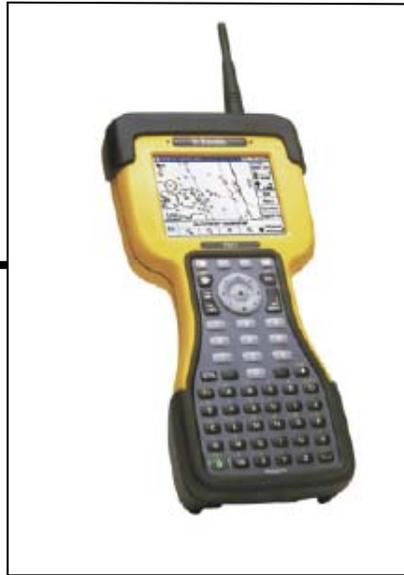
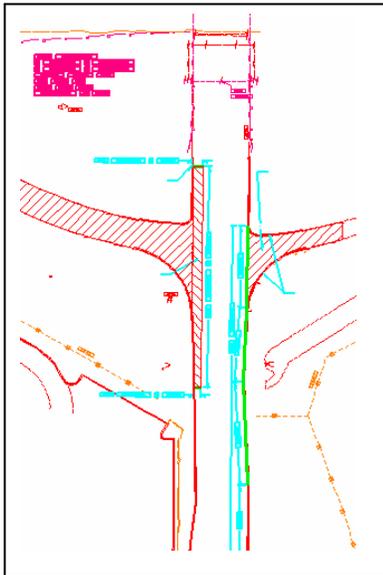




TRAINING MANUAL FOR



DESIGN TO CONSTRUCTION SURVEY AUTOMATION

NOTE: This manual provides a written account of how certain activities are performed and is designed to guide and assist staff members in performing their functions.

When appropriate, there may be deviations from these written procedures due to changes in personnel, policies, interpretation, law, experimentation with different systems, or simply evolution of the process itself.

This manual may be changed at any time. Staff members are encouraged to review this manual periodically and suggest changes in the manual to keep the manual current and to minimize differences between the manual and actual practices.



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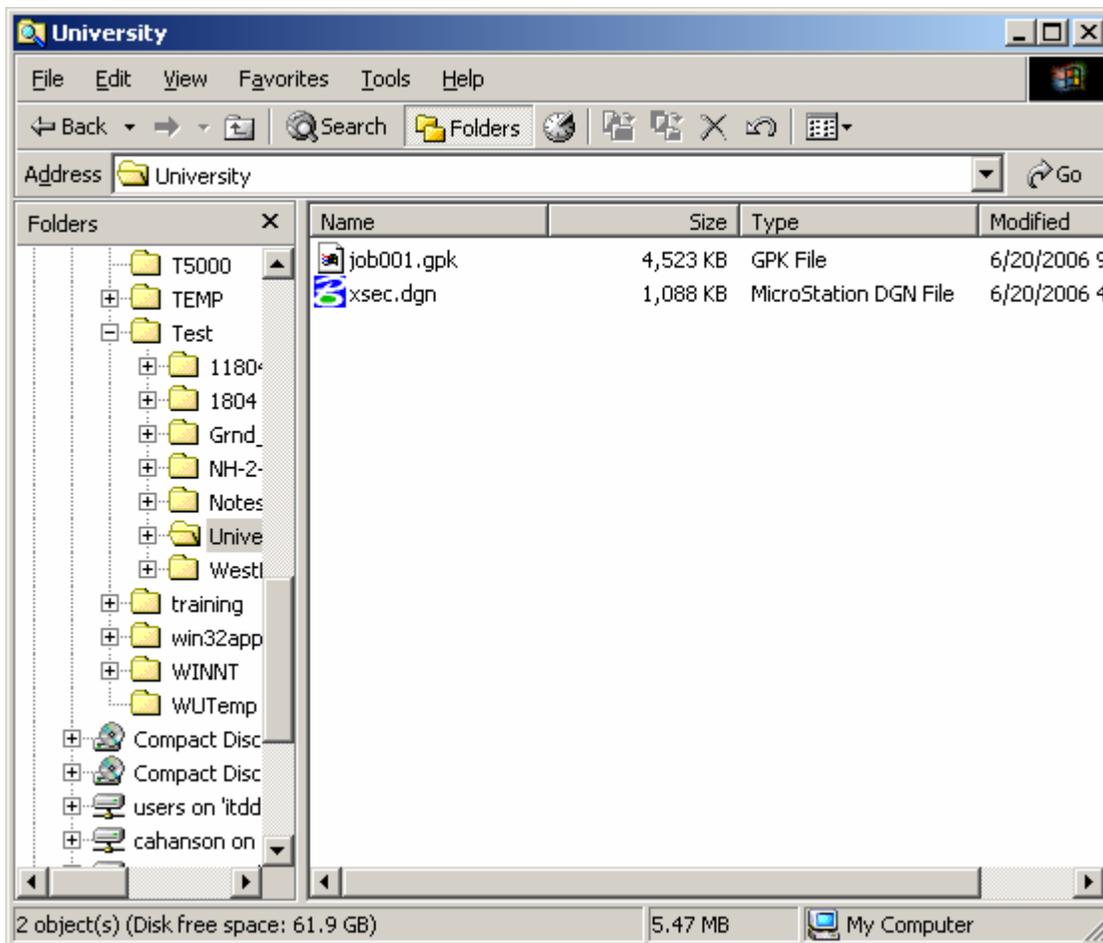


GeoPak GPK Data to Trimble

Step1: Get the cross-section file and the geopak job file from the design folder in the r:\ drive for the project.

Find out from the designer which files were used for cross-sections.
(Usually Microstation file named “xsec.dgn” and geopak file named “job001.gpk”)

Put these two files in a new folder.





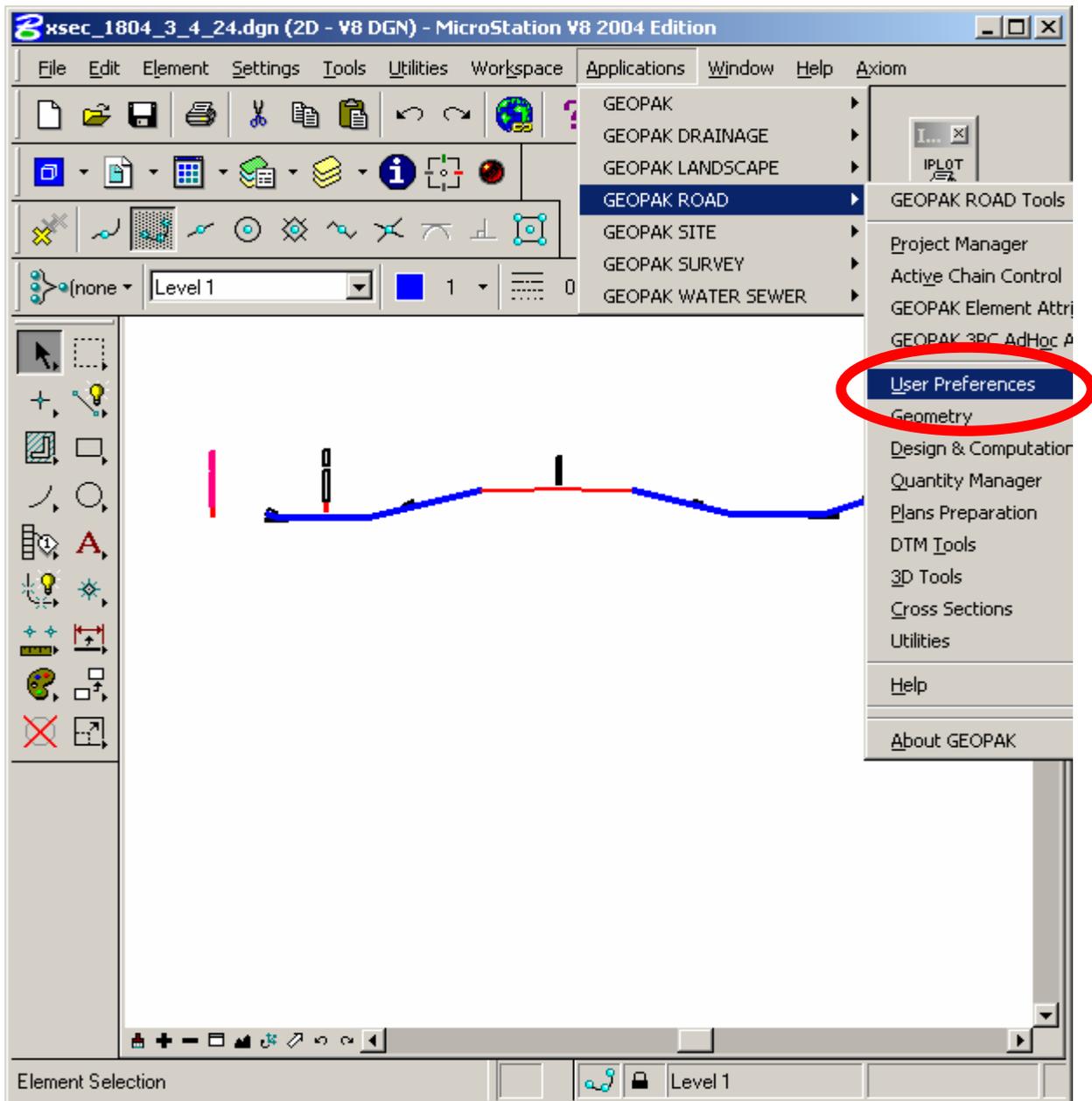
ND DEPT OF TRANSPORTATION SURVEYS & PHOTOGRAMMETRY

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NOTE: Step 2 can be skipped if the gpk files and dgn files are located in the same folder. GeoPak will then default to the working folder. If files are located in different folders, step 2 must be used each time a project is opened.

Step 2: Open “xsec.dgn”.

Open : [Applications-Geopak Road-User Preferences](#)



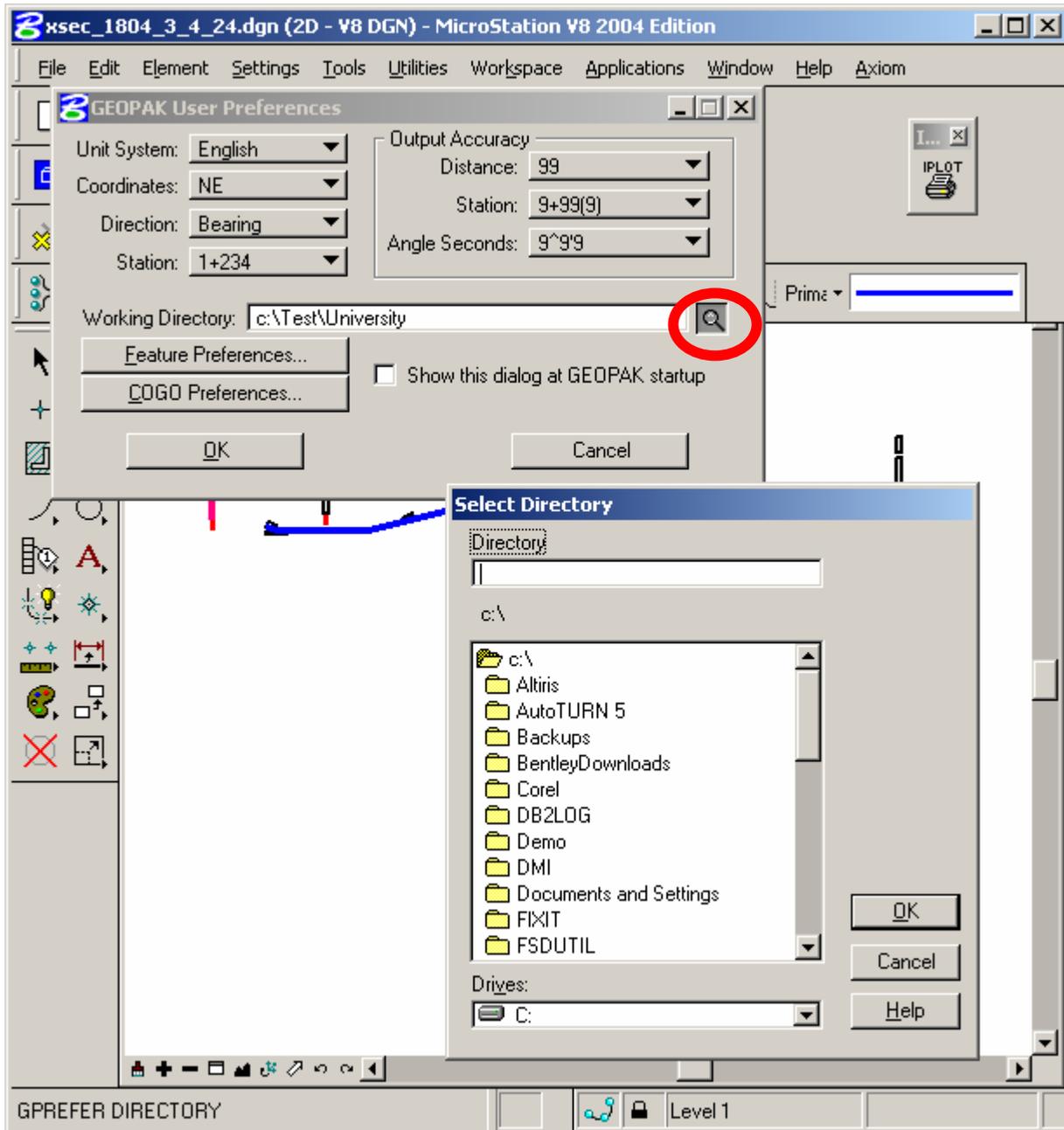


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Step 2 Cont.: Select your working directory: (The folder you made in step 1)

Hit OK

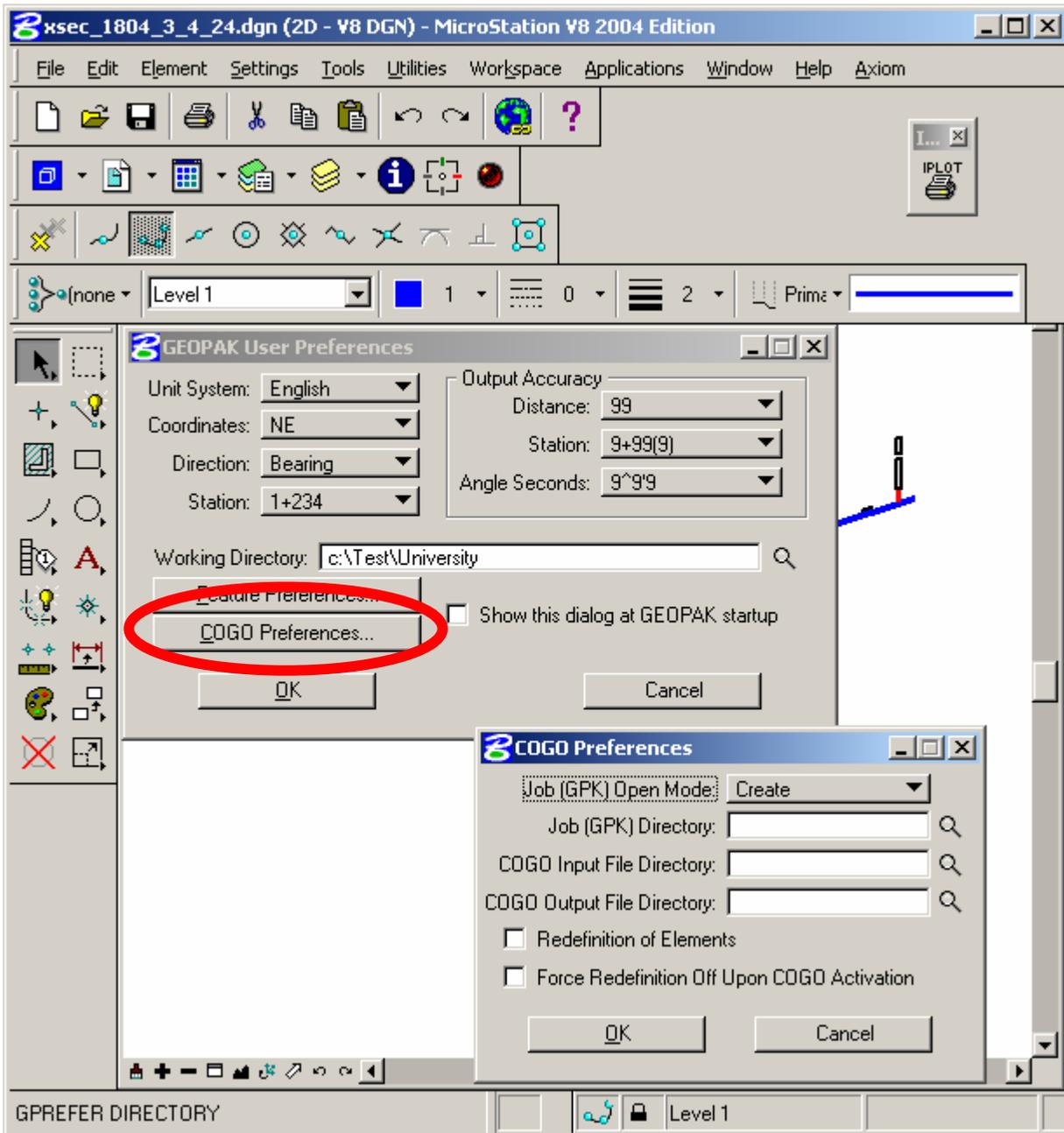




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Click on [COGO Preferences](#) and Change all three directories to your new folder.



