35 Projection 2-8

R

Road features See Feature line See Templates Rotate grid **7-16**

S

Save as **1-20** Save files **1-13**, **1-19** backup **1-20**

Т

Templates 6-28 add 6-28 add placement 6-35 alignment 6-13 delete 6-33 delete element 6-32 delete placement 6-36

edit 6-14 edit placement 6-36 elements 6-29 multiple 6-14 placement 6-34 Text files horizontal elements 6-22 import/export formats 2-13-2-16 linework 4-7 points 3-8 TIN 5-9 TIN surface 1-10, 5-1, 5-9 3Dsimulation 5-16 compare 5-20, 5-21 copy 5-12, 8-12 draping polylines 4-6 options 5-22 view 5-9 Title block 1-20, 1-21, 1-22 Toolbar 1-12 3D-views 1-16 standard 1-12 Tools 1-11 coordinate calculator 2-30

W

WGS 2-31 Window 1-12

X

XML configuration file 2-30

U

Uninstall 1-3 Units 2-35 for Plane files 9-8 project 2-35

V

Vertical curve 6-23 add 6-24 delete 6-27 edit 6-26 insert 6-25 print 6-27 Vertical error 2-10 View 3D-view 1-8 menu 1-8 profile 5-18-5-19, 6-39-6-40



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