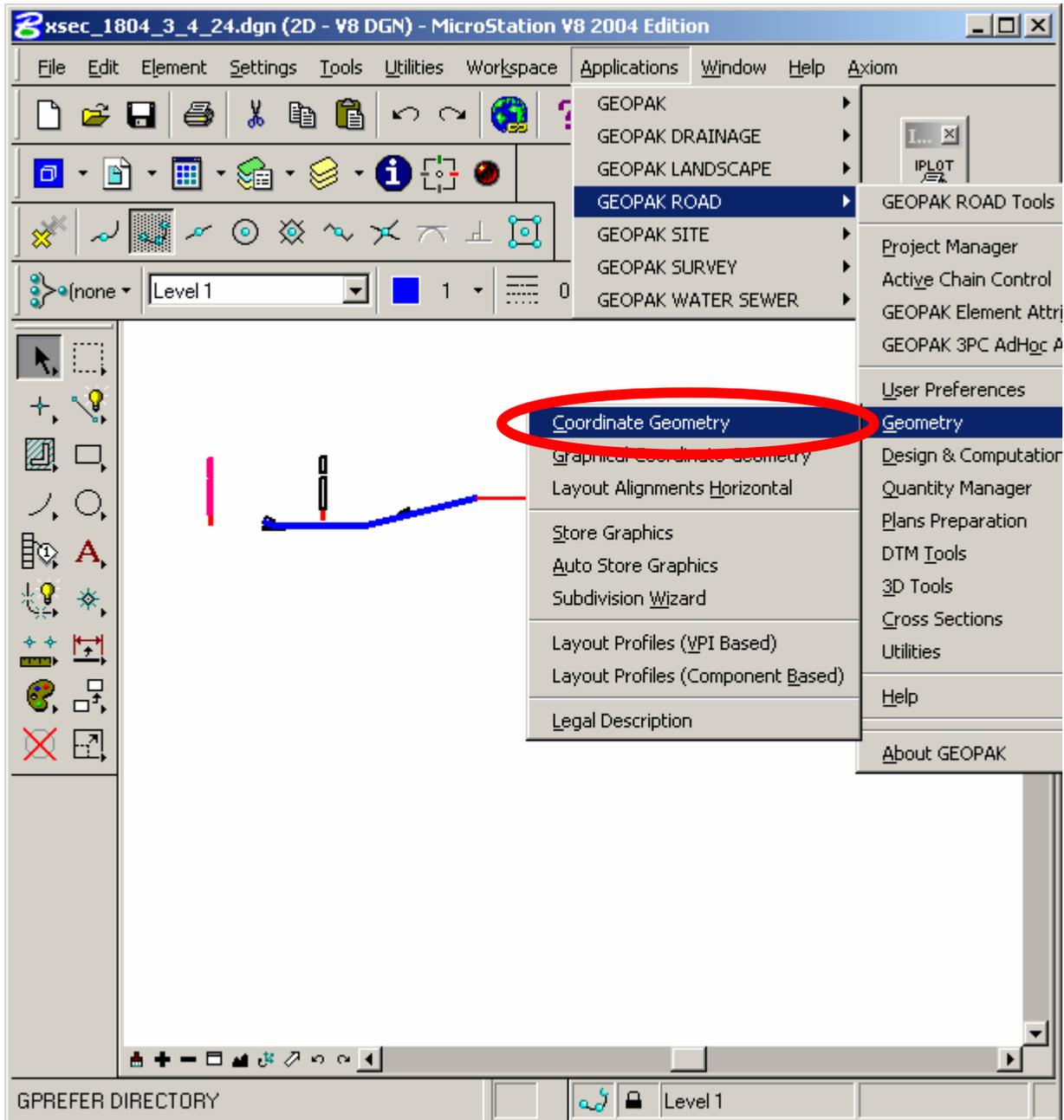


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Step 3: In Geopak, open [Applications-Geopak Road-Geometry-Coordinate Geometry](#).

NOTE: Refer to Chapter 4.1 of the NDDOT CADD Standards for further information.





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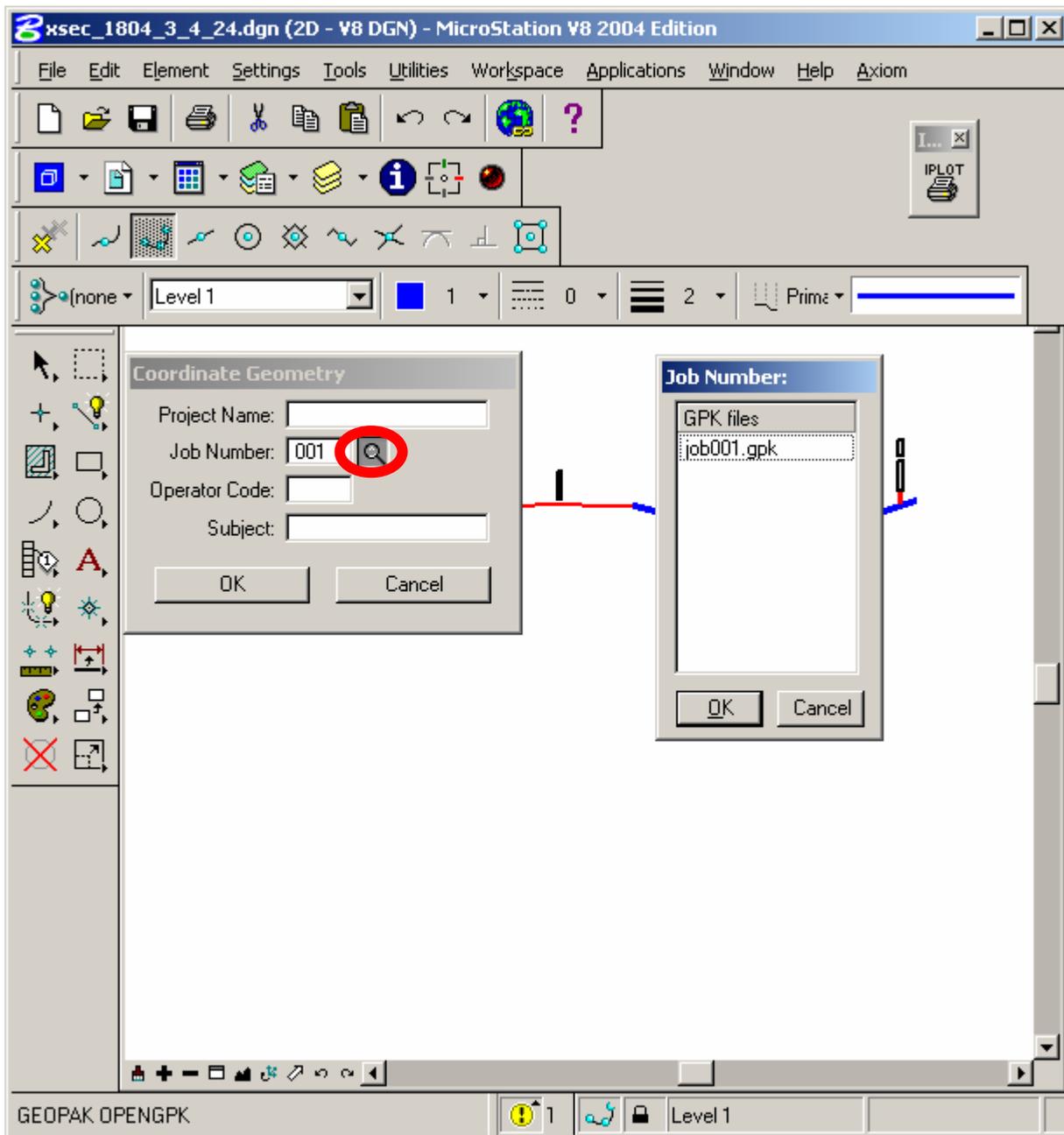
TRAINING SUBJECT: DESIGN TO CONSTRUCTION SURVEY AUTOMATION

Step 3 Cont: Make up a name for the project.

Select the .gpk file where the chains and profiles are stored (Job001.gpk)

Type nd for operator code. You can leave subject blank.

Click [OK](#).

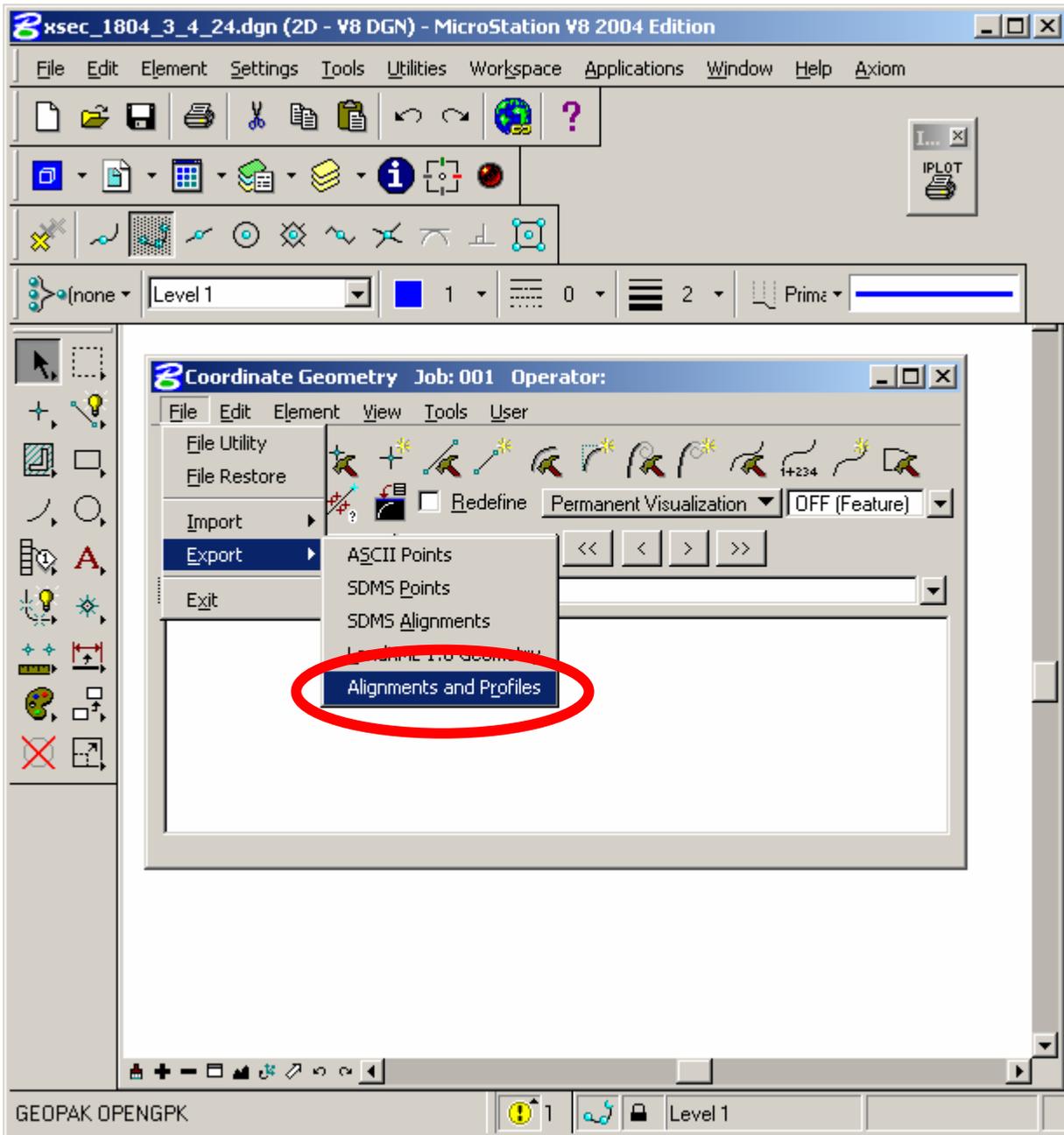




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Step 4: In the Coordinate Geometry Dialog Box, press: File-Export-Alignment and Profiles.



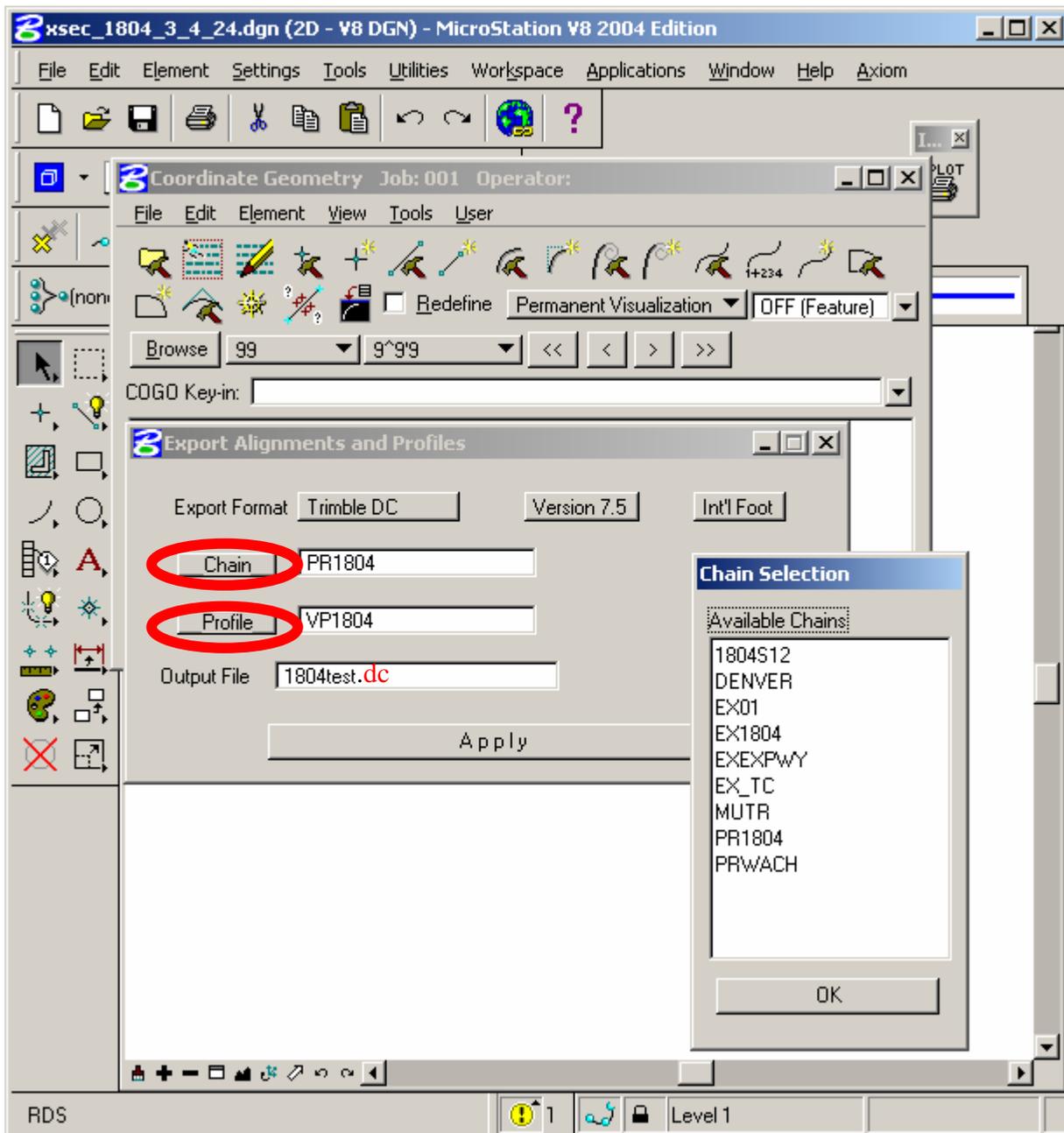


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Step 5: For “Export Format” select TRIMBLE DC, Version 7.5, Intl Foot.
Click on Chain and select the chain, Click on Profile and select the profile.
(There may be several. You will have to check with the designer to know which one to use for the final design and for each alignment)

Make up a name for your new .dc file in the Output File. (Make sure to put the .dc file extension behind the name)





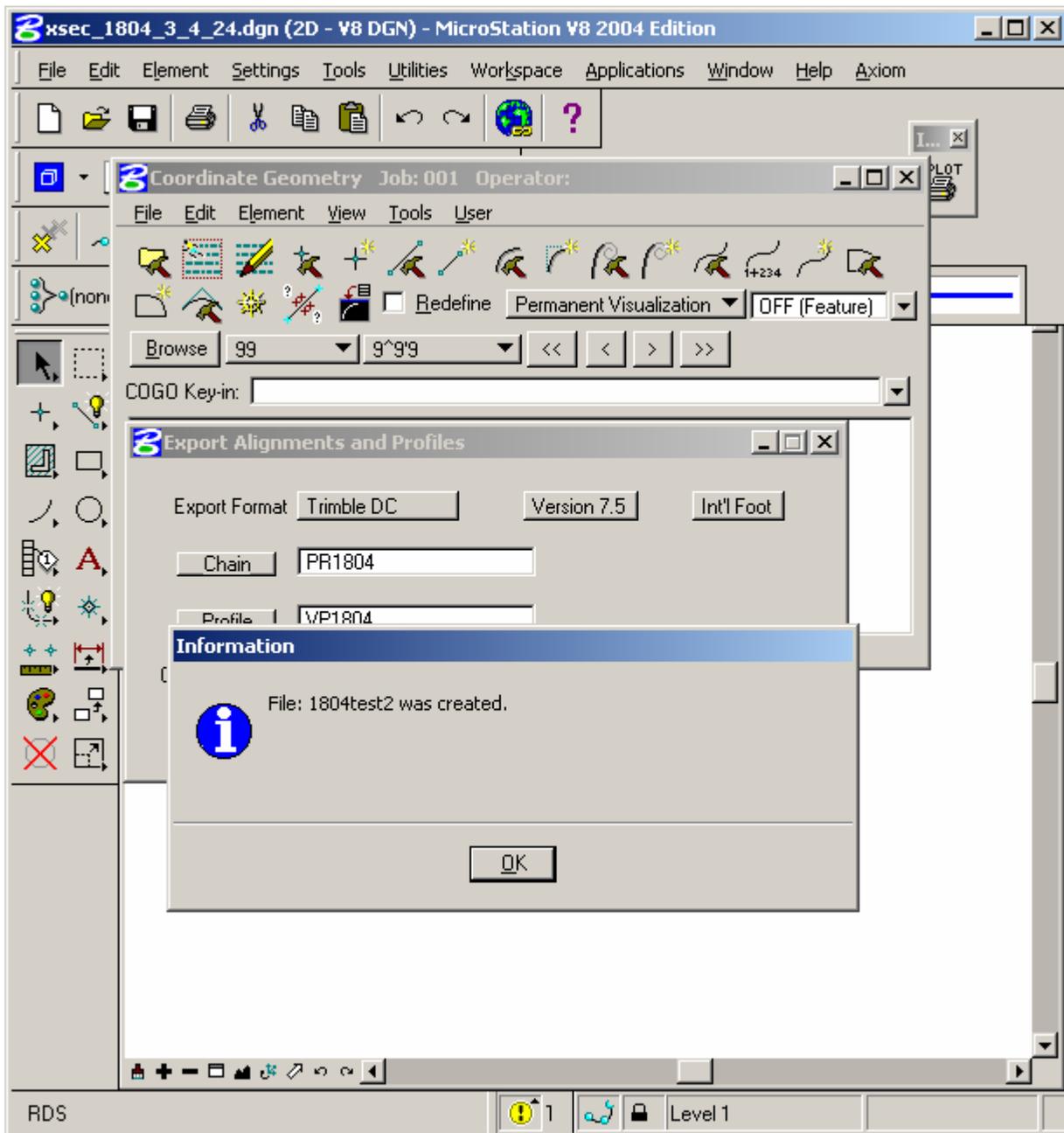
ND DEPT OF TRANSPORTATION SURVEYS & PHOTOGRAMMETRY

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Step 5 Cont.: Click [Apply](#).

Now you have created a “.dc” file in your working directory. Now you can append CrossSection Template information to this file with the following steps.

Hit [OK](#).

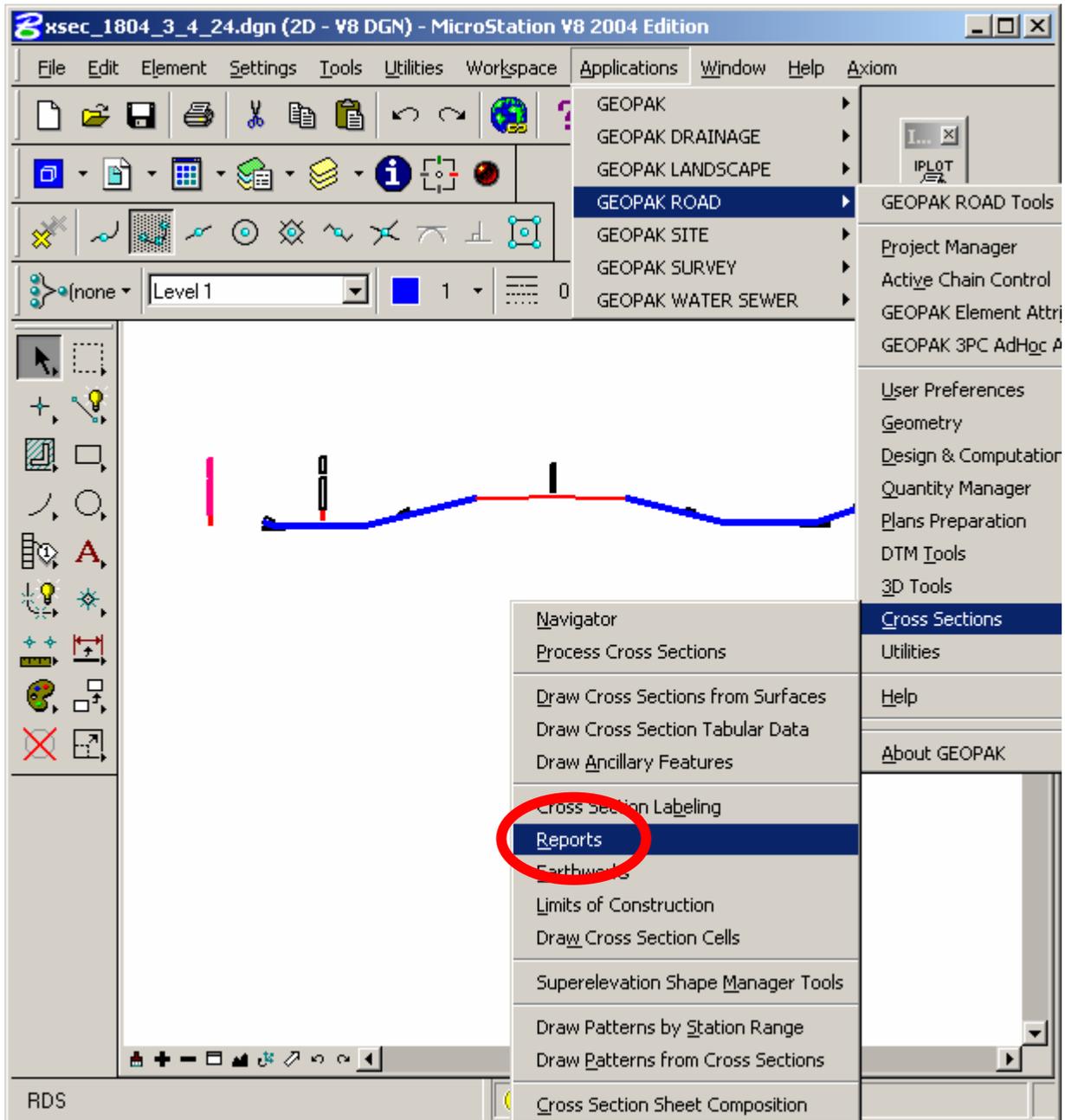




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Step 6: In the xsec.dgn file- Open [Applications-Geopak Road-Cross Sections-Reports](#).

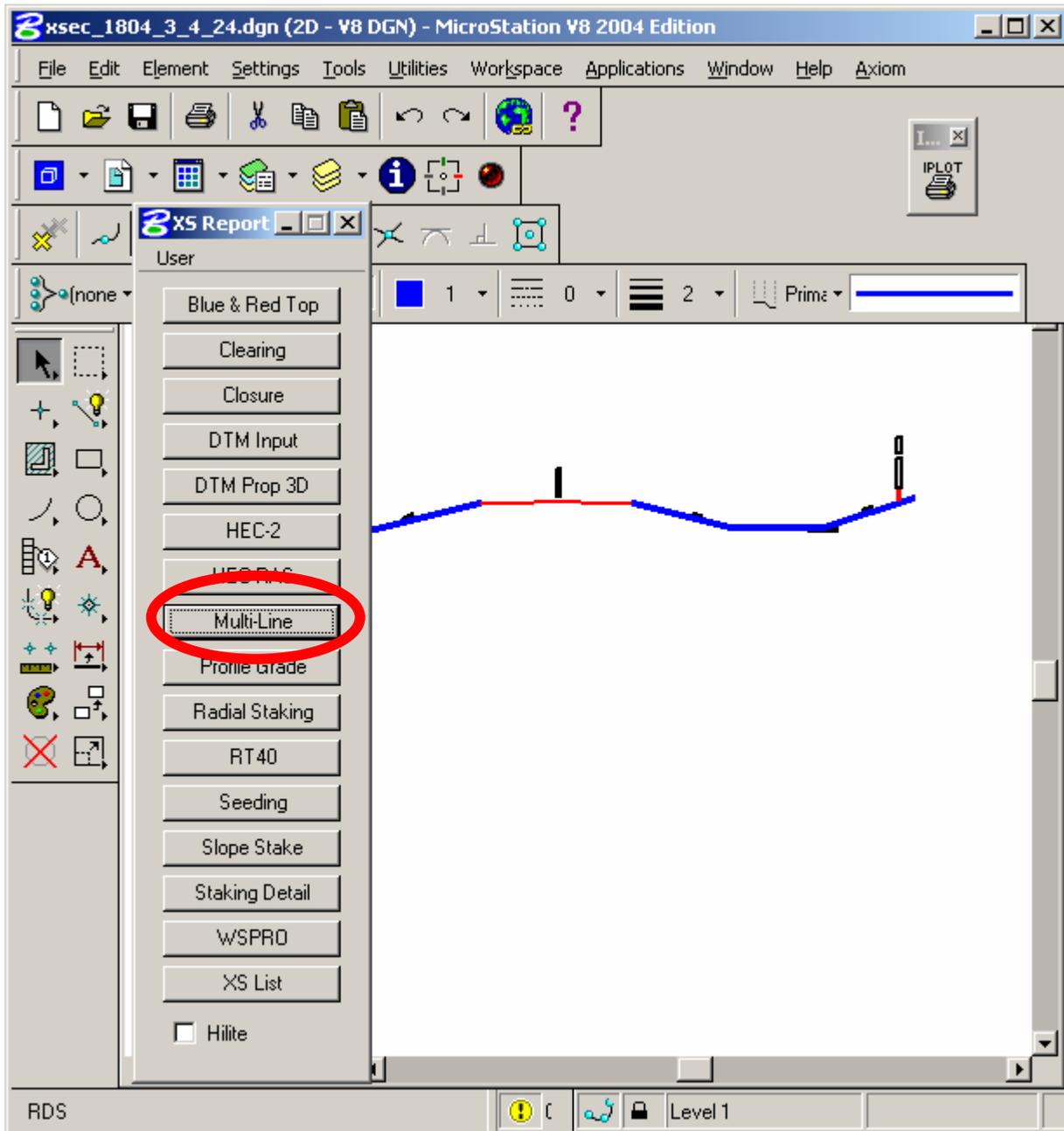




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Select [Multi-Line](#).





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Step 7: Type the Job # where the reference chain or center line chain is stored (i.e. 001)

Select The Chain.

The screenshot shows the MicroStation V8 2004 Edition interface. The main window is titled "xsec_1804_3_4_24.dgn (2D - V8 DGN) - MicroStation V8 2004 Edition". The "Multi-Line Report" dialog box is open, showing the following fields and options:

- File: Job # **001** (circled in red), Chain: P1804_3 (circled in red)
- Beg Sta: 372+261 R 1
- End Sta: 372+261 R 1
- Output Format: TRIMBLE DC
- Horiz Offset: 0.000000
- Version: 7.5
- ASCII File: c:\Test\University\1804test.dc
- Cur Sta: 372+261 R 1
- Buttons: Display, Label, Top, Primary, Apply
- Checkboxes: Hilite, Pause on Each XS

Level	Lv Name	Color	Weight	Style	Lb	T/B	Lv	Co	Wt	LC	P/S



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Step 8: Click on the XS Elements button



The screenshot shows the MicroStation V8 2004 Edition interface with the 'Multi-Line Report' dialog box open. The dialog box has a 'File' section with 'Job' set to '001' and 'Chain' set to 'P1804_3'. It also shows 'Beg Sta' as '372+261 R 1' and 'End Sta' as '380+100 R 1'. The 'XS Elements' section contains a table with columns for Level, Lv Name, Color, Weight, Style, Lb, T/B, Lv, Co, Wt, LC, and P/S. Below the table is the 'XS Elements' button, which is circled in red. Other buttons include 'Display', 'Label *', 'Top', and 'Primary'. The 'Output Format' is set to 'TRIMBLE DC', 'Horiz Offset' is '0.000000', and 'Version' is '7.5'. The 'ASCII File' is 'c:\Demo\Grnd_test\TazTest\TAZ1.dc' and 'Cur Sta' is '372+261 R 1'. An 'Apply' button is at the bottom of the dialog.



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Key in the levels, colors, weights, and/or styles of the proposed section.
(For example: Level 7 on this one describes the roadway surface and Level 59 describes the adjacent slopes) Hit OK and close.

Click the little “add” button  on the right side.

The screenshot displays the MicroStation V8 2004 Edition interface. The main window shows a cross-section profile with a blue line representing the roadway surface and red lines representing adjacent slopes. The Multi-Line Report dialog box is open, showing the following fields:

- Job: 001
- Chain: P1804_3
- Beg Sta: 372+261 R 1
- Output Format: TRIMBLE DC
- Horiz Offset: 0.000000
- Version: 7.5
- ASCII File: c:\Test\University\1804test.dc
- Append: Append
- Cur Sta: 372+261 R 1

The Candidate Elements dialog box is also open, showing the following fields:

- Lv Numbers: 7,59
- Match, Display, and Reset buttons

The Level dialog box is open, showing a grid of levels from 1 to 63. Level 7 is highlighted in the grid. The Multi-Line Report dialog box has a red circle around the 'add' button on the right side.



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Step 9: Select **Append**, the Output Format - **Trimble DC**, and the **Version** you are using.

File Edit Element Settings Tools Utilities Workspace Applications Window Help Axiom

XS Report

User

Blue & Red Top

Clearing

Closure

DTM Input

Multi-Line Report

File

Job 001 Beg Sta 372+261 R 1 372+261 R 1

Chain P1804_3 End Sta 372+261 R 1 380+100 R 1

XS Elements

Level	Lv Name	Color	Weight	Style	Lb	T/B	Lv	Co	Wt	LC	P/S
7.59					*	T		0	0	0	P

XS Elements

Output Format: TRIMBLE DC Horiz Offset: 0.00000

Version: Version 7.5

Pause on Each XS:

Display Only:

ASCII File: c:\Test\University\1804test.dc

Create

Append

Cur Sta: 372+261 R 1

Apply

DLG LISTADD

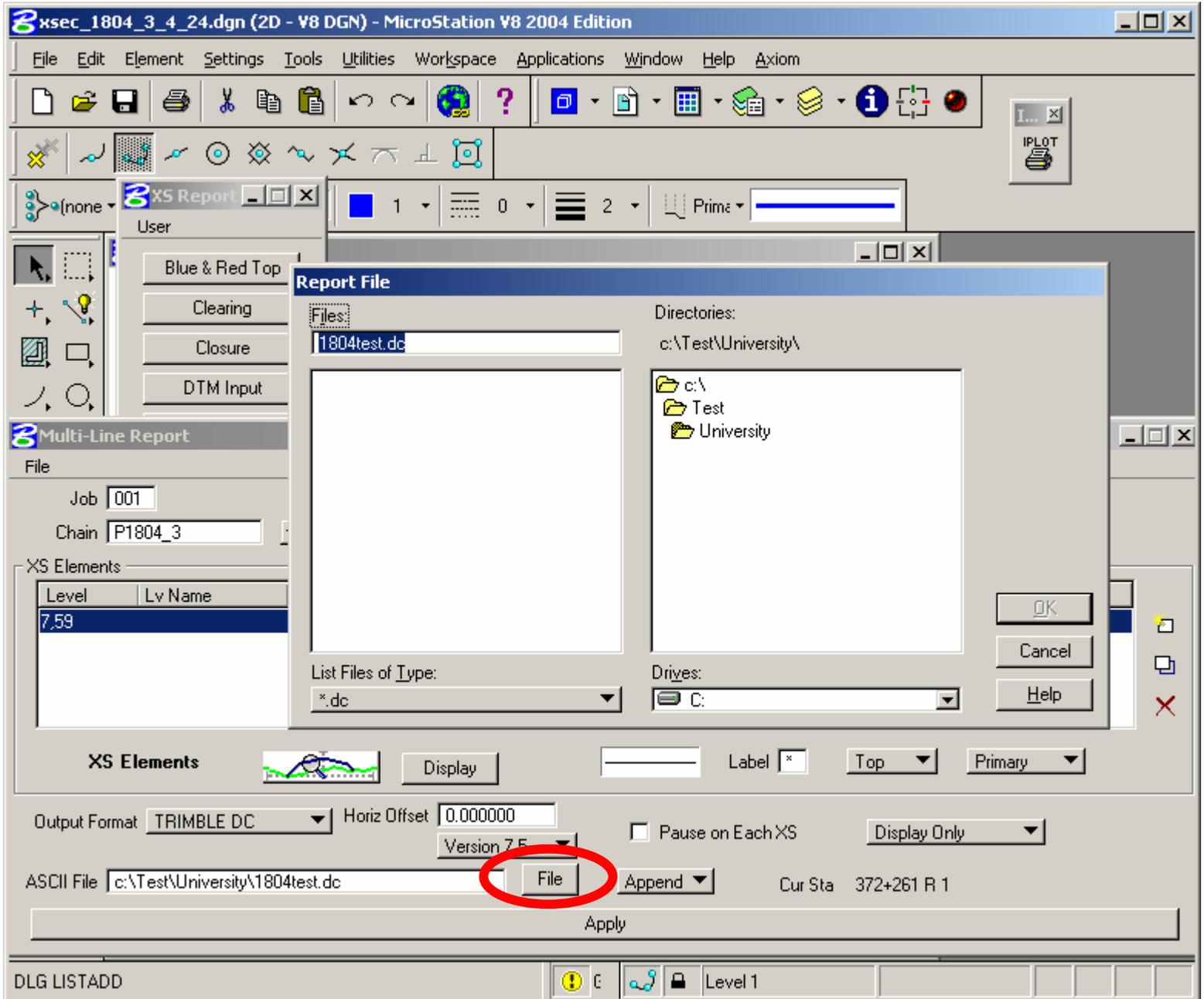
Level 1



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Click on the **File** button next to Append and Select the file you created in step 5 located in your working directory. Be sure that the .dc file extension is typed into this field also.





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Step 10: Click [Apply](#)

GeoPak will now extract the necessary cross section data and exports this to your selected .dc file created in Step 5.

The screenshot displays the MicroStation V8 2004 Edition interface. The main window shows a 2D DGN file named 'xsec_1804_3_4_24.dgn'. The 'XS Report' dialog box is open, showing the following details:

- Job: 001
- Chain: P1804_3
- Beg Sta: 372+261 R 1
- End Sta: 372+261 R 1

The 'XS Elements' table is as follows:

Level	Lv Name	Color	Weight	Style	Lb	T/B	Lv	Co	Wt	LC	P/S
7.59					*	T		0	0	0	P

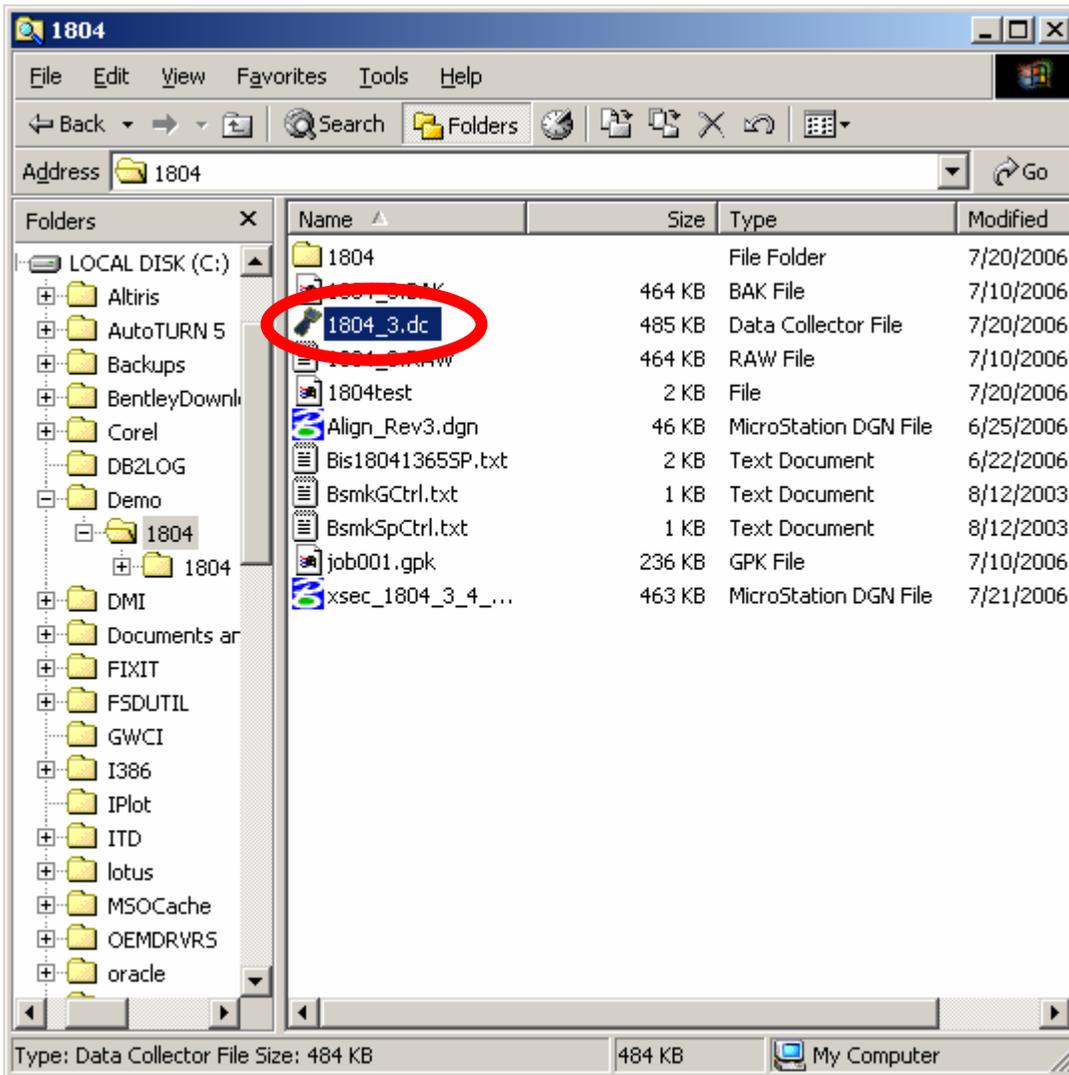
The 'Apply' button at the bottom of the dialog is circled in red.



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Step 11: Be sure to locate your Trimble .dc file before closing.

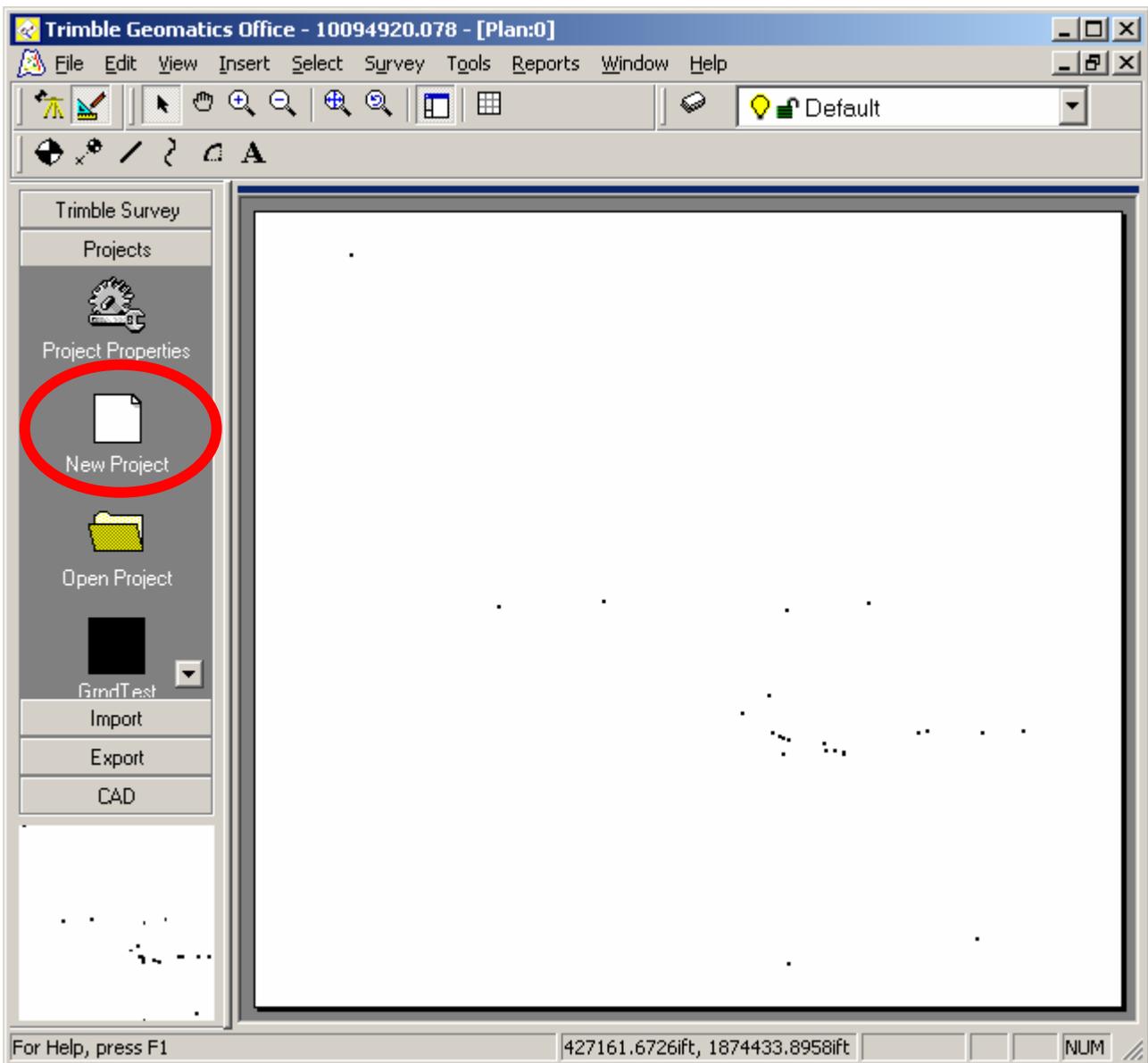




Converting State Plane Grid Coordinates to State Plane Ground in TGO



Step 1: Open TGO and Select [New Project](#).





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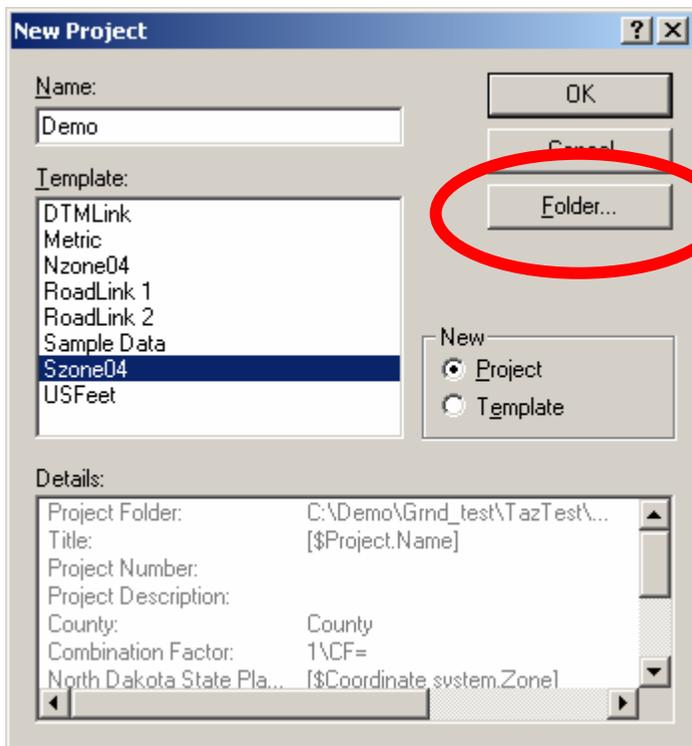
TRAINING SUBJECT: DESIGN TO CONSTRUCTION SURVEY AUTOMATION

Step 2: Type in Project Name.

Select the **Folder** button and select the folder that you want to store the project in.

Select **Nzone04** or **Szone04** (This will be determined by where the project is located). To determine which State Plane Zone you are in refer to Chaper 19 in the Surveys and Photogrammetry Manual Page 19-23.

Hit **OK**





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Step 3: Fill in all Project Details of the Project Properties.

Hit **OK**

Name	Value
Title	Demo
Project Number	IE-Demo
Project Description	RoadLind Demo
County	Burleigh
Combination Factor	1CF=1.0001485221
North Dakota State Plane Zone	North Dakota South 3302
Field Surveyor	C. Hanson
Computer Operator	C. Hanson
Date	6/27/2006
Vertical Datum	NAVD88 / OPUS



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Step 4: Key in or import  .csv Grid coordinates coordinates into TGO.

The 'Insert Points' dialog box is shown with the following fields and options:

- Name:** AUTO0001
- Coordinate details:**
 - Northing:** ?
 - Easting:** ?
 - Elevation:** ?
 - Height:** ?
 - Coordinate type:** Grid
- Coordinate type selection:** Grid, Local, WGS-84
- CAD details:**
 - Feature code:** (empty)
 - Description:** (empty)
 - Layer:** Default
 - Point style:** <By Layer>

OR

The 'Import' dialog box is shown with the following elements:

- Import Method:** Survey | CAD / ASCII | Custom
- File List:** Ascii GPSurvey Coordinates (selected), Digital Level files (*.dat;*.raw), GPS data files (*.dat), GPSurvey Coordinates (curr_net.dat), Gridded DTM file (*.dtx), NGS data sheet file (*.dat, *.ds, *.dsx, *.htm, *.html, *.prl), Precise ephemeris files (*.sp3, *.e18), RINEX files (*.obs, *?.o), Sokkia Data Recorder files (*.sdr), SSF/SSK files (*.ssf, *.ssk), Survey Controller files (*.dc), Survey devices, TDS Survey Pro CE Job file (*.job), TDS Survey Pro CE Raw file (*.raw), Third party data recorder files
- Buttons:** OK, Cancel, New format..., Edit format..., Delete format, Options..., Customize...



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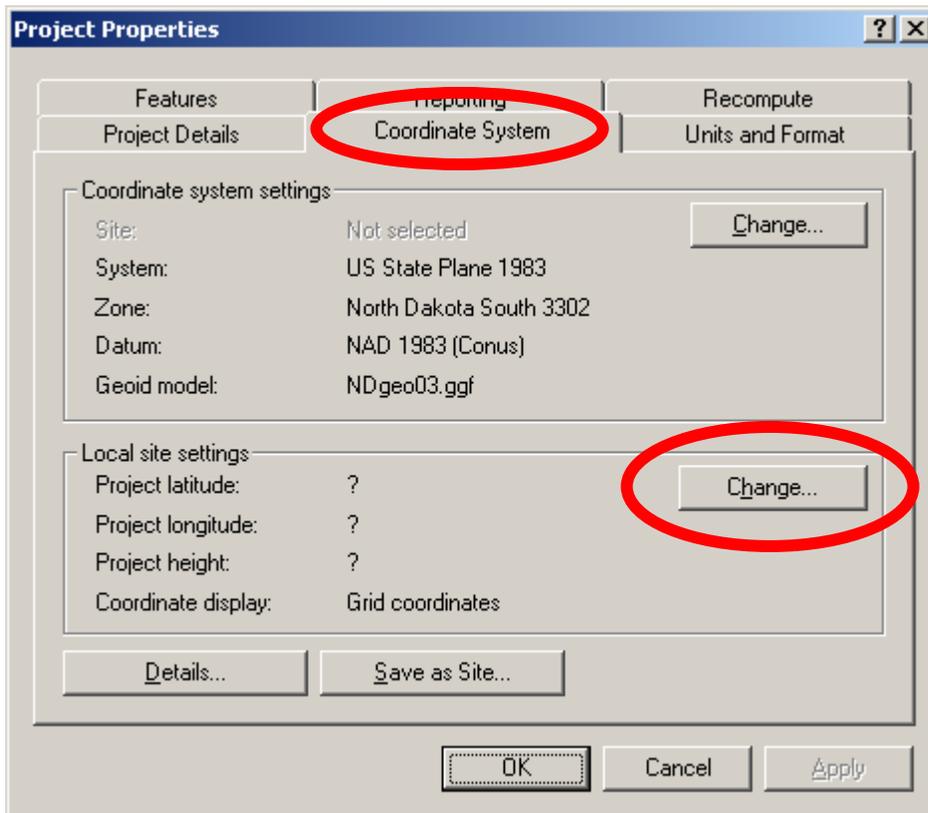
TRAINING SUBJECT: DESIGN TO CONSTRUCTION SURVEY AUTOMATION



Step 5: Go to **File** then select **Project Properties** and the following table will appear:

Select the **Coordinate System** Tab.

Go to Local Site Settings and hit **Change**.





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Step 6: In Project location put “0” (zero) in for the Northing, Easting, and Elevation.

Check Mark “Use Ground Coordinates”.

Key in the 1/CF county scale factor.

Hit OK.

Local site settings

Project location

Northing: 0 Elevation: 0

Easting: 0

Grid Local WGS-84

Use ground coordinates

Ground scale factor: County Scale Factor

Compute scale factor from project location

Ground coordinate display

Northing offset: 0.0000 Easting offset: 0.0000

4 digit coordinates

5 digit coordinates

Example:
North: 0.0000 becomes 0.0000
East: 0.0000 becomes 0.0000

OK
Cancel

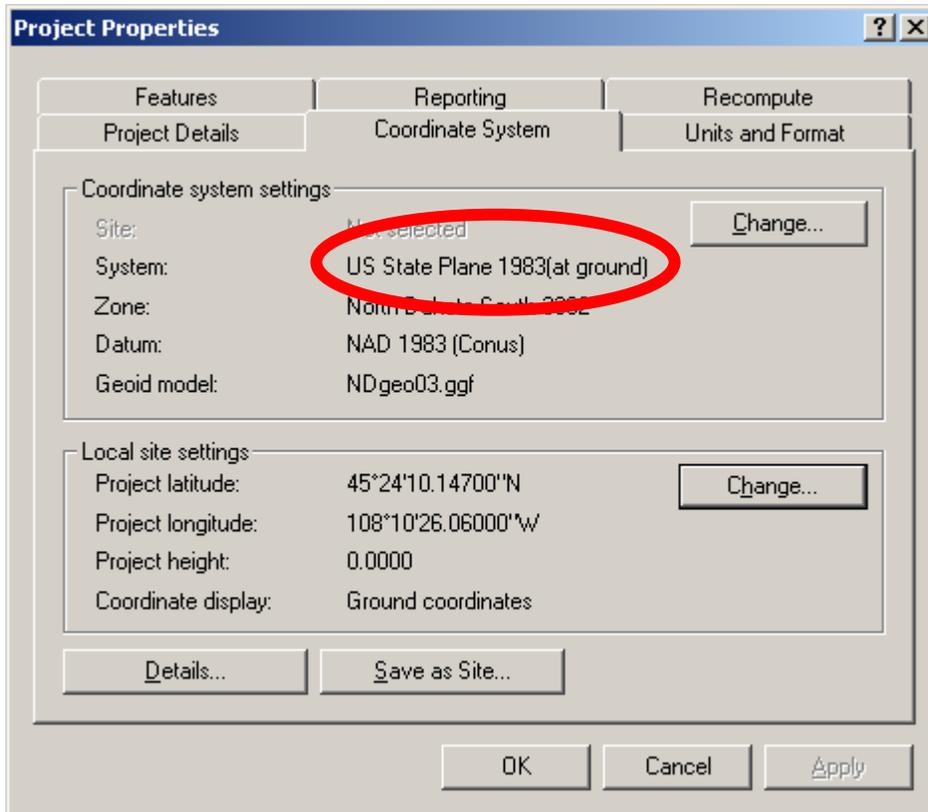


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NOTE: You will notice the System has changed to US State Plane 1983 (at Ground).

Hit **OK**.

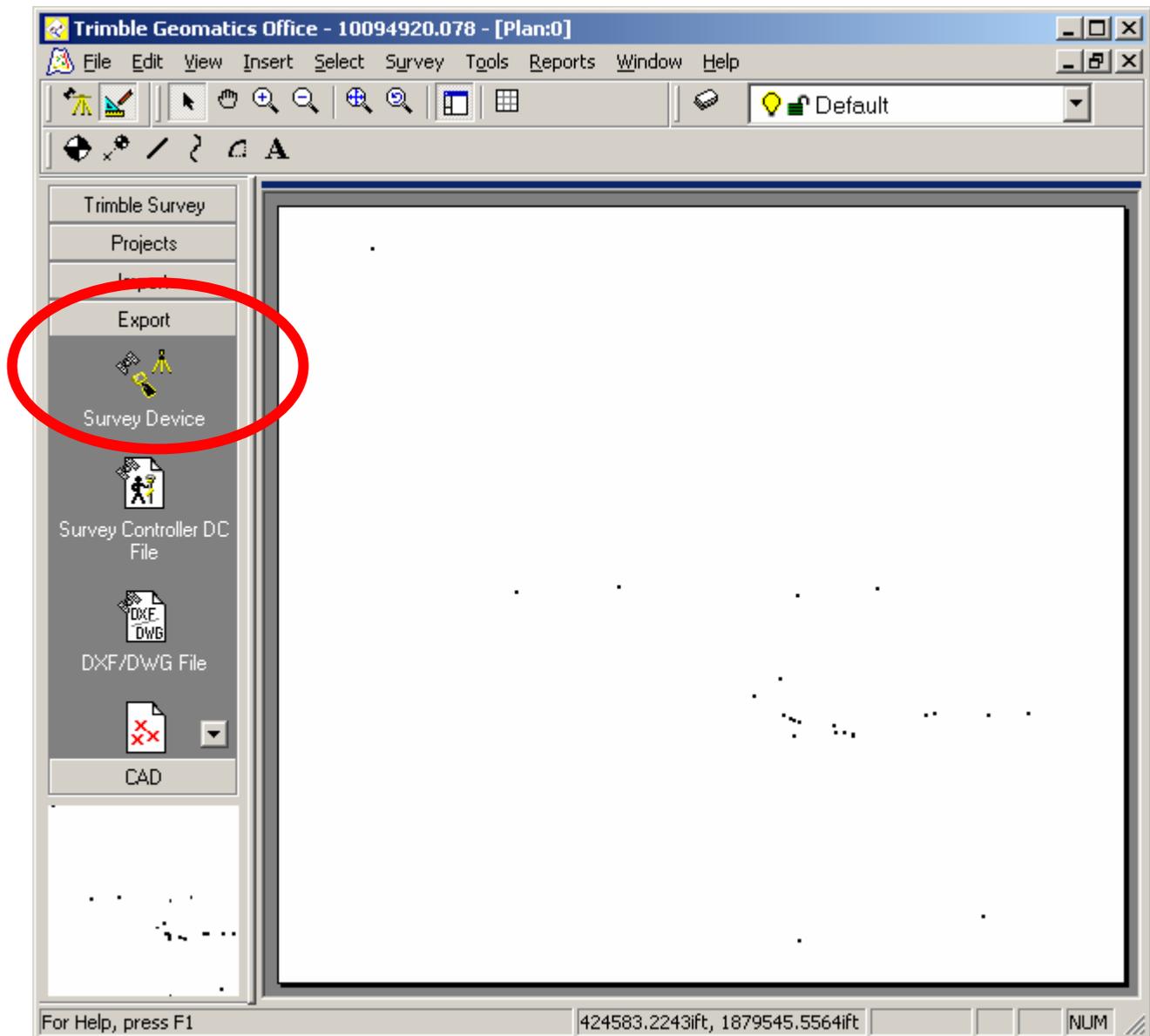




Exporting State Plane Ground Job to Data Collector

Step 1: Go to the [Export](#) tab on the left hand side of the screen.

Select [Survey Device](#).





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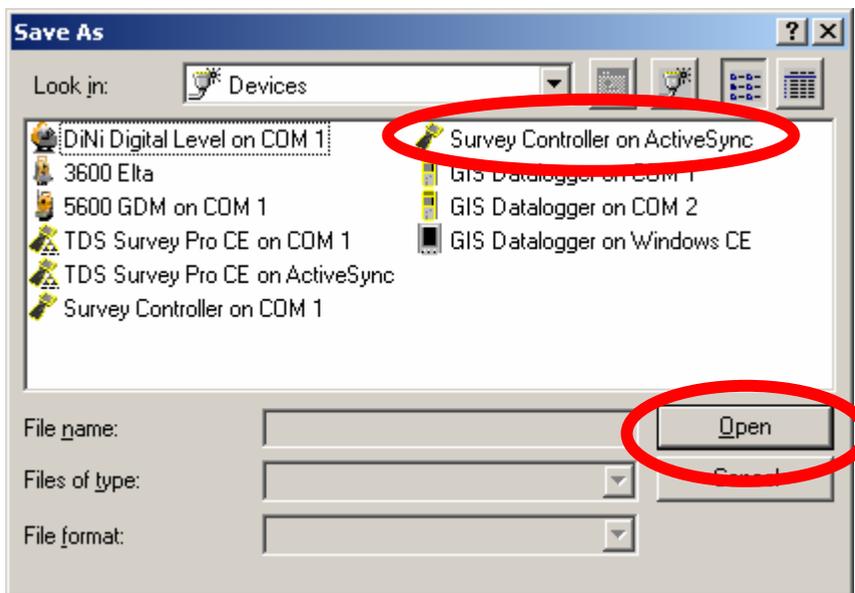
TRAINING SUBJECT: DESIGN TO CONSTRUCTION SURVEY AUTOMATION

Step 2: Select [Survey Controller on ActiveSync](#) for the controller you are using.

Hit [open](#).

The Job that is currently open will be in the File Name Box.

Hit [Save](#).



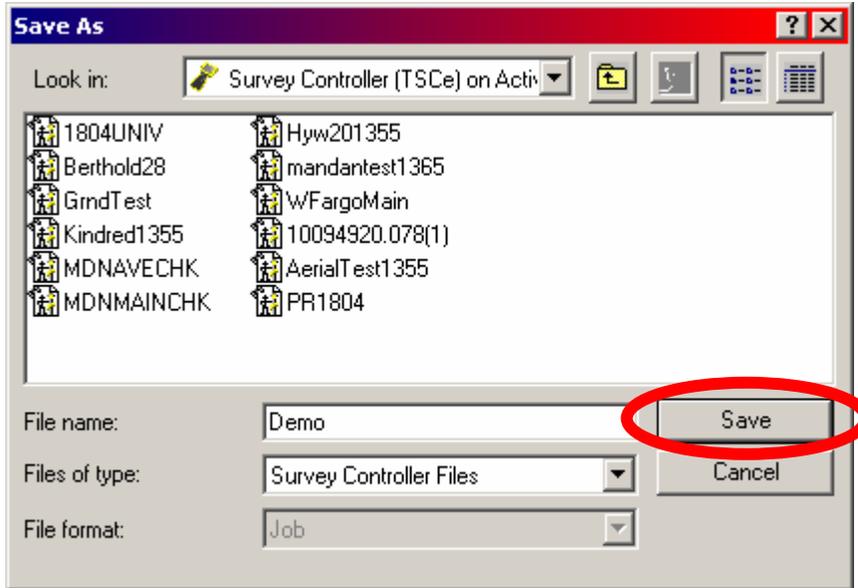


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Step 2: The Job that is currently open will be in the File Name Box.

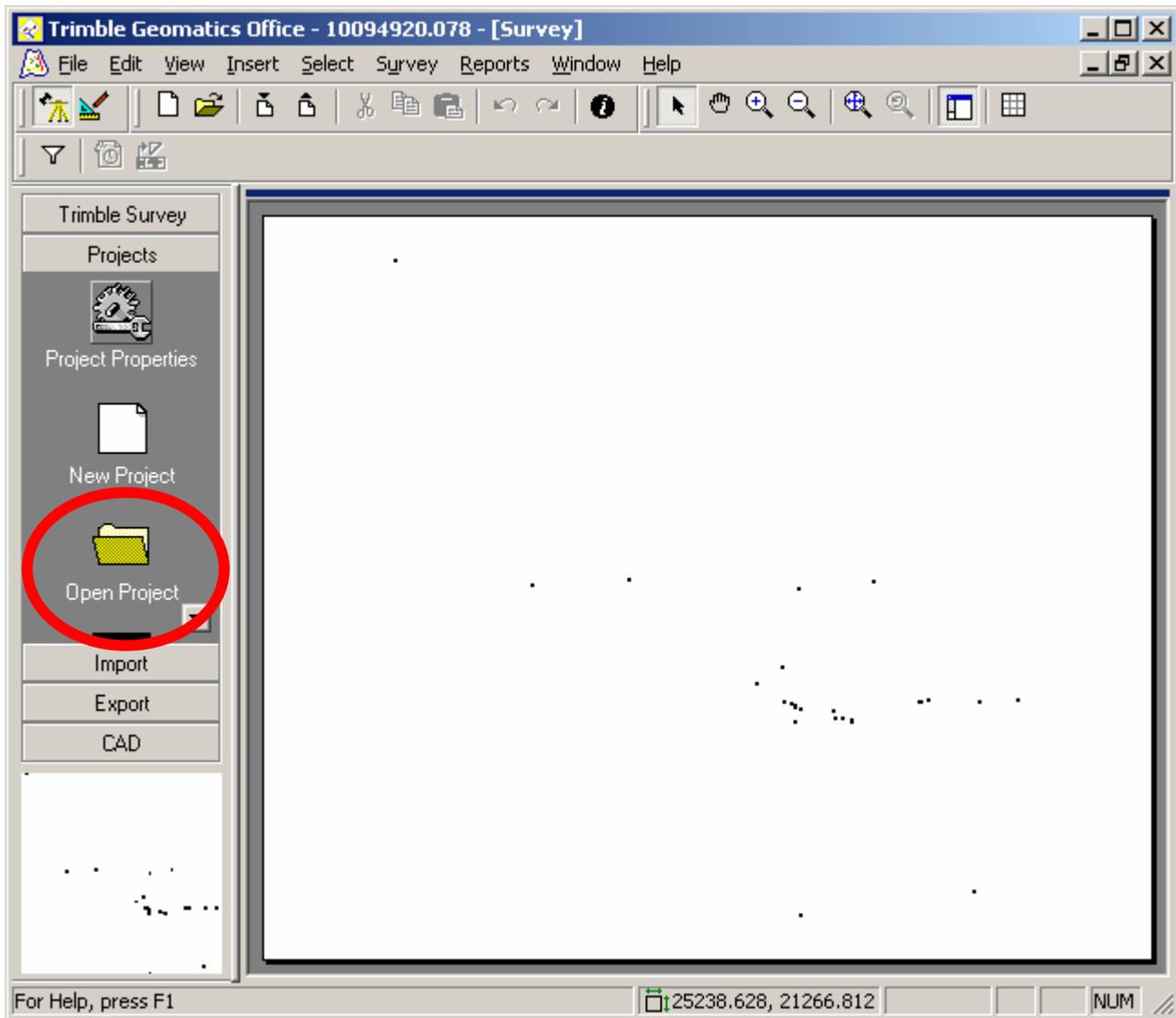
Hit [Save](#).





Control and RoadLink Data To Trimble DC File for Upload

Step 1: Open TGO with project containing ground control points and other necessary data.



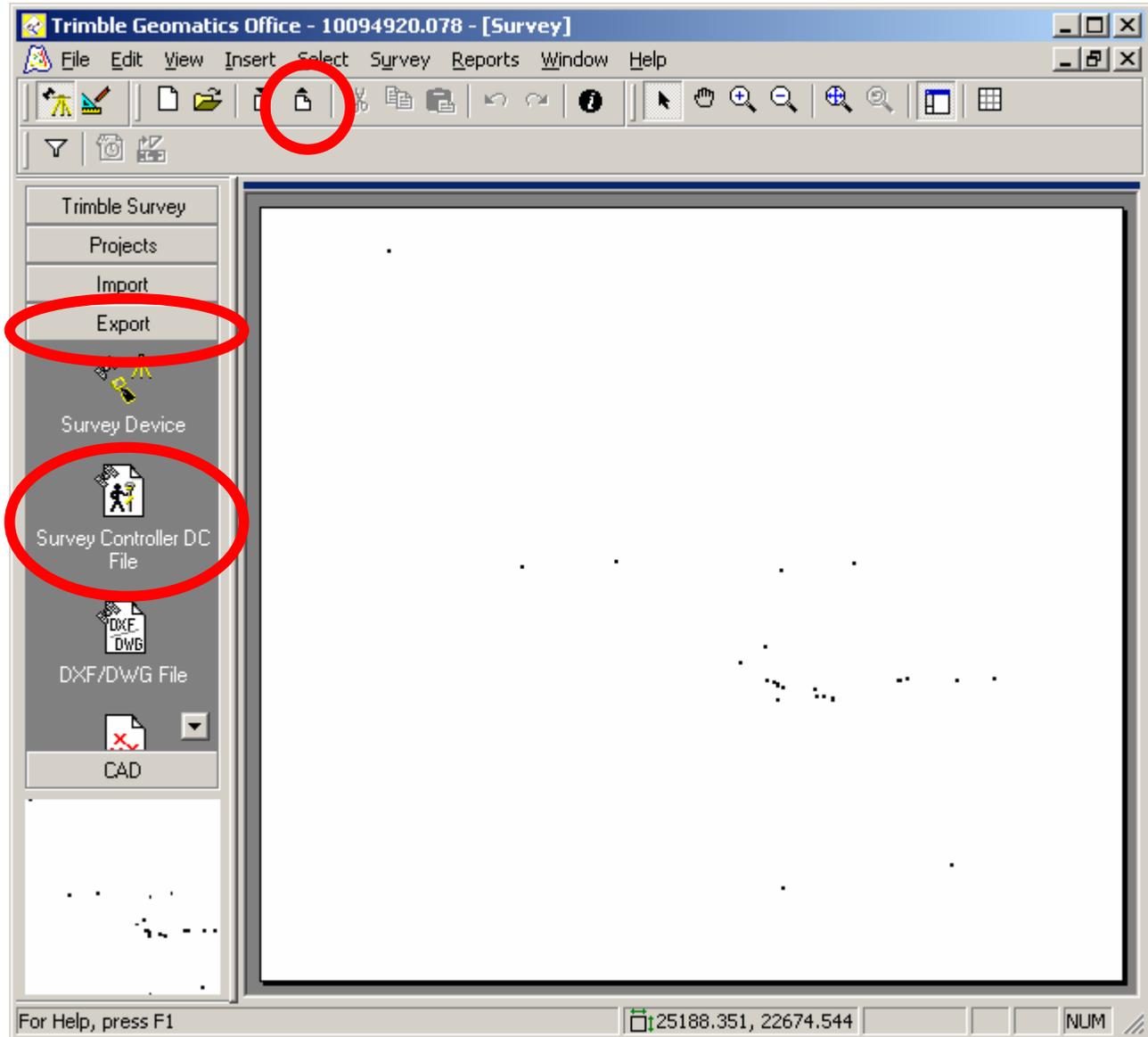


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Step 2: Go to the [Export](#) tab on the left hand side of the screen or 

Select [Survey Controller DC File](#).





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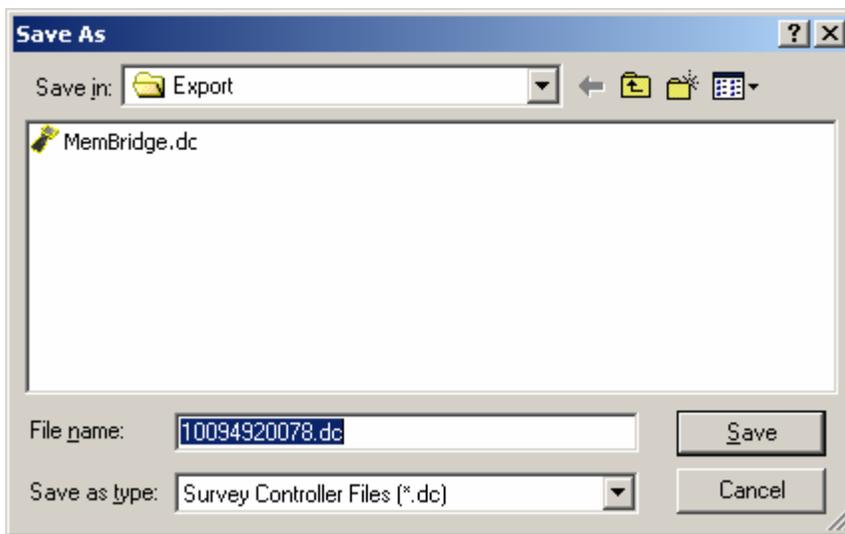
TRAINING SUBJECT: DESIGN TO CONSTRUCTION SURVEY AUTOMATION

Step 3: Select the folder that you want to save the DC file to (TGO defaults to the Export folder under the current project folder).

The Job that is currently open will be in the File Name Box.

Hit [Save](#).

This will create the base Trimble DC file with the needed ground control data.



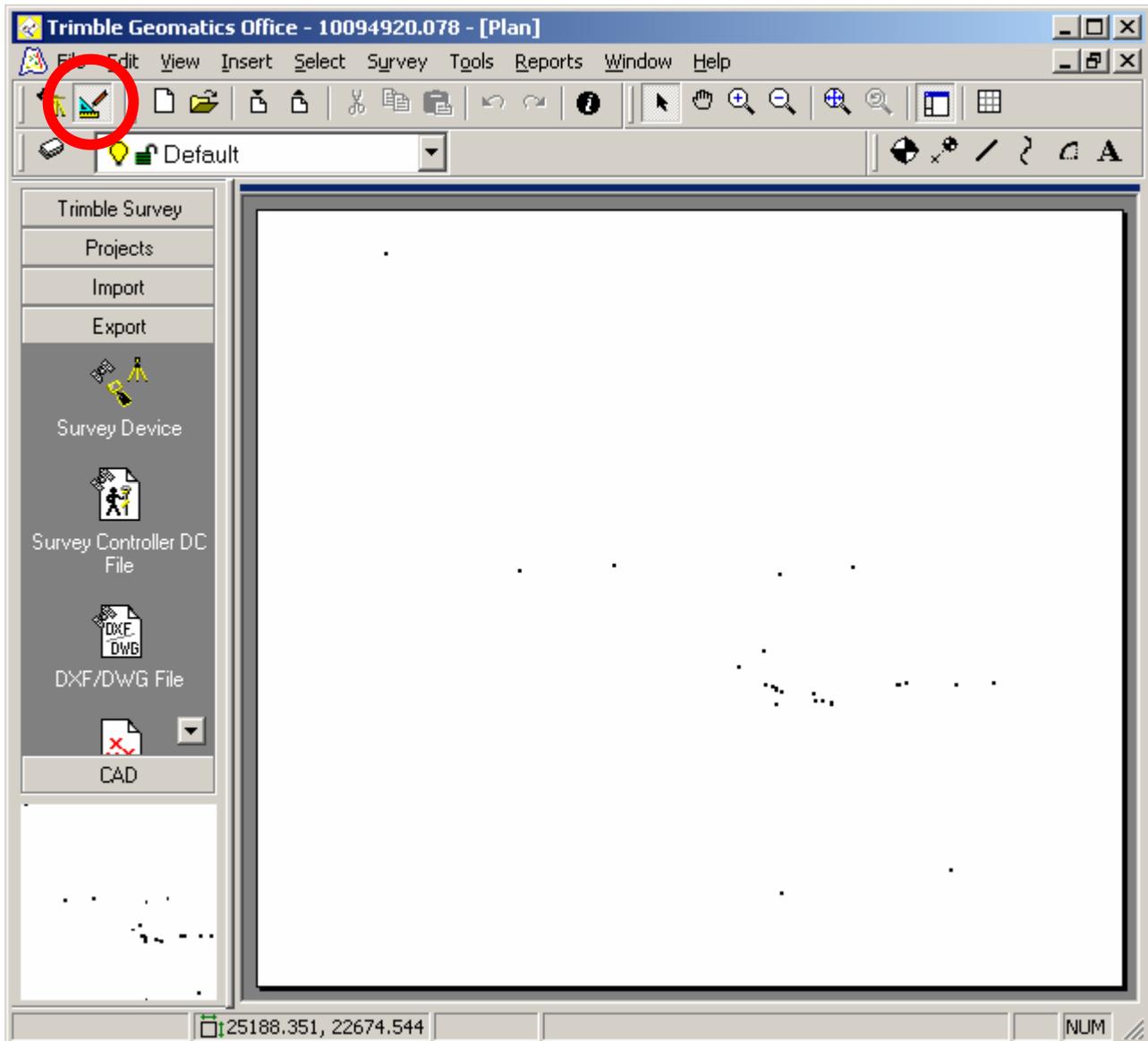


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Step 4: Select Plan View option by using the pull down menu [VIEW](#) – [PLAN](#). or 

Open RoadLink by going to pull down menu [TOOLS](#) - [ROADLINK](#) – [START](#).

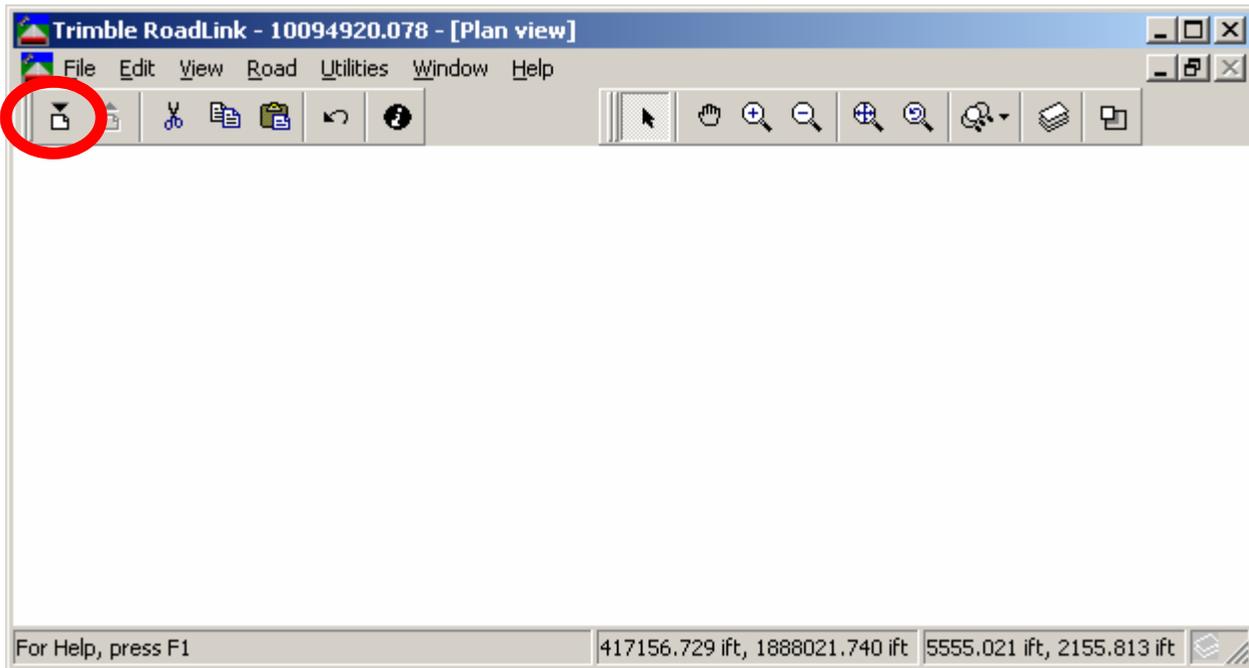




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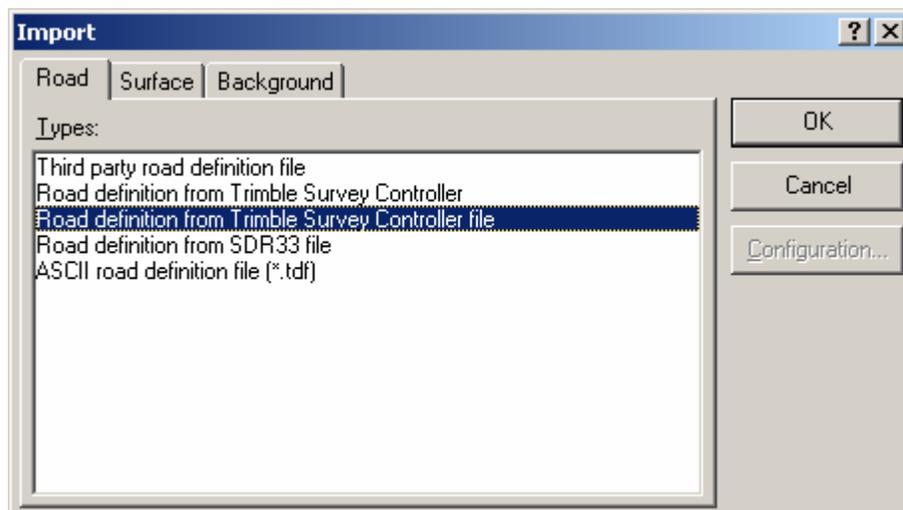
TRAINING SUBJECT: DESIGN TO CONSTRUCTION SURVEY AUTOMATION

Step 5: You now need to import the road file created by Geopak by selecting Import



Select the [Road definition from Trimble Survey Controller file](#).

Hit **OK** after selecting your RoadLink .dc file road definition you want to import.





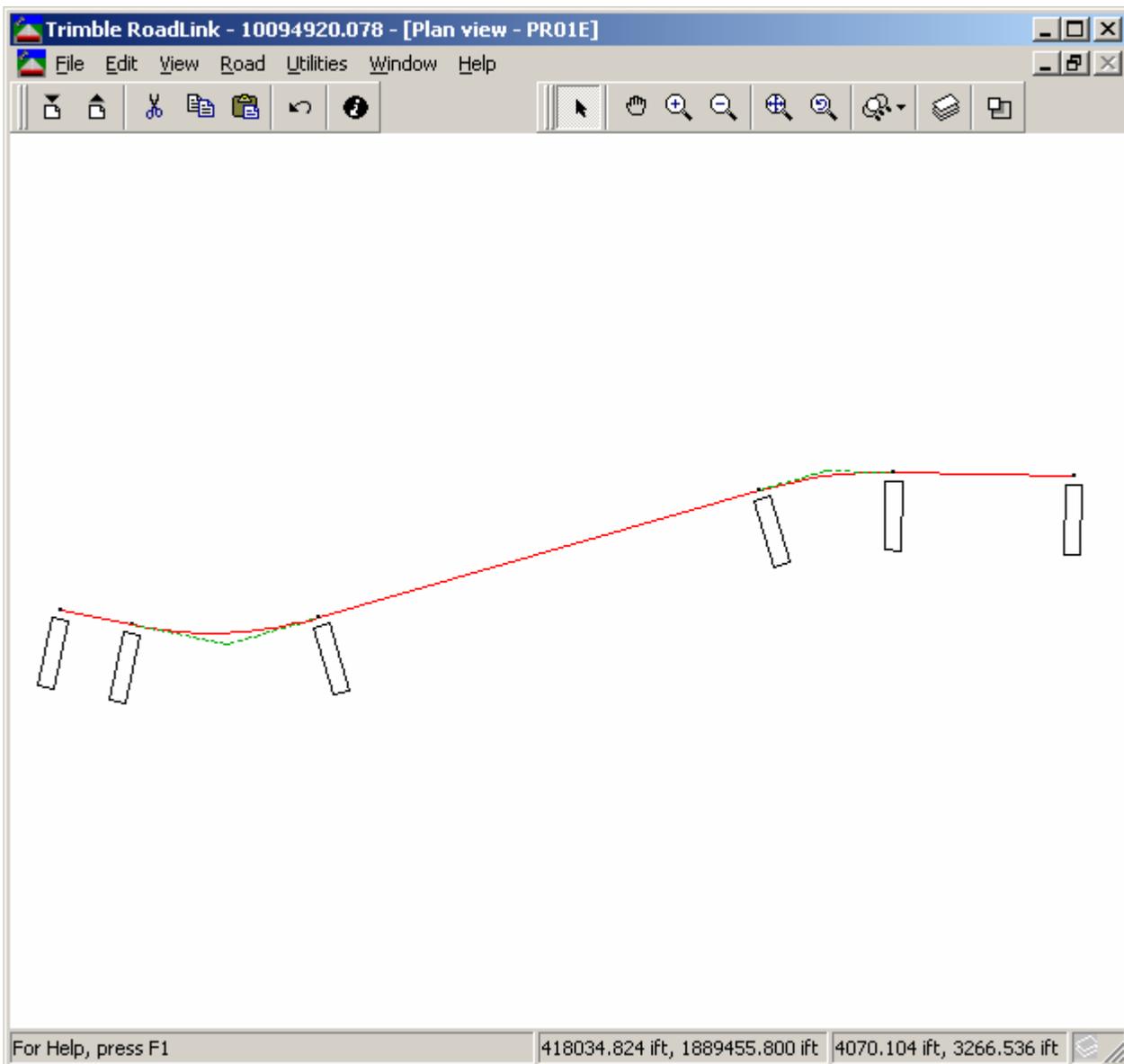
ND DEPT OF TRANSPORTATION SURVEYS & PHOTOGRAMMETRY

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Step 6: Open the Road that you created in the “GeoPak GPK Data to Trimble” procedures by selecting from the [FILE](#) pull down menu [OPEN ROAD](#).



Your Road should appear as follows:

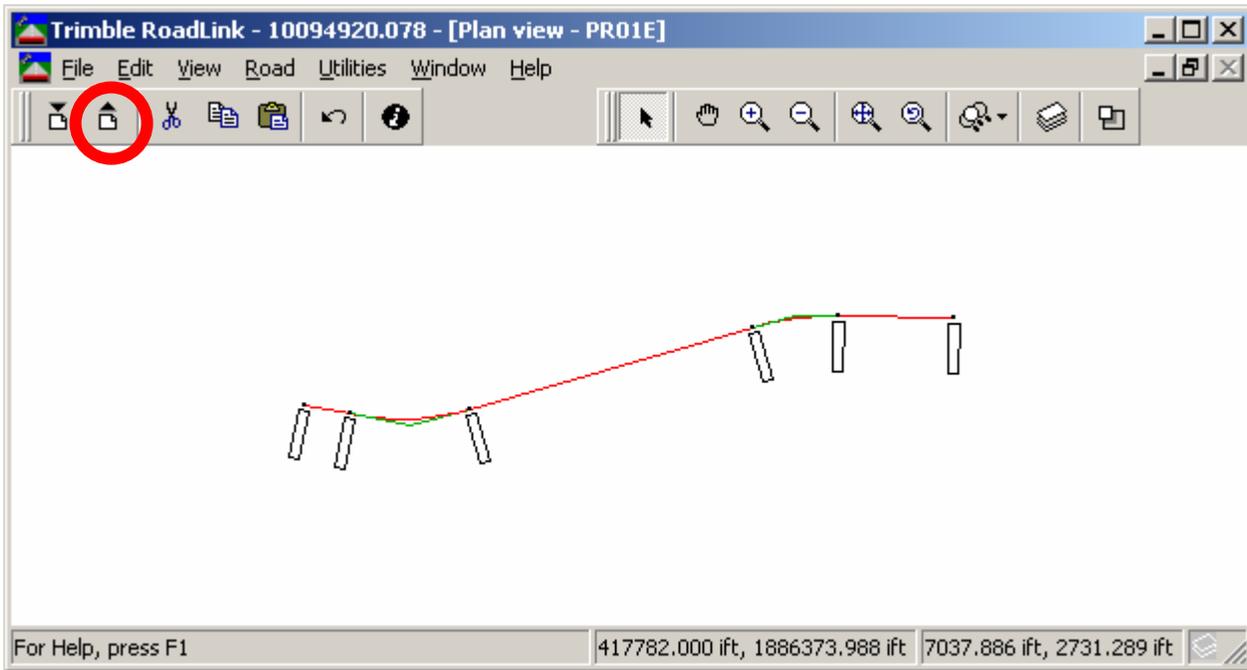




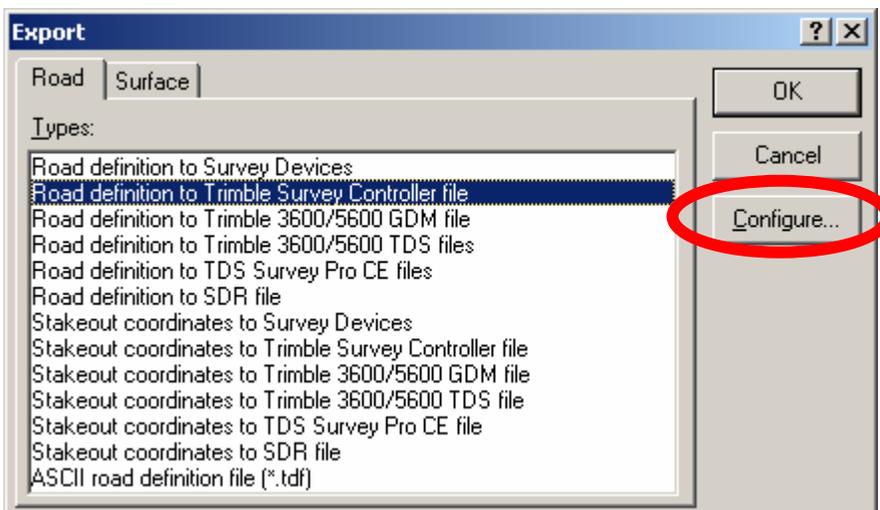
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Step 7: Select from the [FILE](#) pull down menu [Export](#) or .



Select [CONFIGURE](#) and input the desired version.





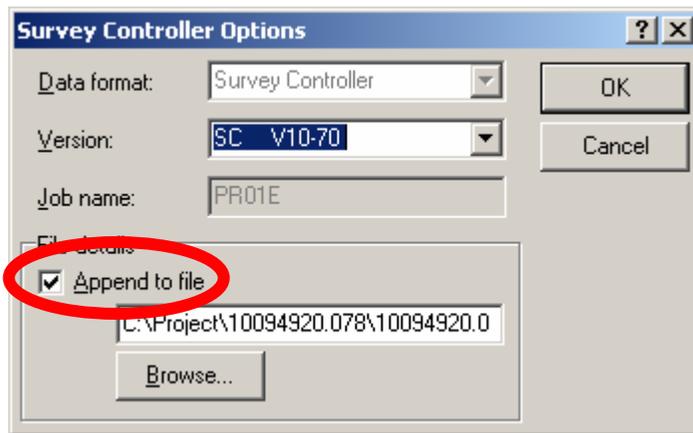
ND DEPT OF TRANSPORTATION SURVEYS & PHOTOGRAMMETRY

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You then need to check the **APPEND TO FILE** box and link the DC file from step 3 containing your ground coordinate control.

Hit **OK**.

This will add the Road data to the original DC file.

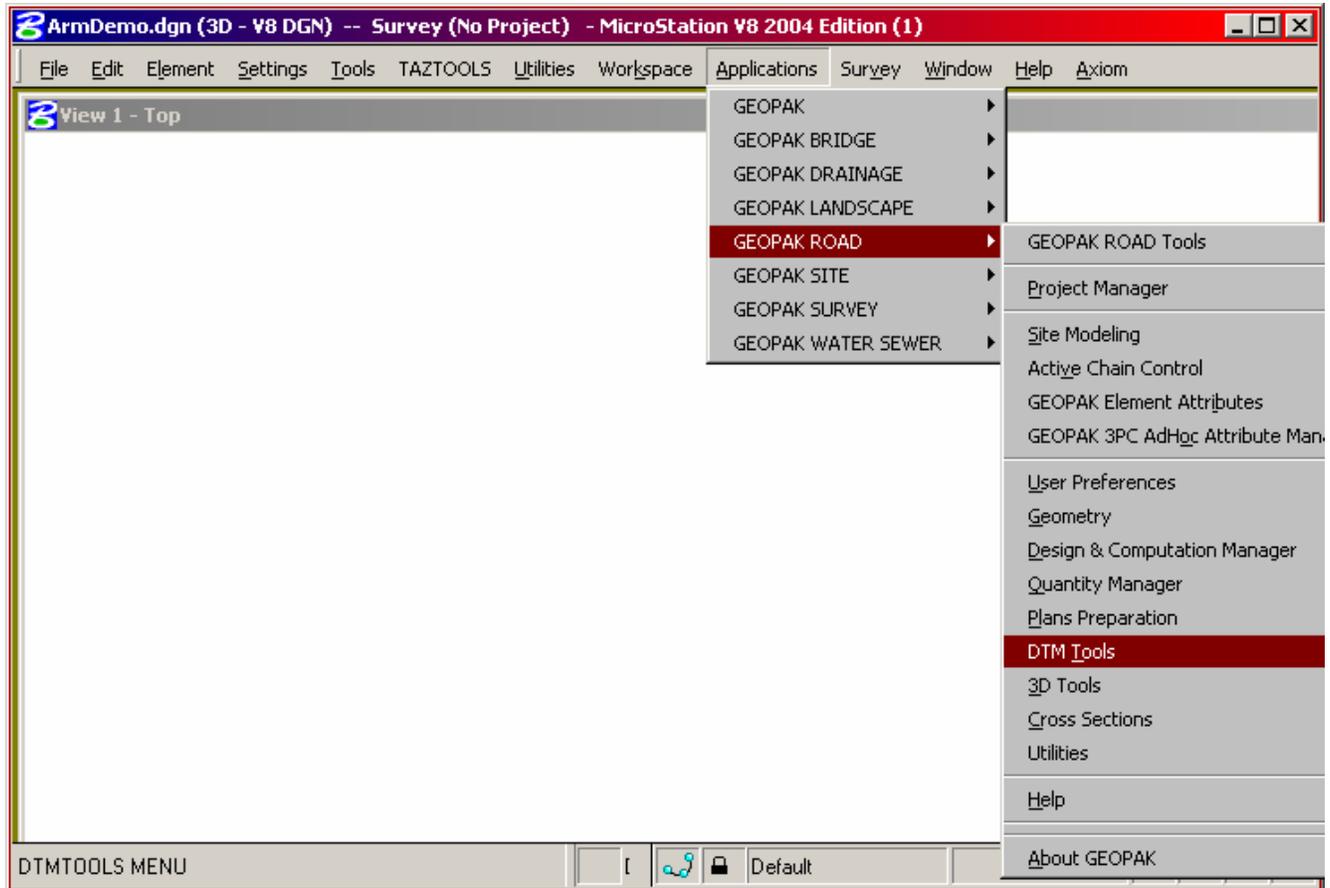


NOTE: For projects with multiple alignments steps 5, 6, and 7 will need to be done for each Road file using the Append File detail.



Creating a DTX file with Geopak

The first step is to have an already created TIN file. To begin we will need to create a Lattice file using the previous TIN file. From the Applications menu select **GEOPAK ROAD-DTM Tools**.



The following button bar will appear:





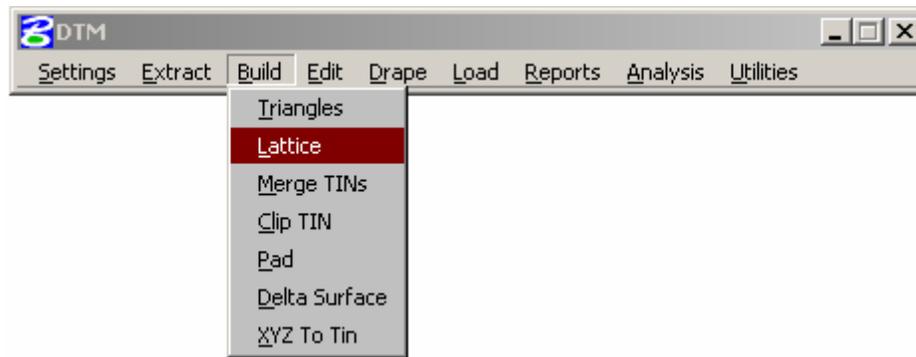
ND DEPT OF TRANSPORTATION SURVEYS & PHOTOGRAMMETRY

TRAINING SUBJECT: DESIGN TO CONSTRUCTION SURVEY AUTOMATION

Select the  button to access the DTM Menu as shown below.



Select **Build-Lattice**.



Navigate to the desired TIN file and enter in the location and name of the LAT file you want to create. Then select **Process**.

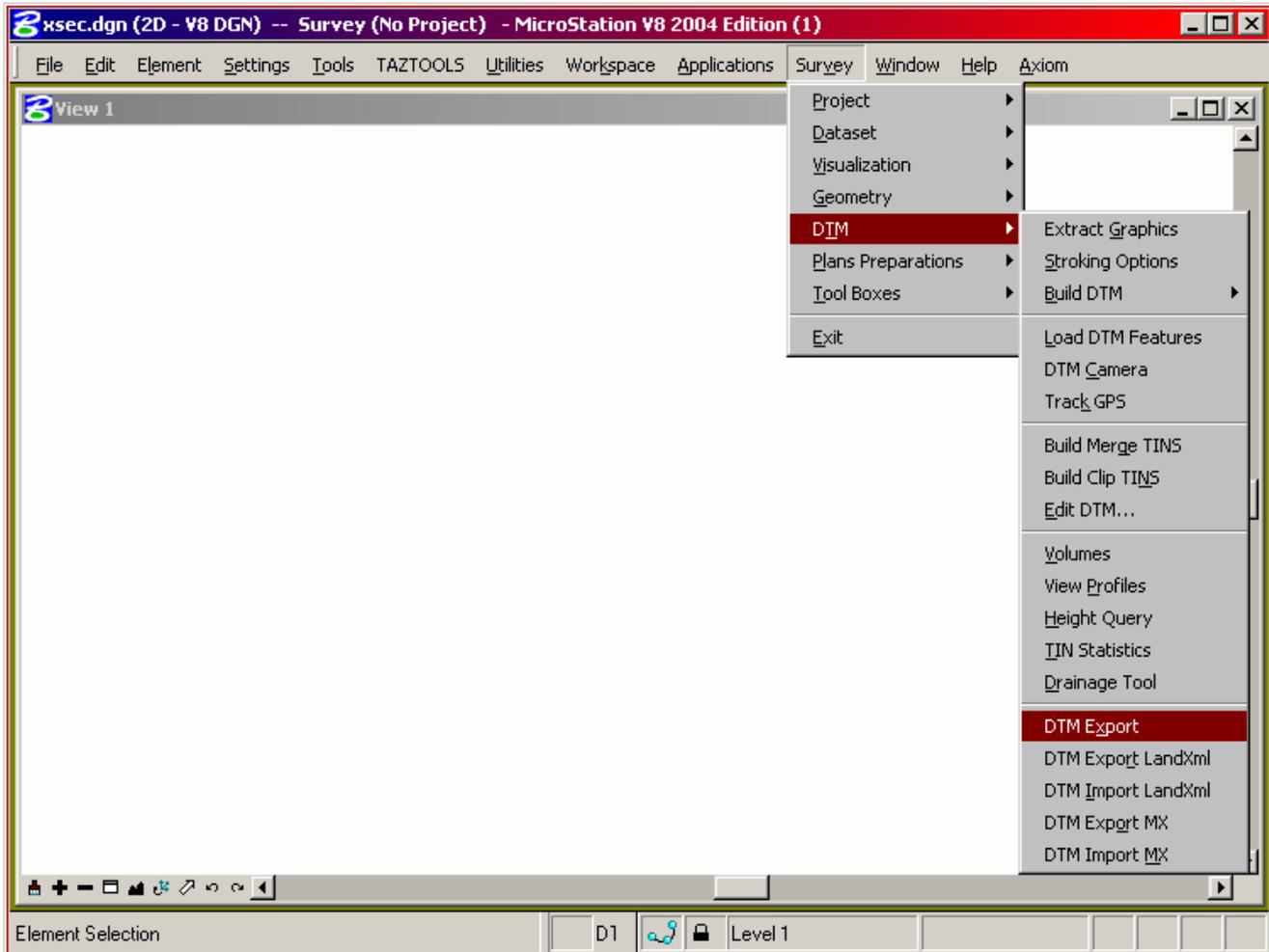




ND DEPT OF TRANSPORTATION SURVEYS & PHOTOGRAMMETRY

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The next step will be to export a DTX file using the LAT file you just created. Go to the Survey menu and select **DTM-DTM Export**.





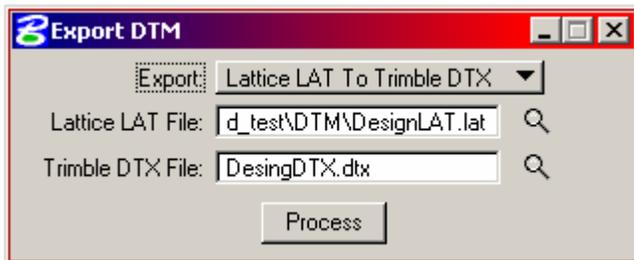
ND DEPT OF TRANSPORTATION SURVEYS & PHOTOGRAMMETRY

TRAINING SUBJECT: DESIGN TO CONSTRUCTION SURVEY AUTOMATION

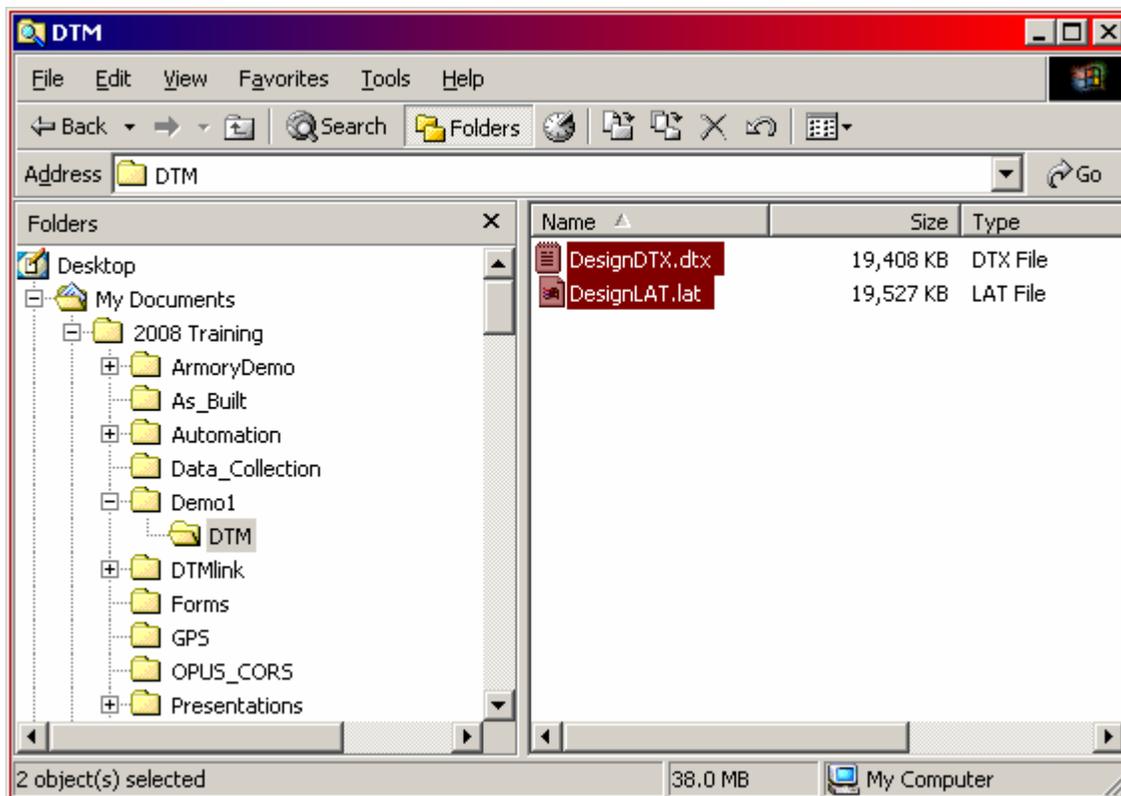
For the Export select Lattice LAT to Trimble DTX.

Navigate to and select the LAT file we created in the previous steps. Then navigate to the location you want the new DTX to be located and give a name that is appropriate.

Select **Process** after the above steps have been completed.



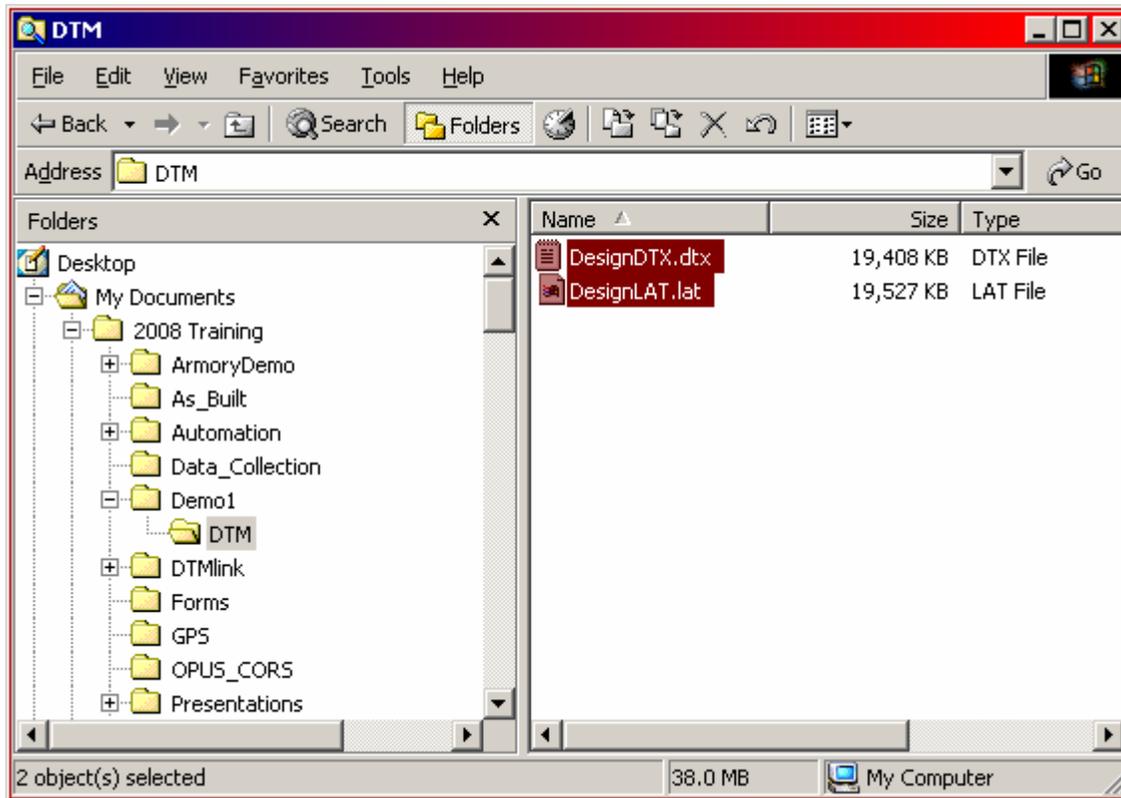
Make sure the files exist where you want them.





Importing a DTX file into TGO DTMLink

First find the location of the DTX file.



Open the TGO project you will be working on.

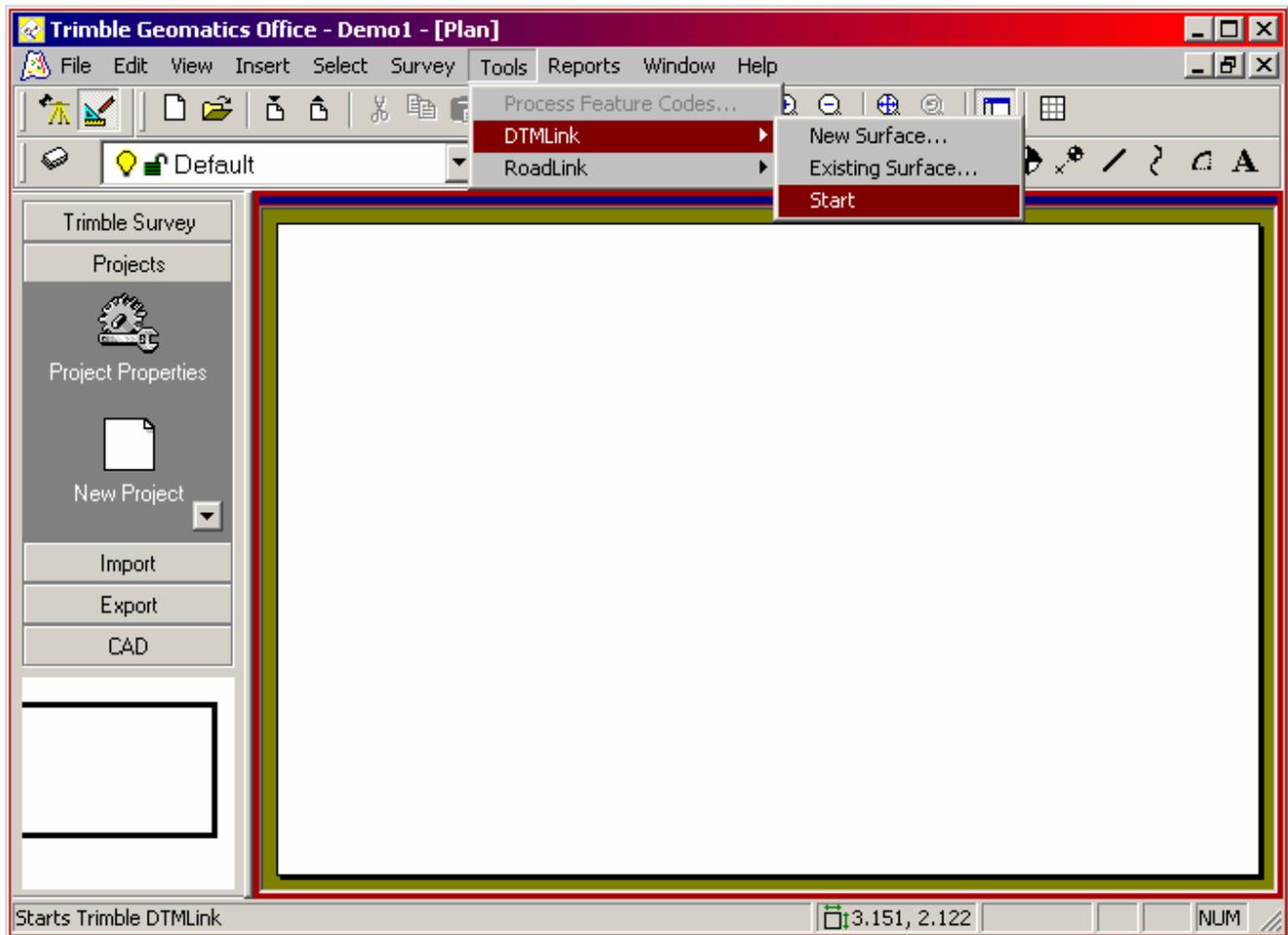


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Select the plan view button, . Or use the View pull down menu and select Plan.

From the Tools menu select [DTMLink-Start](#).



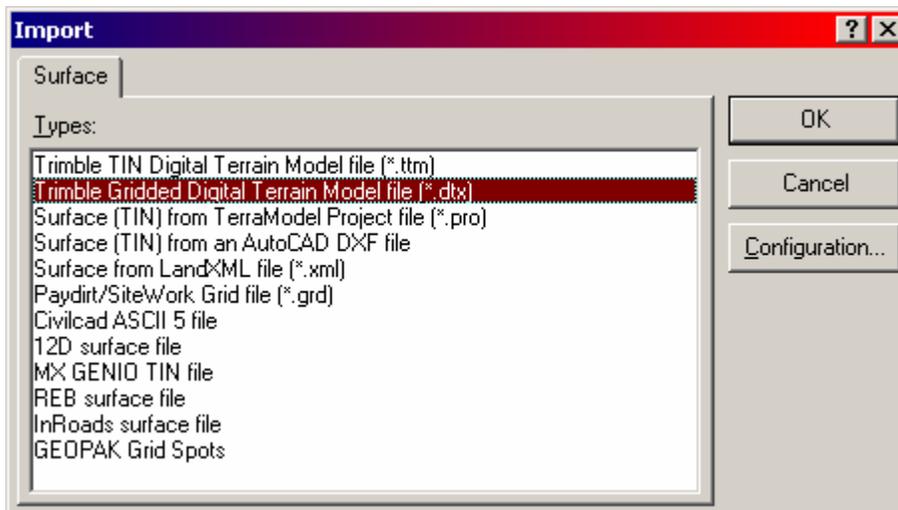


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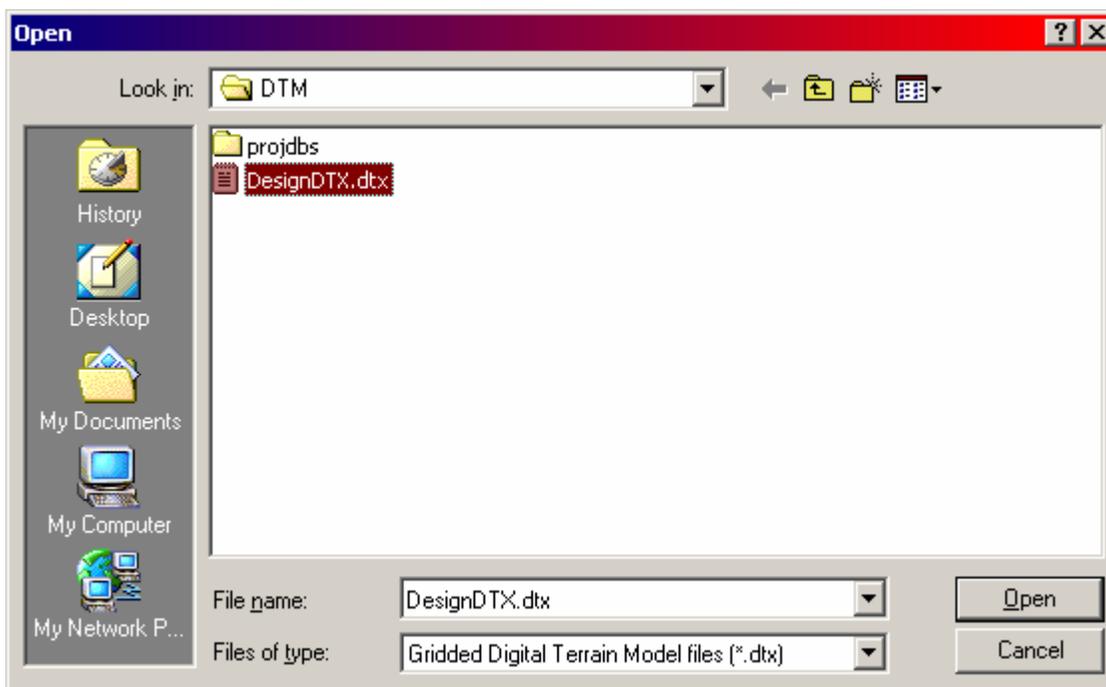
TRAINING SUBJECT: DESIGN TO CONSTRUCTION SURVEY AUTOMATION

In DTMLink select [File-Import](#) or use the command button 

From the Import screen you will need to select the [Trimble Gridded Digital Terrain Model file \(*.dtx\)](#).



Select the desired DTX file. Then select Open and OK on the Import screen.

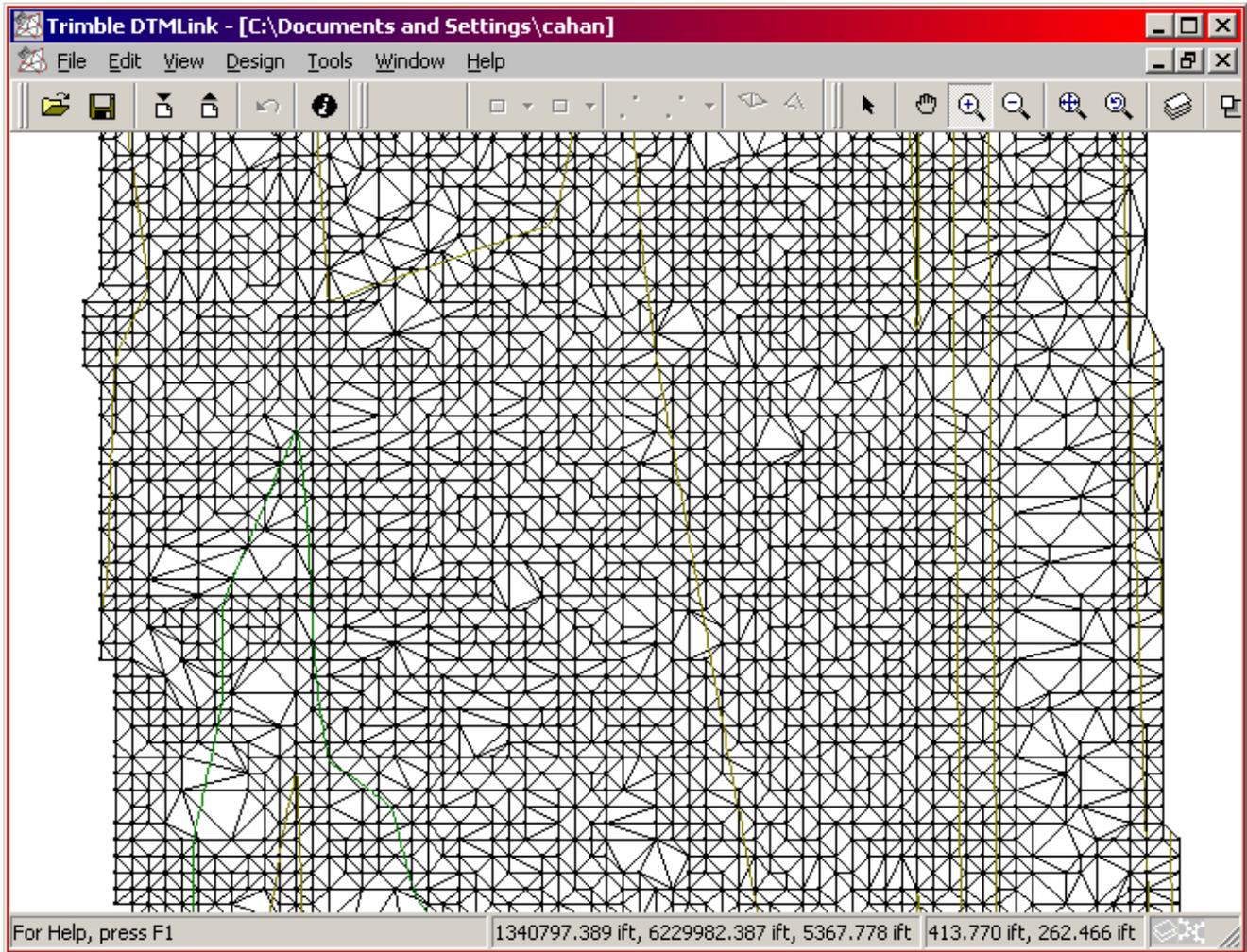




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Now you should be able to review and check your DTM in DTMLink.



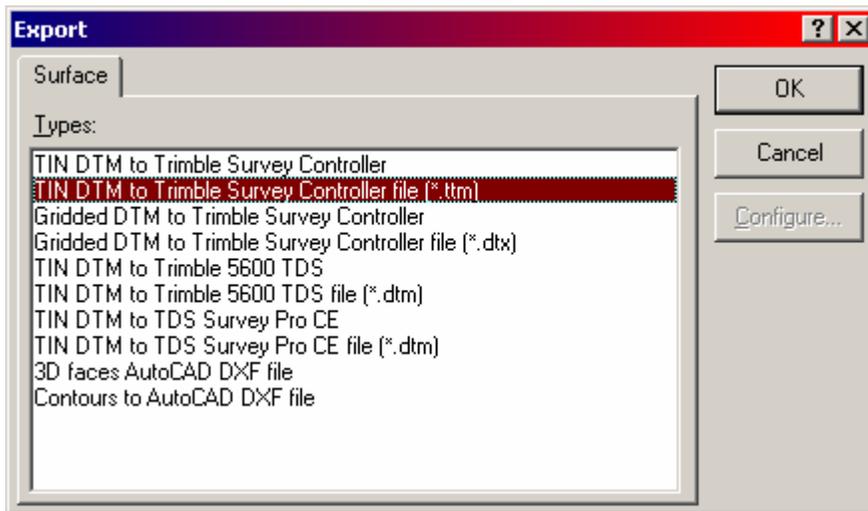


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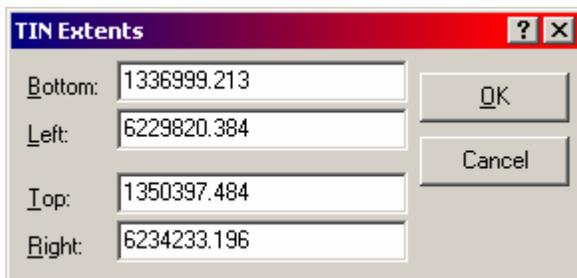
TRAINING SUBJECT: DESIGN TO CONSTRUCTION SURVEY AUTOMATION

This DTM can now be Exported using File-Export or the Export command button .

You can now export to a Survey Controller or to a Trimble Survey Controller file (*.ttm)



A TIN Extents window will appear.

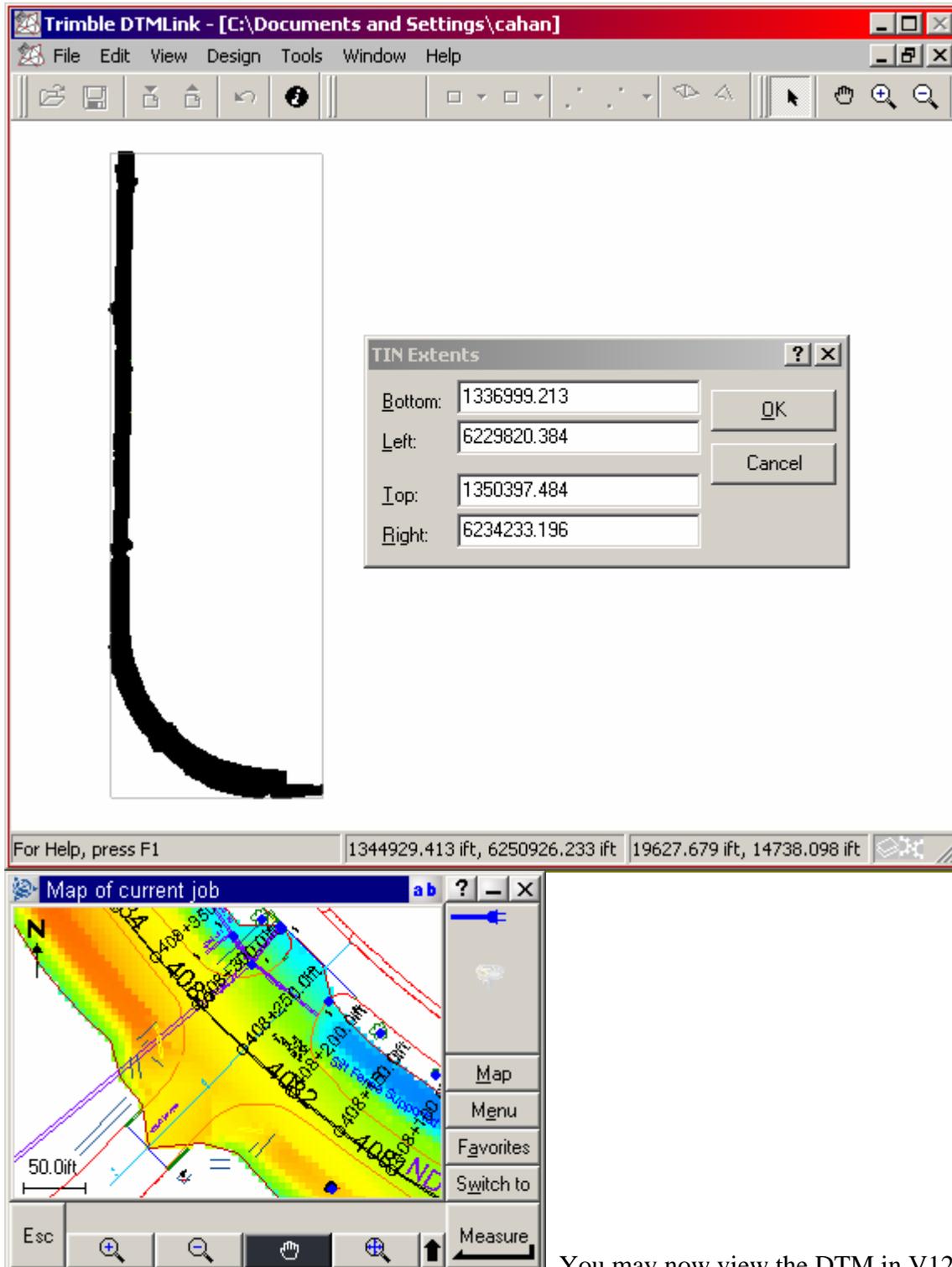




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Check to make sure it encompasses your whole DTM.



You may now view the DTM in V12.20